Forest Appeals Commission

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DECISION NO. 2016-FRP-002(a)

In the matter of an appeal under the *Forest and Range Practices Act*, S.B.C. 2002, c. 69.

BETWEEN:	Apollo Forest Products Ltd.	**APPELLANT**
AND:	Government of British Columbia	**RESPONDENT**
BEFORE:	A Panel of the Forest Appeals Commission: Daphne Stancil, Panel Chair Les Gyug, Member Norman E. Yates, Member	
DATES:	February 14-17, 2017; February 20-24, 2017; March 28-29, 2017; and March 31, 2017	
PLACE:	Prince George, BC and Victoria, BC	
APPEARING:	For the Appellant: Mark S. Oulton, Counsel Rebecca J. Robb, Counsel For the Respondent: Karen Horsman, Q.C., Counsel Sarah Bevan, Counsel	

APPEAL

[1] The Appellant, Apollo Forest Products Ltd. ("Apollo"), is a timber harvesting and lumber milling company situated in Fort St. James, BC, and is a member of the Sinclar Group Forest Products Ltd. Apollo appeals a determination made on April 5, 2016 (the "Determination") by David Van Dolah, District Manager of the Stewart Nechako Natural Resource District (the "District Manager"), Ministry of Forests, Lands and Natural Resource Operations (the "Ministry")[1].

[2] In the Determination, the District Manager found that Apollo had contravened section 105.1(3) of the *Forest Act* by submitting an inaccurate appraisal data submission with its May 2013 application for a cutting permit under Forest Licence A18156. Section 105.1(3) of the *Forest Act* states:

[1] As of July 18, 2017, the Ministry is the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

Complete and accurate information

105.1(1) In this section:

"agreement" means an agreement in the form of *a licence*, permit or agreement referred to in section 12;

...

(3) The holder of an agreement who is *required* under the agreement or this Act to submit information to the government

(a) for use in determining, redetermining or varying a stumpage rate, or

(b) for any other purpose under this Act,

must ensure that, at the time the information is submitted, the information is complete and accurate.

[Emphasis added]

[3] The District Manager found that the proposed cutting permit area had not been cruised in accordance with the requirements of the Cruising Manual (i.e., the plots were outside of the allowable standards of tolerance) and, therefore, the resulting cruise data submitted with Apollo's appraisal data submission was not accurate. There is no dispute that the cruise data and the appraisal data submission were required by both Apollo's licence and the applicable statutory regime.

[4] The District Manager also concluded that Apollo had not established a defence of due diligence or officially induced error under section 72 of the *Forest and Range Practices Act* ("*FRPA*") and levied an administrative penalty of $10,000 under section 71(2)(a)(i) of the *FRPA*.[2]

[5] The Commission is authorized to hear this appeal pursuant to section 82 of the *FRPA*. Subsections 84(1)(c) and (d) of the *FRPA* provide that, on an appeal, the Commission may:

(c) consider the findings of the person who made the determination or decision, and

(d) either

(i) confirm, vary or rescind the determination or decision, or

(ii) with or without directions, refer the matter back to the person who made the determination or decision, for reconsideration.

[6] Apollo asks the Commission to vary the Determination and substitute a finding that:

(a) Apollo submitted accurate information in its May 2013 appraisal data submission and, as such, did not contravene section 105.1(3) of the *Forest Act*; or alternatively,

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[2] Apollo did not rely upon the defence of mistake of fact in the proceeding before the District Manager.

(b) Apollo exercised due diligence to prevent the alleged contravention.

[7] Apollo's appeal is against the District Manager's finding of contravention and decision on the defence of due diligence, not against the penalty assessed.[3]

BACKGROUND

[8] Forest Licence A18156 authorizes Apollo to harvest timber from Crown land within the Stewart Nechako Natural Resource District, after meeting certain requirements. It is a replaceable, volume-based tenure. Apollo has held this licence since 1982, and it has been replaced several times. This licence is Apollo's main tenure.

[9] The contravention at issue is based on timber cruising carried out by Apollo's cruising contractor, CnS Consulting Ltd. ("CnS"), and the submission of information by Apollo to the Ministry based on that timber cruise. The District Manager found that Apollo submitted inaccurate information – namely, inaccurate cruise data – as part of the application process for cutting permit 421 ("CP 421") under Apollo's licence.

[10] CP 421 is located approximately 75 to 80 kilometres northwest of Fort St. James, in an operating area known as the "Kazchek". Apollo has been harvesting in the Kazchek since the early 1980s. CP 421 consists of two blocks, Block 531 and Block 532, with a combined area of 176.4 hectares. It is a cruise-based permit.

[11] The inaccuracy at issue in this appeal relates to the location of plot centres which, the Ministry alleges, resulted in a lower estimate of timber available for harvest. If that lower estimate had been used by the Ministry, it would have resulted in a lower assessed stumpage rate for CP 421. The relationship between the timber cruise and stumpage is explained more fully below.

Requirements for cutting permit applications

[12] Under the terms of Apollo's licence, and in accordance with the applicable statutory regime, Apollo may apply for cutting permits to harvest in specific areas within the Prince George Timber Supply Area. As part of that application, the licence requires timber cruise and appraisal data to be gathered, compiled and submitted for the licence area according to the applicable version of the Interior Appraisal Manual ("IAM").

[13] The IAM contains the policies and procedures approved by the minister. In this case, the policies and procedures approved by the minister are found in the June 1, 2012 IAM. These policies and procedures have the force of "subordinate legislation": *British Columbia (Forests, Lands and Natural Resource Operations) v. British Columbia (Forest Appeals Commission)*, 2014 BCSC 2192.

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[3] Although Apollo also advanced the defence of officially induced error in its Notice of Appeal, it ultimately abandoned this defence. Accordingly, the Panel has not considered this defence in the decision.

[14] When applying for a cutting permit, the IAM requires the licensee to provide the Ministry with an appraisal data submission which must include cruise data that is gathered and compiled in accordance with the specifications in the Ministry's Cruising Manual and Cruise Compilation Manual (section 1.5). The issues in this appeal focus mainly on the requirements of the June 1, 2012 Cruising Manual.

[15] A timber cruise, or "cruising", is the process used to estimate the amount of timber in an area using sampling methods prescribed by the Cruising Manual. Section 2.1 of the Cruising Manual states that the objective of a timber cruise is "to obtain an unbiased estimate of the volume and quality of timber on a cutting authority area to a specified confidence interval or sampling intensity" prior to harvest [Emphasis added in original].

[16] A cruise compilation with estimates of timber volumes must be submitted to the Ministry before a cutting permit can be issued and a stumpage rate determined. Stumpage is the price payable to the government for Crown timber harvested. The process used to calculate a stumpage rate is different for cruise-based cutting permits (such as Apollo's) and scale-based cutting permits.

[17] For a cruise-based cutting permit, stumpage paid to the Crown is based on the net volumes of merchantable timber estimated from the cruise data without the requirement that the timber be scaled.

[18] In contrast, stumpage for a scale-based cutting permit is based on the amount of timber delivered to the mill: the billed volume comes from post-harvesting measurement (scaling) of the harvested timber in accordance with the *Forest Act*.

[19] In other words, stumpage payable under cruise-based permits is determined from a pre-harvest volume estimate (a timber cruise) premised on the cruise having been done according to the Ministry's Cruising Manual, whereas stumpage payable for scale-based permits is determined post-harvest through the timber scaling process.

[20] It should be noted that cruise-based cutting permits became commonplace in the BC interior in July 2010, when the IAM was revised to address issues related to standing dead timber resulting from the mountain pine beetle ("MPB") infestation. More specifically, pine-leading stands containing 35% or more of the trees categorized as standing dead timber due to MPB infestation were to be harvested under cruise-based permits. This change took place when CP 421 was in its development phase.

The events leading to the Determination

[21] Apollo contracted with CnS to provide cruising and other cutblock development activities for CP 421, such as block boundary layout and road layout. CnS is a business solely owned by Craig Crichton, a Registered Professional Forester ("RPF").

[22] CnS performed cruising for Apollo under a General Service Agreement. The relevant agreement in this case was effective from May 6, 2010 to May 6, 2011, with an option to extend the term. It required CnS to perform its work in

accordance with the "work specifications" in the agreement, as well as all relevant laws. Among other things, Schedule A to the agreement expressly required all cruising to be completed in accordance with the Cruising Manual.

[23] A brief chronology of the events leading to the Determination is set out below. Further details are set out in the "Evidence" section of this decision. The chronology is as follows:

- In or about 2011, CnS prepared a cruise plan for Blocks 531 and 532 of proposed CP 421 for Apollo's review, which showed the proposed plot locations along with strip lines[4].
- On November 24, 2011, Apollo submitted the cruise plan to the Ministry.
- CnS cruised the two blocks in January and February of 2013 (the "original CnS cruise") while there was snow on the ground. CnS used the tight chain and compass method to locate cruise plot centres, marking off plots on a field map as they were completed. This field map became the final cruise plan map.
- In all, CnS cruised 135 plots in Block 531 and 55 plots in Block 532, for a total of 190 plots. CnS recorded data for every tree in each plot on Cruise Tally Sheets, including: species, diameter-at-breast-height ("DBH")[5], tree class, pathological indicators (which reduce the amount of merchantable timber in a tree from the gross volume to the net volume, also known as "netting down"), and comments or information such as the distance from plot centre to borderline trees. CnS also measured and recorded the heights of some trees.
- On March 14, 2013, John Leidl, RPF, Apollo's Operational Forester, emailed scanned copies of the final cruise plan map and the Cruise Tally Sheets to the Ministry and requested a "check cruise".
- On April 5, 2013, Susan Forshner, Registered Forest Technician ("RFT"), a revenue technician in the Ministry's Fort St. James office, and Warren Wilkinson, with the Ministry's engineering department, conducted a check cruise for CP 421, Blocks 531 and 532, randomly selecting 10 plots in total from strip lines 16 and 17 of Block 531 as the sample for that check cruise to represent both blocks.
- Apollo prepared a summary appraisal report dated April 12, 2013, estimating the net merchantable volume for CP 421. It reported a sampling error of 5.6% calculated at the 95% confidence interval, and the average number of cruised trees per plot at 2.8.

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[4] At the planning stage a strip line is the connecting line that goes from plot to plot. During the cruise, a strip line is ribboned in the field along a compass bearing. It is defined in the Cruising Manual as "a ribboned line running through the forest and tied to a baseline and/or boundary at one or both ends. Cruise plots are located at regular intervals along each strip."

[5] According to the Cruising Manual, DBH is "located exactly 1.3 m" above ground on the high side of the tree.

- On April 16, 2013, Ms. Forshner sent an email to Mr. Leidl with the check cruise results stating, "you are now free to submit your [cutting] permit application." In an April 24, 2013 email, Mr. Leidl requested clarification, to which Ms. Forshner replied "Yes, field check meets standard".
- On May 7, 2013, Apollo submitted its appraisal data for CP 421 to the Ministry, which included the cruise data from the original CnS cruise. This is the appraisal data submission and cruise data at issue in this appeal.
- This submission was followed by Apollo's formal application for CP 421.
- Between June 3 and June 5, 2013, eight Ministry personnel conducted a Spatial Integrity Test ("SPIT") on 49 of the original cruise plots of CP 421. The Ministry then statistically compared the tree counts at each of the original CnS cruise plots to the four other sample plots placed around the original plot. It found statistically significant differences, and that these differences resulted in the original CnS cruise underestimating the merchantable timber volume in the blocks.
- On June 13 and 14, 2013, Ms. Forshner returned to CP 421 with Ministry staff to check the locations of 15 of the original CnS cruise plot centres using the tight chain and compass method (the "second check cruise"). They determined that 12 of the plot centre locations failed to meet the standards of tolerance specified in section 3.6.3.2 of the Cruising Manual (i.e., plus or minus 2 percent for horizontal distance and plus or minus 2 degrees for the compass bearing).
- On June 19, 2013, Ministry staff met with Darwyn Koch, Apollo's Strategic Planning Forester, and Bruce McLean, Apollo's Woodlands Manager, in the Ministry's Fort St. James office. Andrew Tait, RPF, the Ministry's Senior Licence Authorizations Specialist and Tenures Officer in the Fort St. James office, advised Mr. Koch and Mr. McLean that the Ministry was rejecting the original CnS cruise submission for CP 421. Mr. Tait advised Apollo that the Ministry's field checking of CP 421 on June 13 and 14 confirmed that cruise plot centres were not where they ought to have been. Mr. Tait also informed Apollo that the Ministry had been tracking cut-to-cruise ratios (i.e., the ratio between the cruised timber volume in a cutblock compared to the delivered (scaled) volume at the mill from that cutblock), and further that historical cut-to-cruise ratios for timber that CnS had cruised for Apollo were noticeably higher than usual (well over 1:1) which was out of the ordinary.
- On June 24, 2013, Mr. Koch submitted a plan to re-cruise CP 421.
- In July 2013, CnS re-cruised the two blocks. Later that month, Mr. Tait and Ms. Forshner performed a field check of the re-cruise, reviewing 11 plots in Block 531 and 8 in Block 532. In a letter dated August 8, 2013, the Ministry rejected the results of the re-cruise.
- On September 3, 2013, Mr. Koch submitted another re-cruise plan to the Ministry for CP 421. Apollo retained Baufor Consulting Ltd. ("Baufor") to

perform the re-cruise. In early October of 2013, Baufor cruised the plots for CP 421 (the "Baufor cruise").

- On October 10, 2013, Mr. Koch transmitted the Cruise Tally Sheets to the Ministry and asked the Ministry to conduct a check cruise of the Baufor cruise. On October 29, 2013, Ms. Forshner conducted a check cruise of 8 plots for the Ministry. The Baufor cruise passed the check cruise that same day.
- Apollo re-submitted its application for CP 421, relying on the Baufor cruise as part of a revised appraisal data submission for CP 421. The Ministry issued CP 421 effective November 19, 2013 for a four-year term.

[24] Apollo harvested CP 421 from January to August, 2014. Apollo weigh-scaled the logs as they were delivered to the mill. It calculated the delivered volume from CP 421 to be 52,957 m^3.

[25] Apollo paid stumpage of $532,559 to the Crown, based on the Baufor cruise.

[26] In early November 2015, Apollo carried out a partial stump cruise on the harvested area of CP 421.

Notice of Potential Contravention

[27] On or about August 27, 2015, the Ministry informed Apollo that it had concluded an investigation which indicated an alleged contravention of section 105.1(3) of the *Forest Act* in respect of the May 7, 2013 appraisal data submission based on the original CnS cruise data. The Ministry offered Apollo an opportunity to be heard ("OTBH") and provided Apollo with a binder containing the relevant documents.

[28] On February 11, 2016, Apollo participated in an OTBH before the District Manager. Apollo argued that it did not, on the facts and law, contravene section 105.1(3) of the *Forest Act*. In the alternative, Apollo advanced two defences: the defence of due diligence and the defence of officially induced error.

The Determination

[29] On April 5, 2016, the District Manager issued the 21-page Determination under appeal. In it, the District Manager's decision summarized the evidence and submissions, but ultimately rested on only a few points.

[30] Of relevance to this appeal the District Manager concluded that the word "accurate", in section 105.1 of the *Forest Act*, means "conforming to a given standard" at the time the information is submitted. He also concluded that the applicable standards in this case are the standards in the Cruising Manual, and that those standards were not met. Specifically, the placement of plot centres in the original CnS cruise did not meet the standards of the Cruising Manual. Preferring Mr. Tait's evidence over Apollo's, the District Manager concluded that "12 of the 15 plots were clearly outside of allowable standards of tolerance, and that plots were

off by 4-20 metres, well beyond that permitted by the Cruising Manual"[6]. As a result, the District Manager found that the cruise data provided to Apollo was inaccurate. Because the inaccurate data was used for the original appraisal submission, it rendered that submission inaccurate as well.[7]

[31] The District Manager then considered whether Apollo had made out either of the two statutory defences raised and found that it had not. Regarding the defence of due diligence (the only defence at issue in this appeal), the District Manager found as follows at pages 16 and 17:

> Although the contract between Apollo and CNS contained language that required CNS to comply with Apollo's standards and all laws, Apollo remains responsible for its contractor's work. Apollo did not have a system in place to oversee or monitor the work of its cruising contractor. The hiring of a contractor does not, by itself, meet the test of due diligence or absolve the principal of its legal obligations.
>
> … While the Ministry check cruise procedures can help determine the accuracy of cruise data, they are based on the Ministry's risk ratings of licensees and may not constitute a complete check. They are not intended to replace a licensee's responsibility to establish its own audit procedures. …
>
> …
>
> The evidence, which aligns with my own experience in timber cruising, suggests that most licensees conduct some form of check cruising of their own and that the Ministry check cruise is not relied upon by most licensees as the *only* method of quality assurance. I find that the cut to cruise data showing consistently higher volumes cut than volumes cruised by CNS should have alerted Apollo to a potential irregularity and prompted some action on its part to examine the integrity of its own cruise data. In my view, Apollo did not meet either the industry standard for check cruising or the standard of care that should reasonably be expected of licensees in British Columbia. ….

[32] After considering all of the factors set out in section 71(5) of the *FRPA*, the District Manager levied a penalty of $10,000 for the contravention.

The Appeal

[33] Apollo filed a Notice of Appeal with the Commission on April 25, 2016. In the Notice of Appeal, Apollo submits that the District Manager:

(a) erred in his interpretation and application of the meaning of "accurate" in section 105.1(3) of the *Forest Act*;

(b) erred in his interpretation of the nature, extent and role of check cruising by the Ministry under the Cruising Manual and in practice; and

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[6] See Cruising Manual, 3.6.3.2 "Survey and Area Measurement Standards".

[7] The District Manager did not rely upon the SPIT analysis although it was apparently available to him.

(c) erred in finding that Apollo did not take all reasonable care to prevent the contravention (i.e., had not established a defence of due diligence).

[34] Regarding the meaning of "accuracy", Apollo accepts that cruise data must conform to the standards established in the Cruising Manual, but that cruise data should be considered accurate in this context "if the data falls within the prescribed sampling error and sampling intensity required by the timber Cruising Manual" [Emphasis added in original]. This is because cruising, at its core, is a process of estimation as opposed to concrete measurement. It is "a statistic-based exercise for estimating the volume of harvestable timber in a given stand". As, by its very nature, accuracy cannot mean "absolute or precise" accuracy then, on the facts of this case, reproducibility of plot locations cannot be the test for accuracy. As stated in the Cruising Manual at 1-1: "… two cruises of the same stand, carried out to the same standard may yield different volumes [Emphasis added in original]." In this case, Apollo submits that CnS followed a proper cruise plan, collected data in accordance with that plan, and the cruise data came "well within the prescribed sampling error of 12%" [under section 2.4.3 of the Cruising Manual].

[35] Alternatively, if the cruise data was not accurate, Apollo submits that the District Manager erred in finding that Apollo had not exercised due diligence because Apollo:

a. created operating standards and retained qualified and certified professionals to ensure that its timber cruising activities met the requirements of the Cruising Manual;

b. incorporated those standards into its contract with CnS, and placed a positive contractual obligation on CnS to comply with the requirements of the Cruising Manual;

c. reviewed, as a standard practice, the data generated and complied by the cruising contractors to ensure that the data had been recorded properly and met the prescribed sampling error and sampling intensity; and

d. had a standard practice of obtaining check cruises conducted by the Ministry before making its appraisal data submission, and is standard industry practice to rely on check cruises as part of the quality control process for cruising activities.

[36] Apollo asks the Commission to vary the Determination and substitute a finding that the information Apollo submitted was accurate or, alternatively, that Apollo exercised due diligence to prevent the alleged contravention.

The Government's position

[37] The Government submits that the May 2013 application for CP 421 was not accurate and that Apollo has not established a defence of due diligence to the contravention.

[38] The Government submits that the cruise data that Apollo submitted on May 7, 2013 underestimated the volume of timber in the cutting authority area due to a biased sampling procedure. More particularly, plot centres (or some of them) in the

initial cruise for CP 421 were not placed where they were supposed to have been which resulted in a lower tree count and a lower estimate of how much timber was actually in the stand. The Government argues that:

> Unbiased sampling is a fundamental principle of timber cruising, indeed of any statistical sampling procedure. A cruise affected by the sampling bias to the degree that is evident in relation to the cruise of CP 421 cannot be considered "accurate" for the purposes of s. 105.1(3) of the *Forest Act*. (page 5, Statement of Points)

[39] In its closing argument the Government clarified that it does not allege intentional wrongdoing by CnS or Apollo. It maintains that the term "bias" as used to describe sampling methodology and results does not necessarily entail subjective intent.

[40] Finally, in terms of due diligence, the Government submits that Apollo had no system of supervision over its contractor and it cannot rely on general terms of its services contract without taking active steps to ensure compliance.

[41] The Government asks the Panel to confirm the Determination and dismiss the appeal with one *proviso*. Although Apollo did not appeal the $10,000 penalty, in closing argument the Government suggested that, if the Panel dismisses the appeal, given the new evidence presented during the appeal (which was not available to the District Manager) the Panel "has the option to consider whether to vary, upwards, the $10,000 penalty". After providing authority for the Panel to exercise this jurisdiction, the Government suggests that if the Panel is inclined to revisit the penalty then the parties should be invited to make written submissions.

The Hearing

[42] The Panel heard from a total of 17 witnesses, five of whom were qualified as experts, and received affidavit evidence.

[43] In addition, the parties provided an Agreed Statement of Facts pertaining to the SPIT data and providing a clarification regarding harvesting.

[44] This appeal was conducted as a new hearing. Although much of the evidence presented to the Panel had been before the District Manager at the OTBH, the Panel also heard new evidence and argument.

ISSUES

[45] This appeal raises the following issues:

1. Did Apollo submit "accurate" information to the Ministry as required by section 105.1(3) of the *Forest Act*?
2. If the answer to Issue 1 is "no", then has Apollo established a defence of due diligence to the contravention under section 72 of the *FRPA*?
3. Should the Panel revisit the quantum of penalty in light of the new evidence presented during the appeal?

RELEVANT LEGISLATION

[46] The following legislation is relevant to this appeal.

Forest Act

Complete and accurate information

105.1(1) In this section:

"**agreement**" means an agreement in the form of a licence, permit or agreement referred to in section 12;

Forest and Range Practices Act

Part 6 — Compliance and Enforcement

Definition for Part 6

58.1 In this Part, "**the Acts**" means one or more of this Act, the regulations or the standards or the *Forest Act*, the *Range Act* or a regulation made under the *Forest Act* or the *Range Act*.

Administrative penalties

71(1) The minister, after giving a person who is alleged to have contravened a provision of the Acts an opportunity to be heard, may determine whether the person has contravened the provision.

(2) After giving a person an opportunity to be heard under subsection (1), or after one month has elapsed after the date on which the person was given the opportunity, the minister,

(a) if he or she determines that the person has contravened the provision,

(i) may levy an administrative penalty against the person in an amount that does not exceed a prescribed amount, or

(ii) may refrain from levying an administrative penalty against the person if the minister considers that the contravention is trifling and that it is not in the public interest to levy the administrative penalty, or

(b) may determine that the person has not contravened the provision.

(3) Subject to section 72, if a person's contractor, employee or agent contravenes a provision of the Acts in the course of carrying out the contract, employment or agency, the person also contravenes the provision.

...

(5) Before the minister levies an administrative penalty under subsection (2), he or she must consider the following:

(a) previous contraventions of a similar nature by the person;

(b) the gravity and magnitude of the contravention;

(c) whether the contravention was repeated or continuous;

(d) whether the contravention was deliberate;

(e) any economic benefit derived by the person from the contravention;

(f) the person's cooperativeness and efforts to correct the contravention;

(g) any other considerations that the Lieutenant Governor in Council may prescribe.

...

(7) For the purposes of this section, the Lieutenant Governor in Council may prescribe administrative penalties that vary according to

(a) the area of land affected by the contravention,

(b) the volume of timber affected by the contravention,

(c) the number of trees affected by the contravention,

...

Defences in relation to administrative proceedings

72 For the purposes of a determination of the minister under section 71 or 74, no person may be found to have contravened a provision of the Acts if the person establishes that the

(a) person exercised due diligence to prevent the contravention,

...

Administrative Orders and Remedies Regulation, B.C. Reg. 101/2005

Penalties — *Forest Act*

8 The maximum amount that the minister may levy against a person under section 71 (2) of the *Forest and Range Practices Act* is

...

(b) $100 000 for a contravention of any of the following sections of the *Forest Act*: … 105.1(3);

...

RELEVANT PORTIONS OF THE CRUISING MANUAL

[47] Apollo submits that the original CnS cruise was within the 12% sampling error set out in section 2.4.3, which states:

2.4.3 Mountain Pine Beetle Cruise-Based Cutting Authorities

The following standards apply to all MPB cruise-based cutting authorities:

1. Each block within the cutting authority must contain at least 35% red and grey attack lodgepole pine net merchantable volume of all coniferous species. The net volume is the post-reduction cruise volume compiled to the interior standard merchantability specifications.

2. Cutting authorities must:

   - *achieve a 12% sampling error objective at 2 S.E. using measure and count plots*, or
   - the sampling error will be waived as per the scale-based standards specified in section 2.4.1(1) and (2).

3. Cutting authorities that *do not meet the MPB standards must meet the standards in section 2.4.2 to be a cruise-based cutting authority*.

[Emphasis added]

[48] The Cruising Manual defines the sampling error objectives that must be met for cruise-based cutting authorities and describes variable-plot (prism) sampling methodology and field procedures.

[49] Section 2.4.2 states as follows:

2.4.2 General Cruise-Based Cutting Authorities

The following standards apply to all general cruise-based cutting authorities.

1. 8.0% at 2 S.E. on all plots, and
2. If count plots are used, then a 2 S.E. of 12.0% on full measure plots must be achieved.

All other scale-based standards apply, except that the sampling error cannot be waived.

[50] The following section describes the procedure for the location of plot centres:

3.1.4 Plot-Centres

When the required distance has been measured along the strip line, a stake, tree or equally effective marker must be established at the plot centre where the compass person marks the chainage. If the chainage is at a tree, mark the plot centre with an “X” at the point where the chainage touches the tree. If a stake is used then the plot centre is the ground level point and not the top of the stake.

A reference point (RP) must be recorded in the traverse notes or on the cruise tally card. It is acceptable to use a reference tree that is an “in” tree and record the bearing and distance to the nearest point on the tree at DBH. The reference tree will be used to determine the position of the plot centre for check cruising. It is recommended that

the reference information is recorded below stump height to facilitate post-harvest evaluations. Refer to any regional guidelines for any additional requirements and use of reference trees.

[51] The following principles and standards apply to check cruising:

3.6.3.2 Survey and Area Measurement Standards

This section outlines the distance and area measurement standards used to locate plots and or harvest boundaries. Cruisers or check cruisers may use any appropriate method to measure and or initially verify a distance or area. For audit purposes, the true distance and or area measure will be derived from conventional measurement systems such as a survey chain and compass.

1 - Strip or Tie Lines

The following standards apply to the strip or tie line measurements used to locate the plot centre. This standard applies from plot to plot or for any combined strip interval distance. The check cruiser will follow the same plot intervals that the original cruiser traversed. The plot will be re-cruised if the plot location is not within the following standards:

Horizontal distance: plus or minus 2 percent.

Bearing: plus or minus 2 degrees.

Plus or minus 2 degrees translates to 3.49 m in 100 m using the formula: (100 * (tan 2 degrees)) = 3.49 percent, therefore: 3.49 percent * 100m = 3.49m.

3.6.4 Cruise Data Submission Standards

The following conditions must be met. If they are not met then the cruise data may not be used for an appraisal.

1. The field data must be consistent with the data used in the appraisal compilation.
2. The field data must be compiled in a manner that is consistent with the cruise plan.
3. When requested by the MFLNRO, the licensee must submit the original tally sheets, traverse notes (if traversed with chain and compass), raw and corrected GPS files (if traversed with GPS), and the ASCII cruise data input files.
4. The cruise tally cards must be signed and dated by the original cruiser.
5. The cruise data must be compiled on an approved version of the compilation software.

THE EVIDENCE

Apollo's Evidence

[52] Apollo called five witnesses, two of whom testified as experts. A summary of their evidence is set out in the order in which they testified.

Darwyn Koch, RPF

[53] Mr. Koch strategic planning forester from November 2012 to June 2016. He performed timber harvest planning at the strategic level, rather than the day-to-day level.

[54] Mr. Koch stated he did not become involved with the events surrounding CP 421 until June 2013, after the original CnS cruise and after Apollo's submission of the CP 421 cruise data. He described the preparations that generally occur prior to timber cruising, such as the development of a cruise plan, as well as other planning activities related to projecting the long- and short-term log supply requirements for Apollo's sawmill.

[55] Mr. Koch explained that, prior to cruising, a formal cruise plan is prepared and submitted to the Ministry. Subsequent field work is done based on the plan and it forms the basis of the cruise-based application. It is developed after the block boundaries are determined and other field assessments such as road layout are completed.

[56] In 2012-2013, a cruise plan consisted of a map showing the location of the area to be cruised, the location of the sample plots relative to the harvest boundaries and the roads, and a "Provincial Cruise Plan" form that contained the specifications or methodologies that would be used for the timber cruise.

[57] The form specified the grid that would be used for the cruise, where the sample plots would be located along the grid, and the Basal Area Factor ("BAF") prism to be used for the cruise.

[58] The significance of the BAF prism is that, depending on the size of the prism, greater or fewer trees will potentially be sampled from a given plot centre, depending on the diameter of the trees and their distance from the prism.

[59] Mr. Koch stated that the cruiser typically selects the size of the BAF prism for the cruise. The data collected from the cruise is used for the compilation that forms the basis of the submission for the cutting permit application and stumpage determination.

[60] Mr. Koch described the Kazchek operating area as being a productive area with some unique features such as a history of forest fires that have resulted in "spatial diversity … in the stands of trees". He compiled a spreadsheet to look at some variables such as tree size and timber volume per hectare. He testified that the spreadsheet summary confirmed his personal knowledge of the Kazchek, i.e., that there were pine-leading stands and some closely-spaced, large diameter trees in parts of the Kazchek.

[61] Mr. Koch testified that Apollo obtains specialty services such as cruising through general service agreements with contractors, based on business choices regarding Apollo's internal needs. His spreadsheet referenced Apollo's use of other cruisers, but confirmed that CnS cruised the majority of blocks in this area from 1998 to 2012.

[62] Mr. Koch confirmed that Andrew Wheatley for the Ministry invited him by email on June 19, 2013 to attend a meeting that day with other Ministry staff members. Since Mr. Koch had contacted Ministry staff the previous day by telephone and then the same day by email regarding urgency related to the issuance of cutting permits, he was surprised to learn at that meeting that the Ministry had rejected the original CnS cruise of CP 421. Mr. McLean also attended the meeting. They learned at that meeting that the Ministry's second check cruise (on June 13 and 14, 2013) had revealed that the location of 13 of the 15 plot centres that were audited were outside of the tolerance limits specified in the Cruising Manual. [The Panel notes that the actual number was 12 of 15 plot centres, as summarized above under Background.]

[63] Ministry staff advised that they had recently compiled cut-to-cruise data in relation to cruises by CnS for Apollo, that the ratios were consistently high, and well over 1:1. The Ministry expressed a lack of confidence in CnS' cruising. Mr. Koch testified that tracking cut-to-cruise ratios was not "on Apollo's radar" during the period in question.

[64] Mr. Koch said that Apollo worked out a GPS-based methodology with the Ministry (based on the Northern Interior method) to re-cruise CP 421.

[65] In mid-July 2013, Mr. Koch submitted the results of the CnS re-cruise and requested a check cruise from the Ministry. The results of the Ministry check cruise demonstrated that the re-cruise failed to meet the Cruising Manual standards (due to "missed down trees"). Mr. Koch advised that Apollo subsequently retained Baufor to cruise CP 421. Apollo used the results of the Baufor cruise to re-submit its cutting permit application.

[66] After being made aware of the Ministry's concerns about the cut-to-cruise ratios calculated for cutblocks that CnS had cruised, Mr. Koch prepared a spreadsheet that referenced all of Apollo's cruise-based cutting permits after July 1, 2010, which was when the IAM changed to cruise-based stumpage calculations for MPB-infested stands. Mr. Koch used Apollo's internal scale data to prepare this spreadsheet and sent a copy to Anton (Tony) Wipfli, RPF, and Ron Alton of the Ministry on November 6, 2013. Mr. Koch said he did not discern any particular pattern of cut-to-cruise anomalies. Under cross-examination, however, Mr. Koch admitted that he had made some errors with respect to the 15 CnS cut-to-cruise ratios used in preparing the spreadsheet and that, once corrected, it was evident that the CnS cruises underestimated delivered volumes in every cutting permit in the spreadsheet by factors ranging from 1.28 to 1.99. The cut-to-cruise ratios ranged from 0.457 to 1.187 for the other 28 cutting permits where cruises had been done by someone other than CnS. Mr. Koch also used this spreadsheet to examine which cutting permits had been check cruised by the Ministry. Five of 20 cruise-based permits had been check cruised by the Ministry and three of 70 scale-based permits had been check cruised by the Ministry.

[67] When cross-examined about a series of spreadsheets (Standing Timber Inventory "STI" Master Worksheets), Mr. Koch advised that he worked on them from 2003 until he left Apollo to work elsewhere in 2008.

[68] In cross-examination, Mr. Koch was asked about a March 14, 2013 conversation with Philip Smith of Conifex Timber Inc. ("Conifex"), another forest licensee and sawmill operator in Fort St. James, about the relationship between Apollo's delivered timber volumes compared with its cruised volumes. [Mr. Smith was called as a Government witness.] Mr. Koch recalled that Mr. Smith "asked me about what is Apollo's cut-to-cruise numbers, and I responded by saying they're good under the context that we - - we didn't - - we haven't heard anything negative about the cut-to-cruise, and so far as I was concerned, they must have been close to 1. Because at that point there was no tracking of it." Mr. Koch said he did not recall making a comment to Mr. Smith that Apollo's cut was consistently greater than its cruise results.

Craig Crichton, RPF

[69] Apollo's second witness was Mr. Crichton, the owner/operator of CnS, and its only timber cruiser. Mr. Crichton performed the original cruise of CP 421, as well as the first GPS re-cruise.

[70] Mr. Crichton said that he learned how to timber cruise "on the job" and relied on his peers for advice if he needed it. He said that there may be formal training available now, but that was not the case when he learned and he has not had any.

[71] Mr. Crichton acknowledged that CnS had a General Service Agreement with Apollo which he would have scanned on the date he signed it, and then put it away. He confirmed that the agreement was for a year, ending on May 6, 2011. He stated that, although it had never been formally renewed, it was the basis of his business relationship with Apollo. For example, he relied on the rate sheets attached to the agreement, and periodic updates of those, as the basis for what CnS would be paid. He believed that CnS complied with the terms of the General Service Agreement because Apollo had never told him otherwise.

[72] Mr. Crichton testified that he routinely reported for work at the Apollo offices in Fort St. James, and someone from Apollo assigned him tasks on a day-to-day basis. He advised he did "full development" work for Apollo, from a conceptual or planning level through to the fieldwork involved in cruising and laying out the area to be harvested, including roads and cutblock boundaries.

[73] Mr. Crichton explained his usual process for timber cruising for Apollo. After doing the initial layout for a cutting permit, he develops and submits cruise plan to Apollo, including the associated cruise plan map showing the proposed strip lines and plot locations. Apollo subsequently tells him when to perform the cruise.

[74] After completing a cruise, Mr. Crichton submits the tally cards and field map for data entry to Industrial Forestry Services Ltd., a forestry consulting firm, which then provides the entered data and data compilation to Apollo.

[75] Mr. Crichton outlined the methodology that he followed for the original cruise and re-cruise of CP 421. He performed both cruises with the assistance of

compassman John Zirul. Mr. Zirul established a plot centre along the pre-determined grid shown on the cruise plan. They used the tight chain and compass method of establishing plot centres for the original CnS cruise and used a GPS-based method for the re-cruise.

[76] Regarding the original CnS cruise, Mr. Crichton remarked on the large pines and unique ecosystem in the Kazchek area, and that the timber was primarily MPB Code 7 - categorically known as "dead potential pine". He said there was about a metre of snow on the ground when he did this cruise and that, as far as he knew, the Ministry did the check cruise in similar conditions.

[77] Mr. Crichton explained that he used a 100 x 100 metre grid. Mr. Zirul led out the "chain" along a compass bearing that is meant to follow the strip lines identified in the cruise plan. Mr. Crichton followed behind, hanging ribbon along the way. At the 100-metre mark, determined by a series of chain pulls, Mr. Zirul hung ribbon, fixed an aluminum tag, and used paint to identify the plot centre. [Mr. Crichton explained this. The Panel did not hear evidence from Mr. Zirul.]

[78] Mr. Crichton testified that the cruise grid commenced from a predetermined point, and the strip lines were established in accordance with the cruise plan map. He made field notes and compiled a Cruise Tally Sheet for each sample plot. He emphasized the importance of marking the strip lines with ribbon to help the check cruisers locate, and endeavour to replicate, the plot results.

[79] Mr. Crichton used a BAF 10 prism for the original CnS cruise because he felt that it gave "a reasonable radius of the plot so that you can see all of the trees". He explained how he measured the DBH for each tree sampled, and how he measured tree heights. He described the various pathological indicators used to establish the numeric "class" of the trees in the cruise plots.

[80] Mr. Crichton testified that he thought the Ministry checked all CnS cruises. He understood that the Ministry check cruised the original CnS cruise, and had advised Apollo that it had passed (April 24, 2013). However, in June of 2013 Mr. Koch told him that the Ministry had rejected the cruise.

[81] Mr. Crichton further testified that, when the cruise was rejected, Apollo directed him to re-cruise CP 421 using the Northern Interior GPS method to establish plot centres at the intersection points along a 150-meter grid and to use a BAF 7 prism. He did not ask why the original CnS cruise had been rejected: he just did what Apollo requested, as he felt it was not his place to ask, or to know, why.

[82] Mr. Crichton eventually learned that the original CnS cruise had been rejected because the Ministry suspected that plots had been "moved" from the locations specified in the cruise plan. He denied doing so, and emphasized that he would never do that except for safety reasons. Mr. Crichton denied doing anything to "reduce tree count" and said that he had "followed the [Cruise] Manual to the letter."

[83] When cross-examined about the location of plot centres, Mr. Crichton said he believed the compassman had put plot centres at the proper location indicated by the tightly-pulled chain, and did not recall plot centres being on trees more

frequently than on brush or stakes. He confirmed that the practice of using the "nearest tree" as the plot centre had been abandoned a number of years before.

[84] When asked about how moving plot centres would impact a cruise, Mr. Crichton said they would have to be moved "quite a bit" or probably "more than a metre" to make a difference, but could not give a specific number. In his view, "moving plots to reduce the tree counts could take significantly longer" compared to placing plot centres where they were supposed to be along the predetermined grid indicated on the cruise map. Mr. Crichton also advised under cross-examination that if there was "an implication of bias, our bias would have been…making calls on indicators in favour of our client."

[85] Mr. Crichton was asked whether the Ministry had previously raised cruise-related issues with him. He said it rarely occurred but that he had followed-up on a few issues raised by Ministry staff in the past. Mr. Crichton felt that he had a positive working relationship with the Ministry.

[86] Mr. Crichton could not recall any instances when an Apollo forester went into the field to review his cruising work.

John Leidl, RPF

[87] Mr. Leidl was Apollo's Operational Forester during the events of 2013. He worked for Apollo as a summer student from 2002 until becoming a full-time employee in 2007. Mr. Leidl's responsibilities included facilitating appraisal submissions and applications for cutting permits from 2010 to 2012.

[88] Mr. Leidl gave a brief overview of the history and business model of the privately-held Sinclar Group of companies from 1969 to present. It started in Fort St. James and is now headquartered in Prince George. The group of companies includes Apollo.

[89] Mr. Leidl explained that, prior to 2010, each of the Sinclar companies tended to "operate in a silo", conducting their woodland and planning operations independently. In or about 2010, the companies started to unify their planning and woodland operations. That process was not complete until well after 2013. Each company continues to be its own business entity and is audited separately.

[90] Mr. Leidl stated that Apollo has approximately 130 mill employees and five woodlands staff. Forest Licence A18156 grants Apollo an annual allowable cut of 215,000 m^3/year. Apollo's milling capacity is about double that, which it fills with wood from other sources: non-replaceable licences, logs that it mills for other forest licensees, or purchased wood.

[91] Mr. Leidl explained that CP 421 was one of the permits proposed for harvest under cruise-based stumpage after the 2010 changes to the IAM. Mr. Leidl testified that Apollo did not treat cruise-based cutting permits differently than scale-based permits: all of the timber harvested is scaled when it gets to the mill as a basis to pay the logging contractors, and to plan and manage log inventory and manage lumber recovery. For both cruise- and scale-based cutting permits, Apollo submitted the scale data to the Government's Harvest Billing System.

[92] Mr. Leidl explained that Apollo's business model entails contracting the services of timber cruisers and other aspects of forestry work. He was familiar with the May 6, 2010 General Service Agreement between Apollo and CnS, which ended on May 6, 2011. Although it ended in 2011, Mr. Leidl assumed that the agreement continued to cover Apollo's full-phase development services, including: reconnaissance work, timber cruising, ecotype assessment, and cut block layout.

[93] Mr. Leidl did not go into the field to review any of the cruise work performed under the General Service Agreement. He stated that he would occasionally go to out to help orient logging contractors about a given cutblock.

[94] Mr. Leidl testified that he routinely did office reviews of the cruise data and field map after a cruise had been done. He submitted the final cruise map and the Cruise Tally Sheets to the Ministry, and advised the Ministry that the area was ready for a check cruise. He also reviewed the cruise data in digital form after receiving the cruise compilation from IFS. He only checked the Cruise Tally Sheets, cruise map and cruise compilation for inconsistencies. Mr. Leidl believed that the Ministry routinely did check cruising.

[95] The Ministry sometimes advised Apollo to proceed with its cutting permit application; other times the Ministry provided specific feedback. If a check cruise identified an issue, Apollo would direct the cruiser to resolve the matter with the Ministry. Mr. Leidl confirmed that Apollo did not supervise cruises nor do check cruises. He was aware that other forest companies relied on check cruises by non-government cruisers, but was of the view that a professional should be able to deliver cruising services without oversight for quality control.

[96] Mr. Leidl was familiar with a November 25, 2010 email from the Ministry (Carl Pollard) to Apollo's foresters, Shane Perry and Mr. Koch. The email pointed out that "with the recent switch to cruise-based pricing/billing, cruise checking had increased in importance and is expected to remain as such in the near future."

[97] Mr. Leidl also recalled a Ministry email dated June 17, 2011, from Mr. Pollard to a number of foresters, including Apollo's Mr. Perry. The email stated that, because permitting was expected to increase due to the MPB infestation, and because of staff cuts, a permit that required Ministry cruise checking would take "4+ Weeks after submission" without it turnaround could be "2+ Weeks" and that most of the Ministry check cruises would be done in the summer and early fall. He was aware of the Ministry's efforts to streamline the process and shorten the time it took to issue cutting permits, which included risk-ranking based on whether an internal check cruise had been done.

[98] Mr. Leidl was responsible for – and submitted – Apollo's application for CP 421. He understood that the Ministry had checked and "passed" the original CnS cruise. He was satisfied that the cruise information met the standards of the Cruising Manual and was reliable when he submitted it to the Ministry. He submitted the permit application for CP 421 on May 30, 2013. Under cross-examination, Mr. Leidl indicated that once the Ministry had passed the cruise he did not inquire about the parameters that had been checked and he did not follow up with the Ministry regarding any aspect of the field check cruise summary form,

including the notation that "The majority of plot center's is established on trees [sic]".

[99] When he submitted the application for CP 421, in his capacity as a RPF, Mr. Leidl certified as follows,

> … while I did not personally supervise all the work undertaken in its preparation, I herby [*sic*] acknowledge that *the appropriate assessments, operational site planning, and professional work* has been completed in support of this application for permits and licenses governed under the Forest Act.
>
> I hereby acknowledge that *this cutting permit application is consistent with* the forest tenure to which it applies, *the requirements of the Forest and Range Practices Act and Regulations*, and all applicable operational plans. [Emphasis added]

[100] Mr. Leidl advised that his role at Apollo changed in June of 2013, and Mr. Koch took over dealing with permitting for CP 421. His last involvement in CP 421 was submitting the application.

[101] Mr. Leidl testified that, in 2012, he developed a spreadsheet for the purpose of tracking variances between anticipated harvest based on cruise data, and actual log deliveries to the mill based on scaled loads at the mill. He did this with a view to assessing whether Apollo could increase its annual harvest based on the company's existing business model. The objective was to associate the volume of logs delivered to the mill, to where the timber came from and how it related to the cruise estimates. He quantified these in the spreadsheet as "% of Net".

[102] Under cross-examination Mr. Leidl acknowledged a pattern that the Government's counsel pointed out to him: he used the compiled Gross Cruise Volume to estimate wood deliveries to the mill for cutting permits cruised by CnS, and used Net Cruise Volume, or a number even lower than Net Cruise Volume, for other cruising contractors. The cut-to-cruise ratio in the spreadsheet for the two CnS-cruised stands was 139% and 151%, and for all other blocks ranged from 49% to 108%. In response, Mr. Leidl said that he did not consider who had done the cruises and did not recall using different methods to estimate delivered volume for different cruisers. He thought that it might have been because different cruisers were operating in different stand types, and that the Gross Cruise Volume may have been much higher than the Net Cruise Volume in the types of pine stands in the Kazchek due to the nature of the stands and the state of deterioration of the timber due to the MPB infestation.

[103] Mr. Leidl testified that MPB stands present challenges for predicting log delivery because of the variability of sound (merchantable) wood. In his view, a cut-to-cruise comparison was not a good tool to determine accuracy of the data submitted for a cutting permit. He noted that Apollo's woods staff would not be aware of that information. He agreed that if a cruise estimate (for a cruise-based permit) was lower than the actual harvest then stumpage payable would be lower, and vice-versa. In his experience, stumpage accounted for five to 20% of the price for which Apollo sold its milled lumber.

[104] Under cross-examination Mr. Leidl agreed that, when a cruiser gets paid on a "piece-rate" basis, in this case $100 per cruise plot, there could be an economic incentive to put in plots as quickly as possible; however, he specified that the work must still meet the Cruising Manual standards.

[105] Under cross-examination, the standing timber inventory worksheets previously described by Mr. Koch were shown to Mr. Leidl. He stated that they had been used by a number of Apollo's foresters as a planning tool to predict wood deliveries to the mill but that he had never entered any data into them, and had only used them beginning around 2011 or 2012 to coordinate cruising, layout or development contractors. Mr. Leidl said that he had worked with a version of the spreadsheet that was colour-coded to identify cruising contractors, but that the version in evidence did not have that colouring on it, except on the final page. He said that Apollo no longer uses the spreadsheet but rather uses a log forecast model to predict wood deliveries to the mill.

[106] In response to the Panel's questions, Mr. Leidl said that he had never sat down with Mr. Crichton and gone through the terms of the General Service Agreement. He assumed that Mr. Koch would have done so when the contract was signed in 2010. He was satisfied that the agreement was still in effect, even though it had an end date of 2011. Mr. Leidl thought that it would have been a good time to "check in" with the cruiser when the IAM policy changed from scale-based to cruise-based for the MPB stands. Mr. Leidl could not recall ever meeting with Mr. Crichton to review his practices and standards.

Expert Witness: Warren Staff, BSF, RPF

[107] Mr. Staff was qualified as an expert in the operational aspects of timber cruising practice, including: plot establishment methodologies in use from 2011 to present; practical application of policies and procedures contained in the Cruising Manual; and the facts and influences affecting timber cruise results. Mr. Staff has been employed as a senior development forester/project manager with Forsite Consultants Ltd. in Salmon Arm, BC, since 1994.

[108] Mr. Staff wrote an expert report dated January 2016 titled "Timber Cruising Expert Report" as well as a supplemental report dated September 20, 2016 in response to three questions posed by Apollo's counsel.

[109] Mr. Staff said that most major licensees contract out timber cruising, and most also retain a separate contractor to check the results. Smaller companies may not retain contractors to perform check cruises or require their cruising contractors to have some sort of internal quality control, and may only do *ad hoc* checks of particular aspects. Most of the licensees that he has dealt with do not rely solely on the Ministry for check cruising: they have some internal quality control, or require their cruising contractors to have some sort of internal quality control. Mr. Staff stated that, since at least 2011, the Ministry has encouraged companies to establish their own check cruise programs, rather than relying on Ministry checks.

[110] In response to a question from the Panel regarding the cruise check programs of licensees, Mr. Staff advised that companies often do not disclose that

they check their cruisers internally, but he was aware of companies that appear to be doing their own internal check cruising.

[111] Mr. Staff described some reasons why two cruises of the same stand may show different results, including:

> Spatial distribution of forest cover across the landscape.
>
> > A highly variable stand is likely to produce statistical anomalies (cruise plots with no trees or greater than 10 trees) that produce cruise results with higher calculated potential error.
>
> The amount of dead and felled timber in the area.
>
> > The amount of dead and felled timber and degree of infestation by pine beetle contribute to variability in the stand and subsequently variability in cruise results.
>
> For Pine-leading stands, the degree to which the stand is infested by the MPB.
>
> > Beetle infestation levels will have a significant effect on cruise results in Pine-leading stands with low levels of natural defect. As the level of defect in the stand increases, the effect of beetle attach will decrease (but should not have any influence on the location of cruise plots).
>
> The season in which the cruise information is gathered.
>
> > For example, if there is much snow on the ground it can cover trees and make it more difficult to observe pathological indicators on trees.
>
> Physical factors (e.g., slope complexity, aspect and brush)
>
> > Any factor that increases the difficulty of making a measurement or decreases the visibility of the trees in a given cruise plot can affect the uncertainty of the cruise results.
>
> Other factors
>
> > For example, a cruiser's experience, training, familiarity with methods and equipment, difficulty navigating terrain, precision and care in sight-line traversing, can all impact accuracy and precision of cruise results.

[112] Mr. Staff said that when there were "marginal calls" in the field, he instructs his cruisers to document why the call was made one way or the other. He emphasized that the call had to be based on what they saw, not based on what they think somebody wants to see. If marginal calls, such as for pathological indicators, were consistently made in favour of the licensee, that would lower the net volume result of a cruise. Under cross-examination, Mr. Staff admitted that there was pressure from clients to get the most favourable results possible. In general, Mr. Staff found that his clients monitored cut-to-cruise ratios and let him know if he had significantly overestimated the timber volume, i.e., the delivered volume was significantly below the cruise-estimated volume. He also said that, if

cruisers tended to consistently make "marginal calls" one way (e.g., in favour of the licensee), those calls would downwardly bias the quality and, therefore, the merchantable quantity of the trees sampled, which would be reflected in a reduction of the volume estimated in the cruise compilation.

[113] Under cross-examination, Mr. Staff admitted that he had only made general comments about cruising, none were specific to Apollo or the case before the Panel. He agreed that unbiased sampling is a fundamental principle of cruising. For example, if plot centres were not at the planned locations then the cruise results would be unreliable.

Expert Witness: Timothy Giesbrecht

[114] Mr. Giesbrecht is an Accredited Timber Evaluator ("ATE") with IFS. He was qualified as an expert in the area of timber cruising practice, including:

(a) the various plot establishment methodologies in use from 2010 to the present;

(b) timber cruising training and auditing;

(c) the operational use and practical application of the Cruising Manual; and

(d) the factors and influences affecting timber cruise results.

[115] Mr. Giesbrecht authored two reports:

- An expert report titled "Expert Opinion on Timber Cruising Related Issues in Support of an Opportunity to be Heard", dated January 2016; and
- A supplemental report titled, "Expert Opinion on Timber Cruising Related Issues in Support of a Forest and Range Practices Appeal", dated September 2016.

[116] In his testimony, Mr. Giesbrecht reviewed the fundamentals of timber cruising and how to establish strip lines and plot centres using the tight chain and compass method. He noted that timber cruisers need not be formally trained nor certified, but that cruise plans must be prepared or certified by a member of the Association of BC Forest Professionals. In addition to courses available at the college level, he advised that there are specialized workshops and training available for cruisers to develop their skills relating to field procedures, sampling theory, statistics and other relevant subjects.

[117] In his view, the key to becoming a competent timber cruiser is through a combination of specific training and field experience. He said that the Northern Interior Cruising Committee - a non-profit volunteer organization with the common objective of standardizing cruising procedures and standards - provided training to industry and government groups. He believes that experienced cruisers typically participate in at least one annual training opportunity.

[118] Mr. Giesbrecht advised that he encouraged more senior cruisers, including himself, to undertake peer reviews of field work as an ongoing way to "keep sharp". He confirmed that he checked the work of the new cruisers.

[119] According to Mr. Giesbrecht, multiple cruises on a given stand of trees can produce variable results due to a variety of factors such as those that are "human-introduced". For example, a cruiser's interpretation of subjective aspects of the Cruising Manual, the sampling methodology used for the different timber types and stand variability, selection of the BAF, and field measurement errors. He stated that bias can be subjectively introduced based on how pathological indicators are assigned, such as those related to "downed trees", insect damage and related breakage factors, and categorizing stand maturity. He said that stand maturity and insect infestation can add to the variability of cruise results to collectively distort the estimate of net merchantable volume, resulting in an underestimate.

[120] In addition, Mr. Giesbrecht noted that, as older diseased pine stands begin to degrade, the variability of their spatial distribution increases and can contribute to variability in cruise results. He also said that collecting cruise data in snow conditions could add to the uncertainty of cruise results because the cruiser can miss downed trees and pathological indicators.

[121] Mr. Giesbrecht said, in his experience, forest licensees sometimes have staff do check cruises, retain consultants to do so, or may rely on the Ministry.

[122] In his opinion there is no direct correlation between cut-to-cruise data and whether or not the standards of the Cruising Manual are met. He relied on his written report to highlight variables that can affect the cut-to-cruise ratio based on how each part of the ratio is calculated. He pointed out potential sources of error for each.

[123] Under cross-examination, Mr. Giesbrecht said that he would expect the cut-to-cruise ratios pertaining to a particular cruiser to include ratios over 1:1 and under 1:1. He advised that he would suspect something was wrong if the harvested volume was under- or over-estimated by 20% or more. He agreed that manipulation of plot centres could result in a favourable outcome for a licensee in terms of stumpage, but that doing so would take time in the field. He said that he would ask the cruiser "a lot of questions" if ratios were consistently over 1:1. He agreed that sampling bias could be a reason for ratios consistently being over 1:1.

[124] In Mr. Giesbrecht's experience, a licensee would normally seek assistance with check cruising if a cruise overestimates the harvestable timber. He agreed that biased sampling could have a direct correlation to the cut-to-cruise result, but believes it would be difficult to isolate the reason without knowing what the cruiser had done.

The Government's Evidence

[125] The Government called 12 witnesses at the hearing. Eight were Ministry employees during the period of Apollo's application for, and the subsequent harvesting of, CP 421. One witness was an employee of another forest licensee in the region. The Government also called three experts.

[126] Given the number of Government witnesses, the Panel has discussed their evidence as it pertains to specific topics or events.

Discovery of Anomalies in Apollo's Cruise Data

[127] Two witnesses provided key testimony for the Government on this matter: Mr. Alton and Mr. Wipfli, RPF. In 2013, Mr. Alton was the Ministry's Regional Cruising Specialist for Northern BC and Mr. Wipfli was the Ministry's Timber Pricing Officer in the Prince George Region.

[128] Mr. Alton described unbiased plot location as the fundamental basis of cruising, advising that everything else is meaningless unless plot location is unbiased. Using a metaphor, Mr. Alton stated that it would be "hard to build a skyscraper if you don't have a foundation".

[129] He testified that the Ministry had a "robust cruising program", which included a risk-ranking approach to evaluate timber cruisers. He provided a general explanation on how the Ministry deals with cruise plans, check cruises, sampling standards and the standards pertaining to tree quality, quantity and volume, and cutting permit applications.

[130] Mr. Alton said that when the Ministry performs a check cruise, the results are summarized and put into a spreadsheet that is reviewed annually. Typically, 10-20% of cruises fail the Ministry checks at some point, either at the office, field or compilation stage.

[131] Mr. Alton described a historical pattern of cruises by CnS that underestimated merchantable or harvested volume. He received monthly Anomaly Reports from the Ministry's Revenue Branch in Victoria that flagged low or high "Billed vs Appraisal" volumes, which are effectively cut-to-cruise ratios. Mr. Alton initially noticed anomalous results for Apollo for the period 2007 and 2008. Over time, Apollo's deliveries compared to appraisals were getting higher. In January 2013, Mr. Alton received an Anomaly Report covering the year 2012, which indicated that 12 of 14 Apollo cutting permits from 2009 to 2012 had Billed vs Appraisal ratios higher than 1.32, and as high as 1.80. He examined Apollo's cruise numbers for the Kazchek area that were 25% lower than the harvested volume, and more outside the norm. He considered various factors and concluded that utilization factors and boundary variances were not causing the anomalies. Mr. Alton was uncertain about what might be causing the anomalies, but thought that Apollo would have been aware of its cut-to-cruise ratios.

[132] In March of 2013, Mr. Alton assigned Mr. Wipfli to look into the anomalies, including the Kazchek cut blocks at issue in this appeal. Mr. Alton and Mr. Wipfli discovered that cruising by CnS was the common factor in the cutting permits with high cut-to-cruise ratios. Mr. Alton explained that Dr. Kim Iles, an expert witness, whose testimony will be discussed below, was retained to develop the SPIT (the special integrity test), in consultation with Ministry staff, to audit the cut blocks covered by the original CnS cruise. The methodology for the SPIT is not contained in the Cruising Manual.

[133] The SPIT is used to check for differences in tree counts from plot centres used for an original cruise compared to tree counts using plot centres located 15 metres in each of the four cardinal directions from the original plot centres. A SPIT analysis provides an unbiased estimate of basal area of timber in the stand[8] compared to the basal area of the plots being checked.

[134] Mr. Alton, Mr. Wipfli, and six other Ministry personnel – including Ms. Forshner and Mr. Tait – conducted the SPIT. They used a BAF 10 prism – which is the same BAF used in the original CnS cruise – to determine if trees were "in" or "out" but without reference to DBH measurements, except for "borderline trees". They sampled every second plot in every second strip line, or about one-quarter of the total number of plots from the original CnS cruise. Any SPIT plots that fell outside the block boundaries were dropped.

[135] Mr. Alton and Mr. Wipfli participated in the first day of the SPIT cruise on June 3, 2013. Only basic forestry skills were required for collecting the SPIT data. Based on his experience, the stand where they did the SPIT was consistent with what Mr. Alton would expect in the Kazchek operating area, i.e., bigger trees.

[136] Both Mr. Alton and Mr. Wipfli attended the June 19, 2013 meeting with Apollo's representatives, Mr. Koch and Mr. McLean. In describing Apollo's response to the concern raised about the initial cruise, Mr. Wipfli recalled "They didn't really comment on what might have been going on. They just sort of agreed to do what we asked them to do, and that, but there was really no commitment or no agreement or disagreement with what our findings were."

[137] On cross-examination, Mr. Alton agreed that a timber cruise gives an estimate of the merchantable timber, and that the equipment used for the cruise potentially introduces some margin of error into the estimate, as does the cruiser's experience and subjective judgment. He thought that changing the grid size and BAF prism should not change the result for a given area, provided that the standards of the Cruising Manual were met. Mr. Alton understands that both industry and the Ministry agree that the Cruising Manual sets acceptable standards and tolerances. He said the Ministry seldom checks the location of plot centres during a check cruise: it is time-consuming, so there would have to be a good reason for doing so. Mr. Alton said that, until their discovery of the anomalies in Apollo's cut-to-cruise ratios and more specifically for the blocks cruised by CnS, there had not been a good reason.

[138] Mr. Alton now works for a forest licensee. He doesn't know whether his current employer specifically tracks cut-to-cruise ratios, but said a licensee would be aware if delivery to its mill was within 5% of the cruise estimate. In his experience, variances in a cut-to-cruise ratio of plus or minus 25% are indicative of a problem.

[139] Under cross-examination, Mr. Wipfli indicated that his role in timber pricing was to get the stumpage rate assigned as soon as possible after receiving notice

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[8] Dr. Iles defines the "basal area" of a cruise as "the cross-sectional area of tree stems at 1.3 m from the ground [DBH] … as if they had been cut and squeezed together into a solid block at that height" (page 4, September 23, 2016 "Statement of Opinion Evidence of Dr. Kim Iles").

that a cutting permit application had been submitted. He would seek additional information if he had concerns. He was not aware of anyone from the Ministry raising concerns regarding cut-to-cruise ratios with Apollo before the June 19, 2013, meeting.

The Ministry's Check Cruises

a) April 5, 2013 check cruise (of the original CnS cruise)

[140] As stated in the Background to this decision, on April 5, 2013, Ms. Forshner and Mr. Wilkinson did the first check cruise of the original CnS cruise. Ms. Forshner thought that the weather conditions were probably similar to when CnS had done the cruise; i.e., snow still covered the area. She testified that she and Mr. Wilkinson located and audited 10 plots on strip lines 16 and 17. They checked slope, tree counts, species, DBH, heights, and pathological indicators after they had located the cruise plot centres that had been flagged and tagged by CnS. Ms. Forshner signed the check cruise summary, indicating that it showed acceptable variance in diameter measurement and tree height, and that the "majority of plot centre's [sic] established on trees, DBH measurements 6-10 cm high".

[141] Ms. Forshner stated that the DBH measurements taken higher than specified by the Cruising Manual did not contribute significant bias to the results because the trees were essentially cylindrical at that height. She noted that there was only a 1.2% difference in DBH compared to diameter measured 6-10 cm higher, which is within the 2% allowable difference in DBH measurements stated in the Cruising Manual. Ms. Forshner did not check the location of the plot centres during this check cruise. At the time, she was not aware of the concerns that Mr. Alton and Mr. Wipfli had with Apollo's cut-to-cruise ratios.

[142] On April 16, 2013, Ms. Forshner emailed her check cruise summary report to Mr. Leidl (Apollo), to CnS, and Mr. Tait (Ministry), noting that the original CnS cruise had "passed" meaning, "the parameters I checked met the requirements in the manual". Her email also pointed out that there was a "new permit process" whereby permit applications would be handled more expeditiously if they included an independent check cruise. She testified that the original CnS cruise was done before that new process came into effect.

[143] In 2013, Mr. Tait supervised Ms. Forshner's work. He was familiar with the District's timber resources - including the rolling topography and stand characteristics of the Kazchek - noting that the MPB infestation in the area had peaked in 2010 and "moved through".

[144] Mr. Tait testified that the Ministry's goal was to field-check a minimum of 1% of all cruise plots in the District on an annual basis but, depending on staffing levels, it achieved closer to 10%.

[145] Mr. Tait said that he contacted regional staff after learning that the original CnS cruise had "passed" based on his knowledge of Apollo's anomalous historical cut-to-cruise results. He enlisted Mr. Alton's assistance to figure out what might be going on.

[146] Mr. Tait was also aware of historical anomalies in Apollo's cruises, such as plot centres being on trees more often than should be the case, and that CnS did the majority of those cruises. He said that using trees as plot centres had been the practice some years before, but the Cruising Manual eliminated that practice due to concerns with sampling bias.

[147] During cross-examination, Mr. Tait said he was not aware if any of the cruises where plot centres had been located on trees had been check cruised nor, if they had, whether they "passed". In his view, check cruisers would have noted on the summary report if plot centres were located on trees, and this would have been passed along to the licensee. Mr. Tait said that he would not be concerned if a plot centre landed on a tree, provided that the cruise was unbiased. Mr. Tait stated that the District did not routinely check the location of plot centres prior to 2013, but did a post-harvest evaluation to determine cut-to-cruise ratios. The District expects ratios to be within the range of plus or minus 20% of 1:1.

b) June 13-14, 2013 second check cruise (of the original CnS cruise)

[148] Ms. Forshner participated in the second check cruise on both days. She was accompanied on the first day by Mr. Tait (as compassman) and another technician. On the second day, someone else took over from Mr. Tait.

[149] The specific purpose of this second check cruise was to check the location of plot centres established by CnS. Ministry staff checked 15 plot centres using the tight chain and compass method. They tried to be precise in their compassing and distance measurements using forward and backward compass sightings along the chain.

[150] Beginning at a given CnS cruise plot centre, they chained 100 metres on the bearing indicated on the cruise map. They then measured the distance and bearing from where they ended up compared to the plot centre established by CnS. Allowable tolerances specified in section 3.6.3.2 of the Cruising Manual were 2% in distance and 2 degrees off-line, which translates to 3.5 metres right or left of the strip line, and 2 metres front or back in the direction of the strip line. Mr. Tait testified that, of the 15 cruise plot centres they checked, 12 were outside of the tolerances. They measured these 12 plot centres to be from 5.8 to 17.94 metres from the plot centres to which they had tight-chained.

[151] Mr. Tait referred to a diagram that he had prepared the results of the original CnS cruise for the 15 plot centres, compared with the results of their second check cruise of those same plot centres. He testified that there were noticeable lateral shifts and some lines with clear bends in them that should have been straight. He said that some plots "stood out" because the plot centre was not on the ribboned line - it was shifted off-line. Mr. Tait described the terrain as rolling, and with slopes that could easily be adjusted for when pulling chain by just physically raising or lowering one end of the chain.

[152] The Ministry "failed" the original CnS cruise of CP 421 as a result of the second check cruise. Apollo agreed to re-cruise CP 421 after it was advised of the second check cruise results during the June 19, 2013 meeting.

c) July 2013 Ministry Check of the CnS Re-cruise

[153] In July 2017, Ms. Forshner and Mr. Tait performed a check cruise of the CnS re-cruise of Blocks 531 and 532. They determined that the cruiser had missed a number of trees, and several "down" trees were either missed entirely or miscategorized.

[154] In an August 6, 2013 email, Mr. Tait advised Mr. Koch of their results, and that they were recommending that the re-cruise be rejected for not meeting the standards in the Cruising Manual. In a letter to Apollo dated August 8, 2013, the Ministry rejected the re-cruise. As a result, Apollo did not submit the CnS data to apply for the cutting permit; rather, it had the blocks re-cruised by Baufor.

The Harvest Billing System

[155] The Harvest Billing System generates stumpage invoices.

[156] Brian Cornelis, RFT, was the Ministry's Northern Region Scaling and Billing Manager. He explained how scaling and scale data are reported in the Harvest Billing System, noting as follows:

- even in the case of cruise-based cutting permits, harvested timber gets weigh-scaled and reported to the Ministry;
- the Ministry does a fiscal year reconciliation by timber mark;
- the data gets tracked to detect anomalies and to create cut-to-cruise comparisons; and
- licensees have electronic access to the Harvest Billing System.

[157] Mr. Cornelis explained that licensees can only access their own data to track trends, whereas Ministry staff can access data for all licensees.

Stumpage Calculation for CP 421

[158] Darius Low, RPF, was the Ministry's Prince George Regional Pricing Officer. He testified that stumpage for cruise-based cutting permits is based on the volume of timber estimated for harvest from the permitted area rather than the actual harvested volume (i.e., logs delivered and scaled). Mr. Low also explained that the initial stumpage rate for a given cutting permit typically gets set before harvesting begins, based on the harvestable volume estimated from the cruise, but the stumpage rate varies quarterly. Invoices are issued in accordance with a market pricing equation that accounts for market fluctuations.

[159] Mr. Low testified that the stumpage rate for CP 421 began at $\$7.69/m^3$ on the invoice dated February 11, 2014, but the rate changed upward to $\$8.97/m^3$, $\$11.30/m^3$, and then $\$11.47/m^3$ for the final invoice. He advised that a greater estimated timber volume theoretically means that more stumpage will be payable, but that the market value to be applied does not always increase.

[160] For CP 421, Mr. Low calculated that Apollo would have paid $260,361 if stumpage had been based on the original CnS cruise. Based on the Baufor cruise,

Apollo actually paid $532,559, which is $272,198 more than under the original CnS cruise. The cut-to-cruise volumes were very similar using the Baufor cruise.

[161] Under cross-examination, Mr. Low clarified that, for cruise-based cutting permits, the area harvested in a given timeframe is the basis on which stumpage invoices are issued. If a cruise underestimates the amount of timber to be harvested, the initial stumpage rate will reflect that. In a cruise-based assessment, the licensee pays stumpage for the volume of merchantable timber estimated by the cruise rather than the amount actually harvested: the licensee pays less stumpage if the cruise underestimates the merchantable timber. The converse is true if the cruise overestimates the merchantable volume available for harvest.

Cruising Practices

a) Expert Witness: Kevin Hill, RFT

[162] Mr. Hill is a cruising coordinator employed by Landmark Forest Management Ltd., a forestry consulting firm based in Salmon Arm, BC. He was qualified as an expert in the operational aspects of timber cruising in the interior of BC, in particular using the tight chain and compass method. He was also qualified to give expert evidence on the auditing standards for the tight chain and compass method of cruising. Some of Mr. Hill's evidence was set out in an expert rebuttal letter dated September 26, 2016.

[163] Mr. Hill explained how a cruiser and compassman work together to establish grid lines and plot locations. He discussed how long it typically takes to traverse between cruise plots and how long it takes to do a plot. He commented on how declination adjustment is used for compassing, and recalled having experienced a "local" magnetic attraction once in a southern part of the Province, but indicated that sort of thing was infrequent.

[164] Mr. Hill explained his cruising practice as follows. When establishing a plot centre, he ensures it is in the right place. When he uses a stake for a plot centre, he uses a live tree as a reference point. Mr. Hill thought it odd that there were no notations for reference trees on the Cruise Tally Sheets for the original CnS cruise. He also noted that the Cruise Tally Sheets did not disclose any steep or challenging terrain.

[165] Mr. Hill agreed that two cruisers who followed the Cruising Manual could end up with plot centres in different places, and that both could be acceptable if they were within the specified standards and there was no bias involved. He understood that the tolerances in the Cruising Manual were, in part, designed to account for small variances between different cruisers, and that small differences in cruise results could be due to factors such as compass declination, slope adjustment, chaining "around" trees, and the chain that was used.

[166] Mr. Hill reviewed the results from the Ministry's second check cruise, and the comparative drawing that Mr. Tait had prepared depicting the location of the grid lines and plot centres. He explained that the second check cruise of the original CnS cruise clearly established that the plot centres were not located within the limits set by the Cruising Manual. In his opinion, the CnS cruiser either lacked

competence or the plot centres had been moved from where they should have been. In his view, the apparent randomness of where the plot centres were located did not exclude bias as a source for error.

[167] In response to the Panel's questions, Mr. Hill stated that, based on the stand type, the lack of steep slopes, and the photos he was shown, he considers CP 421 would be "easy" ground, where physical or vegetation constraints should have no effect on the placement of cruise plots.

b) Philip Smith, RPF, ATE

[168] The Commission granted the Government's application for a summons requiring Mr. Smith to attend the hearing as its witness. Mr. Smith is a Planning Forester with Conifex, a timber licensee and sawmill operator in Fort St. James. He was asked to give evidence regarding conversations that he had with Mr. Crichton (of CnS) and Mr. Koch (of Apollo), as well as evidence regarding Conifex's timber cruising practices.

[169] Mr. Smith was on the leadership team of the Northern Interior Cruising Committee from 2008 to 2015. He said that the committee's primary function was to organize an annual field review and office session to roll out new cruising standards, and to provide professional development. Asked whether he had seen Mr. Crichton at annual field reviews or office sessions, Mr. Smith said he knew Mr. Crichton, having met him in or about 2003, but had never seen him at any of those annual sessions from 2008 to 2015.

[170] Mr. Smith was asked about the size of Conifex in comparison with Apollo. He said that Conifex's licence and mill is larger than Apollo's and more comparable to, or slightly smaller than, the Sinclar Group as a whole. Conifex has a forest licence granting 440,000 m^3/year and has a lumber mill in Fort St. James that processes about 1,000,000 m^3/year.

[171] Mr. Smith reported that Conifex has its own in-house cruising program, although it has been recently contracting out up to 50% of its timber cruising. Further, Conifex does its own check cruising and he performs most of it. He often does a "blind check" where he goes to a previously completed cruise plot but does not take the previously completed Cruise Tally Sheets. He does the cruise and generates a comparison report to determine whether there are any differences.

[172] Mr. Smith testified that he does not cruise in the snow, and has not done so for at least 15 years because, on the rare occasion that this has happened, he had to use a shovel to find downed trees. It was "an experience to have, but not one to repeat."

[173] In explaining Conifex's check cruise system Mr. Smith advised that it does not rely on the Ministry to conduct check cruises to meet due diligence requirements for two reasons. Firstly, as a professional, he takes responsibility for the submitted data so he has to make sure that it is accurate. Secondly, the quality of business decisions depends on the quality of the data in relation to delivered wood profile, including: volume, species mix, size, and wood quality. He

developed a specific form to track due diligence with respect to cruising for all of Conifex's cutting permits.

[174] Mr. Smith said that it would "absolutely" concern him if he found out one of his cruisers was moving plot centres. He also said that it would be quite easy to do so:

> … a good cruiser or a good compassman can stop at a location and tell very quickly, without doing any measurements, just eyeballing, which trees are going to be in or out of the plot or likely to be. And it's just a matter of moving away from – from a tree or towards a tree … to push it out or bring it in and then seeing what the effect on other trees is by doing that.

[175] Mr. Smith indicated that he does not use cut-to-cruise ratios as part of Conifex's cruising quality assurance program. However, he monitors them for business planning purposes, i.e., to predict mill volumes and log flow. He said Conifex generally uses an 8 to 10% net down from cruise volumes to make its delivered wood expectations. If he saw a trend of 20-25% difference in cruise estimates to delivered volume, he would be concerned about the source of the variation and would want to look into it.

[176] Mr. Smith was also asked about conversations with Mr. Koch regarding cut-to-cruise ratios. He recalled that, while chatting after a meeting at the Conifex office in March of 2013, Mr. Koch told him that Apollo's cut-to-cruise ratios were "consistently greater than their cruise loggings". He specifically recalls this because Conifex's cut-to-cruise ratios were generally below 1:1, so this information was unusual. Mr. Smith also recalled a telephone conversation with Mr. Koch a month later during which Mr. Koch tried to clarify, without being prompted, what he had meant in their previous conversation about cut-to-cruise ratios.

Basal Area Calculations

[177] In 2013, Donald Rorison, ATE, RFT (Retired), was a Cruising Projects Specialist at the Timber Pricing Branch of the Ministry in Victoria. Mr. Rorison performed compilations and analyses of the data from the original CnS cruise, the SPIT, and the Baufor cruise. He explained his compilations and analyses in an affidavit sworn on November 21, 2016, and in his testimony at the hearing.

[178] In Mr. Rorison's view, the difference between the original CnS cruise and the SPIT analysis could be partially attributed to the omission of dead potential trees laying on the ground. Comparing the results for the 49 plots of the original CnS cruise that were checked with the SPIT results for the same plots, Mr. Rorison found that the original CnS cruise averaged 2.84 trees per plot, whereas the SPIT results averaged 4.41 trees per plot. The original CnS cruise yielded a basal area estimate of 28.4 m^2/ha (with a 95% confidence interval of 25.7 to 31.1 m^2/ha) whereas the SPIT cruise yielded an estimate 44.3 m^2/ha (with a 95% confidence interval of 41.2 to 47.4 m^2/ha).

[179] Mr. Rorison used two statistical methods to conclude that the CnS and SPIT estimates were statistically different at the 95% probability level. First, the 95% confidence interval of the average difference of the basal area estimates at each

CnS plot compared to the four surrounding SPIT plots was negative and did not overlap zero, indicating that the original CnS plots estimated lower basal area than the surrounding SPIT plots at the 95% probability level. Second, the 95% confidence intervals of the mean basal areas of the CnS plots and the SPIT plots did not overlap. This led him to conclude that the original CnS cruise and the SPIT sampled different populations.

[180] Mr. Rorison also compared the basal area estimates of the original CnS cruise and the Baufor re-cruise. Using the second method referred to in the previous paragraph, he found that the 95% confidence intervals of the estimates of basal area by the original CnS cruise and the Baufor re-cruise did not overlap. The Baufor re-cruise estimated basal area of 41.2 m^2/ha (with a 95% confidence interval of 35.6 to 46.8 m^2/ha). He concluded that the original CnS cruise and the Baufor re-cruise sampled different populations.

[181] Mr. Rorison's affidavit also included in his Exhibit F the results of a third statistical test conducted by Peter Ott, a statistician with the Ministry, who used the same data and conducted a paired t-test[9], which compares the overall group means by analyzing the differences of each CnS plot relative to the four surrounding SPIT plots. Mr. Ott did not report whether he did the test on the number of trees per plot or on the basal area.[10] The calculations show that the basal area (or number of trees) estimated by the CnS plots was significantly lower than the basal area (or number of trees) estimated at the SPIT plots and that the probability that the CnS and the SPIT estimates were the same was 0.00000000112.

[182] Under cross-examination, Mr. Rorison acknowledged that there is some inherent uncertainty in cruise estimates based on the equipment used, the individual cruiser and subjective aspects in the Cruising Manual, and that the Ministry expects the cruiser to provide field notes that help explain subjective factors. In preparing for this appeal, Mr. Rorison advised that he became aware of certain errors in the input data for the worksheet (Exhibit F to his affidavit) and he made some corrections to adjust for these, as has been noted, above. The parties consequently filed an Agreed Statement of Facts pertaining to the data gathered for the SPIT, providing clarification regarding harvesting, and to correct errors found on the Cruise Tally Sheets. By agreement between the parties, Exhibit F to Mr. Rorison's affidavit was further amended to exclude some trees erroneously included, and to include or add others. These "corrections" resulted in a net exclusion of five trees counted in the SPIT data, reducing the SPIT basal area calculation from 44.3 m^2/ha to 44.1 m^2/ha, a 0.4% difference.

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[9] The t-test is one type of inferential statistics. It is used to determine the probability of a specified difference between the means of two groups (e.g., https://researchbasics.education.uconn.edu/t-test/).

[10] There is no difference in the statistical probability result whether Mr. Ott used the count of trees or the estimate of basal area because the estimate of basal area is a result of multiplying the trees per plot by a constant factor, i.e., by the prism basal area factor of 10, which does not change the statistical probability of any difference in the group means.

Apollo's Cut-to-Cruise Ratios

[183] In 2013, Mark Koepke worked in the Timber Pricing Branch of the Ministry in Victoria. He was responsible for extracting and analyzing data from the Harvest Billing System. Mr. Koepke swore an affidavit on November 22, 2016, and testified at the hearing.

[184] Mr. Koepke explained the Harvest Billing System and the requirements of licensees to report harvest data to the Ministry. He gave evidence on specific requirements pertaining to weigh scale data and noted that Ministry staff investigate "anomaly" reports that attract the Ministry's attention. He also explained licensees' access to and use of the Ministry's Electronic Commerce Appraisal System. That system supports the process of licensee submission of appraisal data submissions to the Ministry. Mr. Koepke further explained how cruise data is utilized and stumpage rates are generated.

[185] He referred to cut-to-cruise analyses that he compiled regarding Apollo's harvesting from 2004 to 2013. He identified whether the stumpage had been scale-based or cruise-based, and when CnS, or someone else, completed the cruise. Mr. Koepke explained an attachment (Exhibit G) to his affidavit regarding Apollo's cut-to-cruise ratios from 2005 to 2014. With few exceptions, the results exceeded 1:1; for cruise-based permits the ratios often exceeded 1.5:1.

[186] In another attachment to his affidavit (Exhibit H), Mr. Koepke compared the data produced by different cruisers (CnS and others) from 2004 to 2015. He discovered that, for other cruisers hired by Apollo, the average cut-to-cruise ratio was 1:1 for scale-based permits and 0.94:1 for cruise-based; however, over that same period the average for CnS for scale-based permits was 1.32:1, and for cruise-based was 1.55:1.

Statistical Analyses of the Basal Area Calculations and Apollo's Cut-to-Cruise ratios

a) Expert Witness: Dr. Kim Iles, PhD.

[187] Dr. Iles is a forestry consultant for Kim Iles and Associates Ltd. He was qualified as an expert in forest biometrics and sampling theory.

[188] Dr. Iles wrote two expert reports: a "Statement of Opinion Evidence" dated September 23, 2016, and a "Rebuttal Report" dated October 17, 2016. The latter report was written in response to the September 2016 supplemental reports of Mr. Giesbrecht and Mr. Staff. He also provided a four-page document titled "Sample point comparisons of two data sets" dated June 15, 2013.

[189] Dr. Iles wrote a textbook on forest sampling metrics titled *A Sampler of Inventory Topics: A practical discussion for resource samplers, concentrating on forest inventory techniques* (Canada: Friesens, 2003), excerpts of which the Government referred during the hearing. The textbook is written with a view to explaining statistical theory in practical, easily understandable terms. The Panel relies on definitions from this publication in this decision.

[190] Dr. Iles explained the statistical basis and foundational concepts of timber cruising. He explained the difference between accuracy and precision, the definition of bias in the statistical sense, and explained that data that falls within a specified standard of error could be biased.

[191] Dr. Iles testified that he has an ongoing relationship with the Ministry: he provides advice from time-to-time regarding the Cruising Manual and various issues pertaining to forest inventory. He also assisted in the development of the SPIT as a tool for examining and explaining spatial irregularities in cruise plots. Dr. Iles' written opinions in relation to this appeal were premised on the data compilations for CP 421 provided by Mr. Rorison and Mr. Koepke (described above), and his own analyses of the data.

[192] In Dr. Iles' opinion, every cruiser brings some subjective bias to the estimation of timber volume. He estimated this at 0.5%. However, if a cruiser does something - intentionally or unintentionally - that reduces tree count, this particularly introduces bias. Further, when establishing plot centres, *any* movement away from the point indicated by the measurement process causes a problem: the cruiser does not have to move very far. He concluded that anything not systematic, including anything intentional, introduces bias.

[193] In his first expert report, Dr. Iles states that basal area of timber is "the most important measurement by far - and constitutes the major differences from the data sets compared in this expert report". He compared all of the cruises completed on CP 421 (the original CnS cruise, the CnS re-cruise, the SPIT cruise, and the Baufor cruise) and concluded that the data from these cruises was remarkably similar except for basal area:

> The big difference in the results is therefore due to the Basal Area …. There is some difference in the amount of defect assigned by different parties, but here again the difference is only a percent or two. *The issues in this analysis are virtually all about the Basal Area* of the stand. (page 4) [Emphasis added]

[194] This conclusion is based on the following data from the four cruises:

- the original CnS cruise indicated a basal area of 27.9 m^2/ha, with a net coniferous volume of 33,458 m^3;
- the CnS re-cruise indicated a basal area of 31.0 m^2/ha, with a net coniferous volume of 36,246 m^3;
- the SPIT indicated a basal area of 44.3 m^2/ha[11]; and
- the Baufor cruise indicated a basal area of 41.9 m^2/ha, with a net coniferous volume of 49,866 m^3.

[195] Dr. Iles noted that the results from the two CnS cruises were remarkably similar, as are those from the SPIT and Baufor cruise. However, the two pairs of data sets are statistically different from one another.

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[11] As noted above in paragraph 182, based on the information of the Agreed Statement of Facts, the basal area is adjusted from 44.3m^2/ha to 44.1m^2/ha.

[196] At pages 5-6 of his report, Dr. Iles identified possible sources of error that could cause discrepancies in basal area calculation, and considered whether that source explained the discrepancies observed:

1) Using the wrong tool, such as the wrong BAF prism. He rejects this as significant because the tree counts of the original Ministry check and the original CnS cruise were similar.

2) Ignoring trees that should have been counted as merchantable or miscategorizing "dead-potential" as "dead-useless". Of note, he included the possibility of missing snow-covered trees in this category, but indicated that the Ministry check cruise would have noticed if there were missed trees and discounts this as the likely source of the differences for the same reason as (1) above: the check cruise numbers were similar so this is unlikely to be the reason for the difference.

3) Moving the plot centres to a location that had fewer trees or a certain mix of species instead of what was at the appropriate sample location. Dr. Iles concluded that a compass direction error or distance between plots was unlikely to cause any noticeable error.

4) Getting an unusual sample, which could explain some discrepancy. Dr. Iles considered the likelihood of a sampling error based on the number of plots used and concluded that the differences observed are too large to happen by random chance.

5) Data compilation of the results might be done incorrectly. Dr. Iles stated there is no evidence that the basal area has been corrupted by the compilation process.

[197] In Dr. Iles' opinion, the likely source of error was that the plot centres were simply not where they were supposed to be. This was the focus of his evidence.

[198] Dr. Iles presented his rationale graphically, demonstrating the basal area comparisons of 28.4 m^2/ha[12] for the original CnS cruise, and 44.3 m^2/ha for the SPIT. Dr. Iles concluded that 90% of the plots from the original CnS cruise had a smaller basal area than the SPIT analysis. Illustrating the comparison with another graph, he pointed out that the volume of timber estimated by the original CnS cruise would have to be increased by 56%[13] to correspond to the volume estimated from the SPIT. Dr. Iles considered whether this difference could reasonably occur by chance. He calculated that this result could occur one in 900,000,000 times. Since this is such a highly unlikely outcome, the plot centres for the original CnS cruise must have been moved from where they should have been.

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[12] Dr. Iles used the basal area of 28.4 m^2/ha calculated for the same 49 plots as used for the SPIT cruise by Mr. Rorison (see cumulatively numbered page 88 of Ex 36, Mr. Rorison's affidavit, Tab L). Basal area for all the plots cruised in the original cruise is calculated at 27.9 m^2/ha.

[13] Using the corrected basal area comparator of 44.1m^2/ha, this would amount to an increase of 55%.

[199] Dr. Iles suggested an alternative explanation for the underestimation of timber; namely, that the cruiser deliberately tried to keep the tree count low. He substantiated this by noting that the Baufor cruise and the Harvest Billing System scale information disclose higher volumes for CP 421 than the original CnS cruise.

[200] Dr. Iles replied in writing to Mr. Giesbrecht's and Mr. Staff's supplemental reports, advising that nothing in those reports changed his view that the plot centres for the original CnS cruise had been moved from where they should have been. Further, in his opinion, Apollo's experts did not address the basic issue. Dr. Iles explained that the sources of variability which Mr. Giesbrecht and Mr. Staff suggested could cause the low cruise numbers would apply equally to anyone doing the work on the same cutting permit area. In his opinion, the variability that Mr. Giesbrecht and Mr. Staff described as causing the lower cruise estimates, would show up in the other results, but did not.

[201] Dr. Iles noted that the CnS cruises that he reviewed always underestimated timber volume. He pointed out that, if the results were a consequence of variability in cruising methodology, he would expect there to be approximately equal examples of plots where timber was underestimated and others where timber was overestimated. He determined that all but one of the samples that he evaluated had underestimated timber volume. Dr. Iles concluded that the result could not be due to variability in the cruising methods, and was most likely due to bias.

b) Expert witness: Dr. James Thrower, PhD, RPF.

[202] Dr. Thrower is a forestry consultant currently working for Westwood Fibre Ltd. in Kamloops, BC. Dr. Thrower was qualified as an expert in forest biometrics and sampling theory. He provided two reports: one titled "Technical & Statistical Issues" dated September 18, 2016, and a "Rebuttal Report" dated October 31, 2016, written in response to the supplemental reports of Mr. Giesbrecht and Mr. Staff.

[203] Dr. Thrower's analytic approach differed somewhat from Dr. Iles' review. Dr. Thrower evaluated five cruises: the original CnS cruise, the CnS re-cruise, the SPIT cruise, the Baufor cruise and a partial stump cruise done by an Apollo employee after harvesting had occurred. Because it was incomplete and there was snow on the ground for some of the stump cruise, Dr. Thrower considered the results of the stump cruise unreliable and did not rely on those results for his opinion.

[204] Dr. Thrower focused his analysis on the original CnS cruise using tree and stand attributes from the other cruises. He noted that tree heights (important to the calculation of tree volume) in both the original CnS cruise and the Baufor cruise "were measured to the same degree of accuracy"; accordingly, he considered those height estimates to be reliable. Similarly, Dr. Thrower interpreted the diameter estimates for both cruises to be reliable. He pointed out that the estimated deductions used to reduce gross to net merchantable volume were essentially the same for the original CnS cruise and Baufor cruises (33% versus 32%). Dr. Thrower advised that he could not calculate these comparisons from the SPIT data because the SPIT was only meant to verify tree counts: it did not collect tree diameters except for borderline trees, and did not collect heights or pathological indicators to allow for volume net downs.

[205] Dr. Thrower noted that the "estimates of stand density (number of merchantable trees/ha) was dramatically different" in the original CnS cruise (643 trees/ha) compared with the Baufor cruise (1,050/ha), and that stand density could not be calculated for the SPIT data. He stated at page 9 of his first report:

> *3.2.5 Basal Area*
>
> The CNS1[14] [original CnS cruise] estimate of basal area (27.9 m^2/ha) was dramatically lower than the Baufor cruise estimate (41.9 m^2/ha) and the SPIT cruise (44.4 m^2/ha). …. *These differences in basal area among cruises are essentially the same proportionally as the difference in stand density*. [Emphasis added]

[206] In terms of net merchantable volume, Dr. Thrower reported at page 10 of his first report that "the Baufor cruise estimate was 50% higher and the SPIT cruise 58% higher" than the original CnS cruise estimate. Dr. Thrower concluded that the original CnS cruise "appears to under-estimate the actual volume of the CP 421 area." He wrote, "I believe the reason for this under-estimate (in volume, basal area, and stand density) is the substantially lower number of trees in the cruise plots as compared to the Baufor cruise (which I consider, based on the information provided to me, to be of higher reliability)."

[207] At page 11, Dr. Thrower considered possible reasons for the differences between the cruises:

1. using a different BAF prism in the field than for compiling the data;
2. sample plots consistently being put in areas of lower stand density compared to the overall stand density; or
3. random chance.

[208] Dr. Thrower said that there was no evidence that a different BAF was used in the field than for compiling the data.

[209] To assess the third possibility – random chance – Dr. Thrower developed probability curves for each of the original CnS, SPIT and Baufor cruises - based on metric volume per hectare - and then compared them. Dr. Thrower concluded that:

> … there is no statistical test or comparison that would show even a remote chance that the CNS1 [original CnS cruise] estimate could be within a reasonable probability of being the same as the SPIT or Baufor cruise estimates. (page 12)

[210] Accordingly, Dr. Thrower discounted random chance as a possibility. He testified that the original CnS cruise estimate was so different from the others that he had to conclude that it sampled a different population of trees than the Baufor cruise and the SPIT. This left the second possible reason: the sample plots were not where they should have been.

[211] Dr. Thrower evaluated the original CnS cruise information against similar stand types in the same geographic area as CP 421. He concluded that, "there is

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[14] In his reports, Dr. Thrower referred to the original cruise of CP 421 as CNS1.

an extremely high likelihood that the CNS1 cruise underestimates the true average volume for the CP 421 area (and stand density and basal area)." To that end, he examined the harvested volume from over 700 cutting permit areas in the region, and by district, highlighting differences associated with the cruiser (CnS), and licensee (Apollo). In his first report, Dr. Thrower infers the following from the data:

> The Apollo cut-to-cruise ratios appear higher than other licensees when CNS cruises are included (Figure 9). However when CNS cruises are removed, Apollo's ratios were similar to other licensees (Figure 10). The reason appears to be impact on the overall average of the ratios from the CNS cruises, which were always higher than any other Apollo cruising contractor. …. (page 23)

[212] Dr. Thrower outlined several possible reasons and conditions that could result in high cut-to-cruise ratios:

- more merchantable timber is recovered during harvest using different log specifications than assumed in the cruise;
- pulpwood is recovered;
- the cruise otherwise under-estimates the volume actually harvested or recovered; or
- there is a systematic error in cruising.

[213] For the last possibility, he lists the same potential reasons noted above (computational error with the BAF prism, consistently locating plots in locations of lower tree density, and random chance). He concluded at page 26 that the most likely explanation was "locating plots in areas of lower stand density than the overall stand average (purposely or through some systematic or application error)".

[214] Assessing the reliability of the cruises conducted after the original CnS cruise, Dr. Thrower rated them as follows:

- SPIT - high;
- Baufor - high;
- CnS re-cruise - unreliable.

[215] In his rebuttal report to Mr. Giesbrecht's and Mr. Staff's supplemental reports, Dr. Thrower considered an answer they gave regarding whether there is a direct relationship between a cruise being conducted in accordance with the Cruising Manual and the specific cut-to-cruise ratio achieved for a particular permit. Both Mr. Giesbrecht and Mr. Staff had answered "no".

[216] While Dr. Thrower believes that both of these experts "answered the question properly as it was presented", he elaborated as follows:

> However, I believe it is worthwhile expanding on the question by discussing an element of error they may not have considered – and that I consider completing work that is *not in accordance with the Cruising Manual*. That is a systematic error in how trees are selected for sampling - that result in a consistent under- or over-estimation of cruise volume - which would then bias the C2C [cut-to-cruise] ratio to

> a higher or lower value than would otherwise be the case. (page 2) [Emphasis in original]

[217] Dr. Thrower considered the factors that Mr. Giesbrecht and Mr. Staff had suggested could explain the anomalies. He said that measurement error is generally assumed to be negligible based on two premises: firstly, the generally high level of training and experience for forest professionals and technicians when cruising to industry standards; and secondly, due to check cruising. Regarding the source and magnitude of measurement errors, he agreed with Mr. Giesbrecht that, if the error was within the tolerances set by the Cruising Manual, the impact could be 2 to 5% of volume. Dr. Thrower considered Mr. Staff's comments on the potential impact of systematic measurement error resulting in bias due to identification of pathological indicators. In Dr. Thrower's view this can be relatively significant for individual trees, but is likely much less when assessed over all trees sampled in a cruise. Dr. Thrower estimated the potential impact of this type of error to be up to 5% volume, and potentially greater than 10% in areas with a high proportion of decay.

[218] Dr. Thrower next explained that it is essential not to "miss" trees in prism cruising, and that the sample must be collected as intended. He states at page 4:

> Trees must be included in the sample in a way that is random, where the statistical probability of inclusion is known, and that probability is correctly used in the analysis and compilation of the data. Any deviation from this results in a bias in the estimates.

[219] Dr. Thrower testified that the Cruising Manual sets the standard in this regard: "The large potential for bias from deviations from the random (or representative) sample is reflected in the strict FLNRO auditing standards. A systematic error that results in plots with fewer trees than is representative of the stand, or missing a tree or trees in a series of plots, can readily introduce bias." He clarified that this type of error would result in high cut-to-cruise ratios.

[220] Under cross-examination, Dr. Thrower responded to Apollo's assertion that, in cruising, "a plot is a plot is a plot" by clarifying that, "a *valid* plot is a *valid* plot". He explained that a valid plot is one done within the standards, i.e., in a valid way with known probability. He said that the results from different cruisers in the same area should be comparable provided that the Cruising Manual standards are met. He emphasized that plots need to be located, and samples taken, in an unbiased manner. As to the characteristics of the Kazchek operating area, Dr. Thrower could not imagine them significantly influencing the cut-to-cruise results, noting that local conditions could foreseeably have some – but not a significant – effect.

DISCUSSION AND ANALYSIS

1. Did Apollo submit "accurate" information to the Ministry as required by section 105.1(3) of the *Forest Act*?

[221] Section 105.1(3) states:

> (3) The holder of an agreement who is required under the agreement or this Act to submit information to the government

> (a) for use in determining, redetermining or varying a stumpage rate, or
>
> (b) for any other purpose under this Act,
>
> must ensure that, at the time the information is submitted, the information is complete and accurate.

[222] There is no dispute that Apollo was required by its licence and the IAM to submit an accurate appraisal data submission to the Ministry with its application for CP 421. Nor is there any dispute that the cruise data was a mandatory component of that appraisal data submission, or that the information was used to determine the stumpage rate and the billed volume of Apollo's cut timber.

[223] The narrow issue in dispute is whether this information was accurate at the time it was submitted.

Apollo's Submissions

[224] Apollo addresses two questions that arise from this narrow issue: (1) how should "accuracy" be interpreted and applied in the cruising context; and (2) what is meant by "at the time the information is submitted".

"Accuracy"

[225] Apollo argues that the meaning of the term "accurate" must be taken from its statutory context. In support, it refers to section 8 of the *Interpretation Act*, R.S.B.C. 1996, c. 238, and *Rizzo & Rizzo Shoes Ltd. (Re)*, [1998] 1 SCR 27 at paragraph 21:

> … Elmer Driedger in *Construction of Statutes* (2nd ed. 1983) best encapsulates the approach upon which I prefer to rely. He recognizes that statutory interpretation cannot be founded on the wording of the legislation alone. At p. 87 he states:
>
> > Today there is only one principle or approach, namely, the words of an Act are to be read in their *entire context and in their grammatical and ordinary sense* harmoniously with the scheme of the Act, the object of the Act, and the intention of Parliament. [Emphasis added]

[226] Because the term "accurate" is not defined in the *Forest Act*, Apollo states that the Panel should look to the interpretations previously given to the term by this Commission and the courts. It places particular emphasis on the Commission's decision in *Ainsworth Lumber Co. Ltd. v. British Columbia*, (Decision No. 2008-FOR-006(a), October 29, 2010) [*Ainsworth Lumber*], in which the Commission specifically considered the meaning of "accurate", as follows:

> 108. … the phrase from the Canadian Oxford Dictionary (1998) definition of "accurate" that most appropriately fits the context of this case is "conforming … with a given standard". [Emphasis in original]

[227] In the present case, Apollo submits that the "given standard" is the Cruising Manual because the IAM requires an appraisal data submission to include cruise

data that is "gathered and compiled" in accordance with the Cruising Manual (section 1.5.1). However, Apollo notes that the BC Supreme Court clarified the requirement for accuracy in *British Columbia (Forests, Lands and Natural Resource Operations) v. British Columbia (Forest Appeals Commission),* 2014 BCSC 2192 [*Western*].

[228] The Court in *Western* considered accuracy in the context of a licensee operating under the requirements of the Coast Appraisal Manual (the equivalent manual to the IAM for the coastal region of the Province). It found that:

> 171. …. *Section 105.1 does not impose an absolute and paramount requirement to submit accurate and complete information in a stumpage appraisal regardless of the circumstances.* The information must only be accurate and complete in accordance with the required standards set by the CAM. This standard is mandated by s. 105(1)(c) of the *Forest Act*. To conclude otherwise places a standard of compliance on a licence holder that would be impossible to meet. [Apollo's emphasis]

[229] Apollo submits that this is an important qualification in the context of timber cruising because it is an exercise in statistical sampling that does not lend itself to any notion of absolute or precise accuracy. It highlights the fact that cruising produces an "estimate" and, as such, cruise information is inherently uncertain. This is clear from the evidence of various witnesses who identified a number of variables that can affect the cruise data. Further, Apollo notes that the Cruising Manual acknowledges this lack of precision at page 1-1, where it states:

> The reliability of any cruise is based on statistical concepts and the cruise provides an estimate of the volume on the area cruised. The reliability of this estimate is a function of the intensity of sampling, the uniformity of the timber on the area cruised and the degree of fit of the volume equation and loss factors to the particular stand. *It is for these reasons that two cruises of the same stand, carried out to the same standard may yield different volumes. For administrative purposes it is assumed that the calculated volume is the true volume.* [Apollo's emphasis]

[230] Apollo notes that section 2.1 of the Cruising Manual states that the objective of a timber cruise is to obtain an "unbiased estimate of the volume and quality of timber" in the cutting permit area "to a specified confidence interval or sampling intensity". As such, Apollo submits that the test for accuracy in this case ought to be whether the cruise data falls within the parameters of sampling intensity and sampling error prescribed by the Cruising Manual. It submits that this approach is warranted because not every deviation, or apparent deviation, from the required cruising process will affect the accuracy of the cruise information generated.

[231] Apollo further submits that, whether a plot location is reproducible (e.g., by check cruises) does not have a direct bearing on the accuracy of the cruise information generated "because it does not tell you one way or the other whether it was [located in a] biased manner (i.e. to achieve a particular result in the sense of driving your estimate consistently higher or lower) or whether it is just part of the

variability inherent (and accepted) in the cruising process." Apollo concedes that, if plot locations were moved (i.e., located in a biased manner), then the information will be deemed inaccurate as it reflects a biased sample of the volume and quality of timber; however, it denies that this occurred in this case.

[232] In the present case, Apollo submits that the original CnS cruise was "accurate" because the cruise was based on a proper cruise plan, data was collected in accordance with that plan, and the data fell within the prescribed sampling error allowed by the Cruising Manual. Moreover, it argues that the Ministry accepted the cruise data in May 2013 – after which Apollo submitted its first application for CP 421 – noting that Ms. Forshner had advised Apollo that the original CnS cruise had passed the Ministry's check cruise.

[233] Apollo also notes that Mr. Leidl reviewed the Cruise Tally Sheets and the cruise compilation report and was satisfied the cruise met the statistical error requirements of the Cruising Manual. Apollo submits that this demonstrates that the cruise was consistent with the cruise plan and that the results met the standards of the Cruising Manual, and was therefore accurate.

[234] The thrust of Apollo's position is that the difference in results identified by the Government can be attributed to the inherent variables that can distort the estimate of merchantable timber. Sources of "human-introduced" variability include: the cruiser's interpretation of the subjective rules of the Cruising Manual, field measurement considerations (including instrument-based errors and compass adjustments due to declination), adapting the cruise plan to account for the timber being cruised, miscalculating the sampling requirements to account for stand variability, selection of the BAF prism, and prevailing climatic conditions. Further, the amount of dead wood can lead to more variable cruise results as a stand ages, or as a result of bark beetle infestation and mortality. Apollo submits that the collective effect of these variables can account for the differences between the original CnS cruise and the check cruises.

[235] Regarding the location of plot centres, Apollo submits that, absent bias, the inability to reproduce plot locations does not demonstrate inaccuracy in the cruise data. At the hearing, Mr. Crichton clearly stated that, unless there are safety issues, he would not intentionally move a plot. Apollo argues that there is no evidence to counter Mr. Crichton's testimony. In sum, Apollo submits that, even though the plot centres for the original CnS cruise were not consistent with the second check cruise, accuracy is not a reflection of that sort of reproducibility.

[236] As has been noted, Apollo accepts that data must be unbiased in order to be considered accurate; however, it submits that there is no direct evidence that the plots were located with intentional bias – and without that evidence, the Government cannot be successful.

[237] Regarding the Government's reliance on Apollo's historic cut-to-cruise ratios to establish bias, Apollo submits that there are two issues with this approach. Firstly, a multitude of factors affect cut-to-cruise ratios for a given permit, but none of the witnesses analyzed whether there are alternative explanations for some – or all - of the data making up the trend alleged by the Government. Secondly, an assessment of the cut-to-cruise ratio for CP 421 is, of necessity, an exercise in

hindsight and improper in the context of the alleged contravention because it uses post-submission information (i.e., the harvest results for CP 421) to draw the necessary comparisons to assert that the information, as submitted, was inaccurate. This latter issue is addressed further under the next heading.

"At the time the information is submitted"

[238] Apollo submits that, in section 105.1(3), accuracy is not to be assessed retrospectively based on information collected after-the-fact or in hindsight. It submits that the Government's analysis and criticism of the original CnS cruise is improperly based on "after-the-fact statistical analyses" of CP 421 and other permits and trends. For example, as noted above, the Government is using cut-to-cruise ratios to establish bias. However, cut-to-cruise ratios can only be determined once timber is delivered to the mill. In this case, that information was not known at the time of the data submission. As such, the use of this information is contrary to the intention of section 105.1(3) of the *Forest Act*.

[239] Apollo submits that the following findings in *Ainsworth Lumber* support its position on the meaning of this phrase:

> 119. In considering this issue, the Panel finds that subsequent information provided by Ainsworth in May 2006 is not appropriate to take into account in determining whether Ainsworth violated section 105.1 of the *Forest Act*.
>
> 120. …. The original appraisal data submission and the second appraisal data submission reflected Ainsworth's estimates of the engineering costs that the notional average operator would incur if constructing roads for CP 205. Only after construction was complete, and actual site conditions were known, were alterations made to its road design. It was only when these changes were made that the construction and actual site costs were known, and Ainsworth's ECEs [engineering cost estimates] could be amended (as they were in fact amended after negotiations with the Ministry). This does not make the estimates that were the basis of the second appraisal data submission inaccurate at the time they were submitted.

[240] For all of these reasons, Apollo submits that the information was considered accurate at the time it was submitted and, therefore, it complied with section 105.1(3) of the *Forest Act*.

The Government's Submissions

[241] The basic premise to the Government's argument regarding "accuracy" is succinct: the original CnS cruise of CP 421 was biased. As a result, the information submitted with the application was inaccurate.

[242] The Government agrees with Apollo that the term "accurate", in the context of section 105.1(3) of the *Forest Act*, means that the cruise must conform to the standards of the Cruising Manual (and the Cruising Compilation Manual). However, it disagrees with Apollo regarding the application of the evidence to this definition.

[243] The Government also disagrees with Apollo's interpretation of the phrase "at the time the information is submitted". The Government submits that this phrase means that accuracy is to be determined with reference to the standards in effect at the time of submission, not that accuracy must be reviewed with reference to the facts known to the licensee at the time of submission.

[244] Regarding bias as a basis to conclude that information is not accurate as intended by section 105.1, the Government submits that it is not necessary to prove subjective intent, i.e., that plot centres were *intentionally* moved; rather, it is only necessary to prove that the plot centres were located in a manner that resulted in a biased sample, such as a reduced tree count (and corresponding reduction of basal area).

[245] The Government refers to "four strands of evidence" that, when woven together, establish that Apollo's submission of appraisal data, based on the original CnS cruise, was inaccurate. Those strands of evidence are as follows:

1. the Ministry's basal area cruise (the SPIT) of 49 plots that yielded a basal area higher than the original CnS cruise "by a margin too large to have occurred by random chance";
2. the second check cruise of plot locations which indicated that 12 out of 15 original CnS cruise plot centres were not where they should have been within a 100 metre grid, by a margin "far exceeding the tolerances specified in the Cruising Manual" and "on a pattern not explicable on the basis of systematic procedural or instrumental error";
3. the re-cruise of CP 421 by Baufor, an independent cruising agency, which yielded a higher basal area than the original CnS cruise, and which was in line with the SPIT data; and
4. the pattern of anomalously and consistently high cut-to-cruise ratios "since at least 2005", including a ratio of 1.6 times the volume of the original CnS cruise volume for CP 421 delivered to Apollo's sawmill.

[246] The Government asserts that the evidence is clear that the basal area of the stand in question – and by extension, the cruised estimates of harvestable timber – was significantly under-estimated by the original CnS cruise. Whether Apollo knew it or not, the cruise results were inaccurate and inherently unreliable.

[247] The Government notes that the second check cruise shows 12 of the 15 plot centres checked from the original CnS cruise were located in a manner that exceeded the tolerances permitted by the Cruising Manual (section 3.6.3.2), making that cruise unreliable and not in conformance with the Cruising Manual. There were 175 plot centres from the original CnS cruise that were not checked.

[248] In addition, the Government says that Mr. Hill's evidence establishes that the plot location discrepancies were too large, and too inconsistent in pattern, to be the result of systemic "field navigation" errors. This corroborates Mr. Tait's observation that a number of plot centres had been located laterally from where they ought to have been along the strip lines.

[249] The Government submits that the SPIT results are useful because this test is specifically designed to determine bias in sampling and is corroborative of the discovery that so many plot centres were not where they should have been: the test results show that plots from the original CnS cruise were not representative of the stand and plot centres were consistently in areas that resulted in lower stand density. In other words, the location of the plot centres was biased.

[250] The Government emphasizes Dr. Iles' conclusion that there is a one in 900 million chance that the results of the original CnS cruise were valid, which effectively equates to no chance at all. While some bias in sampling basal area can result from small movements by the cruiser, that was not the case here. Dr. Thrower put this somewhat differently, concluding that the original CnS cruise estimate was so far out that it appeared to have been for a different population (stand) of trees than the Baufor cruise that was ultimately used to do the appraisal and determine stumpage for CP 421.

[251] The Government also submits that its expert evidence ought to be preferred over Apollo's, pointing to Dr. Thrower's comment that portions of Mr. Giesbrecht's and Mr. Staff's expert reports seem to confuse "statistical terms that in my world don't get confused".

[252] Relying on Mr. Hill's evidence, the Government argues that the stand of timber in question ought not to have been difficult to cruise and, further, there is no evidence that it was. Also, there is no evidence that the timber or topography associated with the stand had characteristics that would explain, or excuse, the discrepancies. Finally, the Government refers to the historical cut-to-cruise data, and points out that it demonstrates consistently lopsided cut-to-cruise ratios (well over 1:1) associated with CnS cruises, not just in the Kazchek but also in other areas.

[253] Based on the evidence presented, the Government submits that the determination regarding contravention ought to be upheld as Apollo's information was not "accurate", i.e., at the time that it was submitted, the original application was based on data from biased sampling.

The Panel's Findings

[254] Before deciding the issue of whether Apollo's information was accurate at the time it was submitted to the Ministry in accordance with section 105.1(3) of the *Forest Act*, the following sub-issues must be considered:

a. What is the meaning of "accurate" in section 105.1(3) of the *Forest Act*?

b. Does the *assessment* of accuracy have to take place at the time the information is submitted and be based only on evidence or analyses in existence at that time?

(a) What is the meaning of "accurate" in section 105.1 of the Forest Act?

[255] In *Ainsworth Lumber* this Commission adopted the Canadian Oxford Dictionary (1998) definition of "accurate" as being "careful, precise; lacking errors" and "conforming exactly with the truth or with a given standard".

[256] The Panel agrees with the parties that *Ainsworth Lumber* establishes that "accurate" in the context of the present case is "conforming with a given standard". The Panel further agrees that the required standards are set out in the various provisions of the Cruising Manual pursuant to section 1.5 of the IAM. The Panel also accepts Apollo's general assertion that, to be accurate, cruise data ought to "achieve the applicable confidence interval and sampling intensity as demonstrated by, among other things, the prescribed tolerance limits for sampling error in the Cruising Manual". However, meeting the prescribed tolerance is not "the end of the story." As Apollo notes, accurate information in the context of cruising must mean that the information "is reliable, in the sense of producing an unbiased estimate of the volume and quality of timber on a cutting authority area to a specified confidence interval or sampling intensity." [Emphasis in original]

[257] It is clear to the Panel that, to be "accurate" in compliance with section 105.1(3) of the *Forest Act*, the information submitted must have been obtained using practices that comply with the standards established by the Cruising Manual and result in a reliable and unbiased estimate which is within the specified confidence interval or sampling intensity. This determination cannot be limited by what the licensee knew regarding the facts of the submission of the application. This means that accuracy is to be determined with reference to the standards in effect at the time of submission, not that accuracy must be reviewed with reference to the facts known to the licensee at the time of submission.

b) Does the assessment of accuracy have to take place at the time the information is submitted and be based only on evidence or analyses in existence at that time?

[258] *Ainsworth Lumber* addresses a similar question and the facts in that case are important to this sub-issue. The Commission considered whether the engineering cost estimate ("ECE") information submitted for road design and construction was accurate. The issue centered on whether the licensee should have "updated" the engineering cost estimates ("ECEs") for road construction contained in its original appraisal data submission used to establish stumpage rates. Ainsworth submitted to the Ministry a total of three appraisal data submissions containing its ECEs. The first estimate exceeded $800,000. After some of the construction was complete, the Ministry asked for an updated ECE that reflected a number of changes. Ainsworth submitted a second appraisal, but did not change the original ECEs. Nine months later the company submitted revised appraisal data, based on the actual costs of construction work completed, with revised ECEs. The ECEs in the final appraisal were approximately $200,000 less than the previous submissions. The Ministry found that Ainsworth contravened section 105.1 when it submitted its second appraisal data submission without having updated its original ECEs based on actual construction costs known at that time. Of relevance to the present appeal,

the Ministry's Determination in that case found that the second submission (using the original ECEs) was not accurate at the time that it was submitted.

[259] In its decision on that appeal, the Commission found that the IAM requires licensees to provide cost estimates as a "forward-looking exercise" using the parameters established in the IAM. It held that Ainsworth had followed the requisite standards for estimating the costs, including road design and construction costs, in accordance with the standards established in the relevant IAM. Of note, the Commission then found as follows:

> 120. In the absence of a specific reference to which part of the formulas for estimating ECEs in the IAM that Ainsworth failed to meet, or a specific request for actual detailed engineering costs incurred to date, the Panel is unable to conclude that, at the time Ainsworth made its second appraisal data submission, the information submitted was inaccurate. The original appraisal data submission and the second appraisal data submission reflected Ainsworth's estimates of the engineering costs that the notional average operator would incur if constructing roads for CP 205. Only after construction was complete, and actual site conditions were known, were alterations made to its road design. It was only when these changes were made that the construction and actual site costs were known, and Ainsworth's ECEs could be amended (as they were in fact amended after negotiations with the Ministry). This does not make the estimates that were the basis of the second appraisal data submission inaccurate at the time they were submitted. [Emphasis in original]

[260] Having complied with the standards of the appraisal manual when estimating construction costs, the Commission held that the licensee could rely on those estimates for the purposes of section 105.1 of the *Forest Act*, and that they were accurate. The fact that the cost estimates used by the licensee at the time they were submitted were different than the actual costs did not make them inaccurate.

[261] The Panel finds that the situation in *Ainsworth Lumber* is decidedly different from the situation which gave rise to this appeal. In this case, after the submission of the first application for CP 421 the Ministry began an investigation to gather information for enforcement purposes: the Ministry set out to determine whether the applicant licensee – Apollo – had complied with the standards of the relevant legislation, policies and procedures in place at the time the licensee made the submission. The data from the original CnS cruise was essential to the application. The Ministry did not wait and undertake its investigation based on the known merchantable timber volume after the harvest of CP 421. That would have been analogous to what the Ministry did in *Ainsworth Lumber*, where the Ministry pursued its enforcement based on known costs. In this case the enforcement was based on an assessment of whether Apollo met the cruising standards it was obligated to meet. The cruise estimated harvestable timber to calculate stumpage, not actual harvest. The investigation determined if the estimate was accurate, not if the estimate and actual harvest were the same. The Ministry rejected the information within the submission before approving the cutting permit application.

[262] The Panel finds that, as a matter of determining compliance with the legislation Ministry staff is not "time-limited". If further investigation and analysis indicates that the information provided to the Ministry was not accurate at the time it was submitted, then it ought to be considered when determining whether there has been a contravention. This is entirely consistent with the Court's purposive interpretation of section 105.1 in *Western*:

> 169. The underlying premise of the *Forest Act*, and the CAM [Coast Appraisal Manual] provisions in particular, is that the licence holder will submit only accurate information when input is required from the licence holder. The Ministry's employees can question the information submitted by a licence holder and require different data to be used to calculate stumpage and appraisal data submissions must be signed and sealed by a professional forester registered under the *Foresters Act* The Ministry depends on the honesty and integrity of the licence holder under this system; however, section 105.1 of the *Forest Act*, by imposing a statutory obligation on a licence holder to submit "accurate and complete" information, permits the Ministry to enforce compliance with the underlying premise of the Act and penalize a licence holder who fails to comply with this statutory obligation. …. [Emphasis in original]

[263] Importantly, in *Ainsworth Lumber*, the Commission found that there was no evidence to establish that the ECEs in the second appraisal data submission did not conform with a standard required by the IAM, nor was there evidence that the licensee was required to provide additional accurate information. It reasoned at paragraph 120:

> In the absence of a specific reference to which part of the formulas for estimating ECEs in the IAM that Ainsworth failed to meet, or a specific request for actual detailed engineering costs incurred to date, the Panel is unable to conclude that, at the time Ainsworth made its second appraisal data submission, the information submitted was inaccurate.

[264] In the present case, there is no dispute that reliable cruise data was essential to the appraisal data submission, but there is disagreement about whether the information that was submitted conformed with the standards in the Cruising Manual when it was submitted. Further, in *Ainsworth Lumber* the road in question did not exist at the time the estimate was submitted. In this case, the trees certainly existed and the cruise had to comply with the Cruising Manual standards at the time the cruise data were submitted as part of the permit application. Subsequent evidence – obtained from a second check cruise, the SPIT, and re-cruising those same trees – is relevant to determining compliance. The Panel finds that the subsequent analyses were part of the Ministry's enforcement actions and served to determine the accuracy of the data in Apollo's submission at the time it was submitted.

[265] In answer to this sub-issue, the Panel concludes that the Ministry is not constrained by those limitations and must be able to conduct investigations of information after it is submitted, in order to properly enforce its legislation.

Based on the evidence, was Apollo's information accurate at the time it was submitted to the Ministry in accordance with section 105.1(3) of the Forest Act?

[266] As a preliminary matter, as this was a *de novo* hearing, Apollo argues that the Government bears the burden of proof in establishing that Apollo submitted inaccurate information in its application for CP 421. Apollo submits that the Government must demonstrate with "sufficiently clear, convincing and cogent" evidence that CnS introduced bias into the original cruise data for CP 421 by moving plot locations. Underlying this submission is Apollo's belief that the Government is alleging that CnS was intentionally manipulating the plots to achieve a lower tree count.

[267] The Government counters that the burden of proof in this appeal rests with the Appellant. In support, it relies on *Reierson v. British Columbia*, (Decision No. 2006-FOR-006(a), November 21, 2006), where the Commission states: "In an appeal before the Commission, the appellant bears the onus of proving the facts of his or her case on the balance of probabilities".

[268] The Panel finds that Apollo bears the burden of proof on this appeal. The standard of proof to be applied is a balance of probabilities. The District Manager determined that the Ministry had "proven" that Apollo's information was not accurate. Apollo has appealed that conclusion on various grounds. In the appeal, both parties have tendered many witnesses, have produced expert reports and relied on expert testimony that was not before the District Manager. They have had an opportunity to cross-examine the witnesses and have made extensive arguments. It is not unfair if Apollo has the burden of proof to establish, in fact and law, that the information was accurate at the time it was submitted, or that it has established a defence to the alleged contravention.

[269] The Panel now turns to the evidence and considers the parties positions to determine if the information Apollo submitted with its first application for CP 421 was accurate when submitted. The Cruising Manual establishes requirements for the development, use, and certification of a cruise plan for every cutting authority in relation to timber proposed to be harvested from Crown land. It sets out the general procedures and standards for cruising in BC, including how statistically valid samples are selected. It provides at page 1-1:

> In order to ensure that all purchasers of Crown timber are being treated equally and equitably, the manual sets out the minimum cruising standards that must be met. These include specifications for the statistical design of the cruise, the accuracy of field measurements and standard compilation procedures.

[270] The Cruising Manual establishes the standards and sampling error objectives for collecting data for determining the quality and volume of timber available for harvest (section 2.4.3). It mandates sampling error objectives that must be met for cruise-based cutting authorities and describes variable-plot (prism) sampling methodology and field procedures. The Cruising Manual also outlines principles and standards for check cruising and establishes cruise compilation procedures. Section 3.6.3.2 details permissible tolerances for locating plot centres.

[271] The sampling error that Apollo calculated from the original CnS cruise of CP 421 was 5.6% which, it submits, achieved the 12% sampling error objective required by section 2.4.3 of the Cruising Manual. The Government argues that the sampling error of 5.6% describes the *precision* of the data rather than the accuracy of the samples it represents. The Government also points out that the sampling error of 5.6% in relation to the merchantable tree volume does not take into account all sampling requirements and is not a complete assessment of the accuracy of the cruise data. For example, it does not include the sampling error applicable to the *location of sample plots* or the *basal area of the plots*. Ministry staff demonstrated that 12 of 15 plots did not meet the standard required by the Survey and Area Measurement Standards of the Cruising Manual (section 3.6.3.2). Dr. Iles stated that accuracy cannot be determined from the data itself, only the precision or sampling error can be determined from the data. Accuracy needs to be determined from other standards to which the sampling was carried out.

[272] Mr. Rorison's analysis of tree counts and basal area estimates from the SPIT and the Baufor re-cruise compared to the original CnS cruise showed that the trees sampled in the original CnS cruise reflected a different population of trees than that sampled by the SPIT and the Baufor re-cruise. Mr. Rorison's evidence also clarified that the summary appraisal report for the original CnS cruise is based on an estimate of 2.8 trees per plot whereas the SPIT estimated an average of 4.4 trees per plot.

[273] Apollo contends that whether a plot location is reproducible (evaluated by the second check cruise) should not have a direct bearing on the accuracy of the cruise information generated as compared to just being part of the inherent variability that is deemed acceptable in the cruising process. It submits that, if the information generated is accurate on its face then it should be presumed to be unbiased, premised on meeting specified sampling intensity and sampling error requirements. The Panel finds that this argument is not supportable because it is based partly on advice that confuses or misinterprets concepts that underlie the essential premise to timber cruising.

[274] This is confirmed by the testimony of several of the Government's witnesses and experts, and both of Apollo's experts. They all agreed that, if plots are biased, then it is irrelevant whether some of the sampling standards and other specifics dictated by the Cruising Manual are met. According to the Cruising Manual, the primary objective of timber cruising "is to obtain an unbiased estimate …". Mr. Giesbrecht and Mr. Staff agreed that, to be valid, plot centres must be located without introducing bias; however, neither of them specifically dealt with whether the different cruise results in this case could be due to bias, nor did they specifically address the specifics of the different cruises that were completed for CP 421.

[275] The Panel accepts that data, even though precise, could be inaccurate. As Dr. Iles explained, the terms "accuracy" and "precision" have remarkably different meanings. The Panel accepts that there will be some degree of variability between cruisers, but does not accept that the differences in results from the CnS cruise of CP 421, the SPIT and the Baufor cruise are due to any of the type of factors that Apollo's experts suggested can introduce variability in sampling. This is discussed further, below.

[276] Dr. Iles defined the difference between accuracy and precision quite succinctly. All witnesses that were asked agreed with these standard statistical definitions of accuracy and precision, which are set out in Dr. Iles' publication, "A Sampler of Inventory Topics", *supra*, at page 41:

> **Accuracy** is an expression of how close something is to the correct answer, often the population mean, for instance. Accuracy in marksmanship is a question of how close you are to the bullseye.
>
> **Precision**, on the other hand, is just a consequence of *repeatability*. Something is precise if it is close to its *final* average value each time. Precision in marksmanship is how tight the grouping of shots might be. They may be off-center, but the group is still precise.
>
> ***Accuracy*** cannot be directly estimated from the data, which is why we have quality control procedures.
>
> ***Precision*** is computable by statistics, and this is what we get when we calculate "the Standard Error of the mean" for example.
>
> In sampling we spend a great deal of time and money insuring that the ***final*** value (or "expected value") if we had an infinite sample is also the ***correct*** value (the parameter of the population, and therefore accurate). How far we are from that *final* answer is estimated by the "Sampling Error". [Emphasis in original]

[277] Dr. Iles testified, in clear terms, that data from a given sample may fall within a specified standard of error, but this alone does not conclusively demonstrate that the data is reliable, let alone accurate. When asked if the fact that the data from the original CnS cruise fell within the permissible sampling error refuted the Government's claim that the data was biased, he answered:

> Oh, no. I mean, all it says is that you're getting your final answer. If what you're doing is 40 percent wrong, you're still 40 percent different. It's just that you're not - it's not going to change by taking more measurements. It's a structural error which does not go away. It's a little like using a scale to weigh patients which is off by 20 pounds, it doesn't matter how many times you weigh them you're still off by 20 pounds, it doesn't go away … So there's nothing about the sampling error which indicates correctness in the answer. It merely indicates the final precision.
>
> Statisticians talk about precision the way machinists do, "We can machine this thing within a ten-thousandth of an inch". If somebody's doing something that's, you know, a one-inch bolt when they wanted a two, well then that's an accuracy problem. Accuracy is about [the] right answer, precision is about the finality of the answer, and that's what sampling error is. *There's nothing about the sampling error which tells you whether the procedure or the results are correct*, and that's one reason why we have other sources of information to accept or refute that. [Emphasis added]

[278] Dr. Iles also helpfully explained it this way[15]:

> The worst biases are those involving the selection of the sample. These are particularly nasty because they cannot usually be corrected, and most cases cannot be detected by looking at the data.

[279] The Panel adopts Dr. Iles' explanation that precision is unrelated to accuracy, and that cruise data that is within a permissible sampling error does not, in and of itself, mean that the data was obtained from an unbiased cruise. Mr. Giesbrecht agreed that "the sampling error computed for the original CnS cruise assumes an absence of bias in the collection of the data".

[280] The Panel finds that the Cruising Manual applies the distinction between precision and accuracy to timber cruising in adopting the procedures outlined in section 3.6, Quality Assurance Standards. When read as a whole, these standards ensure that every plot centre consistently established along a grid set out in the cruise plan that was submitted, must be established where it falls and must not be moved. The Cruising Manual specifies the allowable tolerances, accounting for human (and instrument) error. Any plots falling outside those tolerances are considered unacceptable (see section 3.6 "Quality Assurance Standards"; specifically, section 3.6.3.2 "Survey and Area Measurement Standards", and section 3.6.4 "Cruise Data Submission Standards").

[281] The Panel finds that it would be correct to say, statistically, that any such plots outside the Cruising Manual tolerances were "not accurately" placed. However, that does not necessarily mean that an estimate from those plots is also statistically inaccurate, because the statistical accuracy would actually be unknown. It would be impossible to say whether they were accurate or not without further information. The Panel finds that the Cruising Manual does not require proof that any plots outside of tolerances are statistically inaccurate, only that if they are misplaced then they are unacceptable and thereby inaccurate. What this means in this case is that the placement of plots – or plot centres, in a prism-based timber cruise – is the determinative factor in deciding if data is accurate or not. This is also consistent with Dr. Iles' evidence. In other cases there may be other determinative factors affecting accuracy.

[282] Dr. Iles testified that some aspects of all of the cruises done for CP 421 are remarkably similar. From this, he concluded that the differences in sampling the stand are due to differences in determining basal area: specifically, how many trees are counted at a given plot and the variability between samples. After considering the possible sources of error that could lead to the discrepancies, Dr. Iles deduced that moving plot centres is almost certainly the source of error. He testified that 90% of the plots from the original CnS cruise showed a smaller basal area than the SPIT plots and unequivocally concluded that, despite the minor errors that Mr. Rorison commented on, the original CnS cruise was considerably biased. The Panel finds his analysis convincing. Based on Dr. Iles' statistical analysis, the Panel accepts that there is virtually no chance that the lower tree counts per plot in the

[15] Page 42, "A Sampler of Inventory Topics".

original CnS cruise reflected the tree counts that should have been achieved using standard field methods.

[283] Dr. Thrower took a different approach to considering the possibility of bias but reached the same conclusion as Dr. Iles. He concluded that the volume of wood calculated from the diameter and height of the trees that were measured is similar for all of the cruises of CP 421 (original CnS cruise; CnS re-cruise; Baufor cruise). However, the original CnS cruise clearly underestimated stand density and basal area. Dr. Thrower concluded that there is no statistical test or comparison that would validate the original CnS cruise as having been for the same stand as the SPIT or Baufor cruise estimates: it was as if the original CnS cruise sampled a different tree population. Dr. Thrower concluded that locating plot centres in areas of lower stand density than the overall stand average is the most likely explanation for the "skewed" results. He also suggested that it could be due to a systematic error in tree count. Both of these factors would introduce bias, but Dr. Thrower discounted the systematic error in tree count because the Ministry's first check cruise found the tree count at checked plots to be within allowable tolerances.

[284] Although the SPIT analysis was a useful investigative tool, the Panel finds that it was not required to show that the data was inaccurate. The testimony from Mr. Tait and Mr. Hill of the lateral displacement of plot centres from plot lines is compelling. The Panel finds that the plot centres were not where they should have been. Of the 15 plots checked, the furthest plot centre was displaced by 17.9 metres with 10 others displaced by more than 10.0 metres. These distances are well above the Cruise Manual tolerances of 2.0 metres along the plot line direction and 3.5 metres left or right of the plot line direction that would apply in this case (with 100-metre inter-plot distance). The expert opinions provided by Dr. Iles and Dr. Thrower about the differences in basal area estimated by the original CnS cruise and the SPIT corroborate, confirm and quantify the inaccuracy but are not necessary to prove inaccuracy. Once the plots were shown to be outside the placement tolerances of the Cruising Manual they were, by definition, inaccurate. Relying on *Ainsworth Lumber* and *Western*, the Panel finds this is enough to show that the data was inaccurate.

[285] If the SPIT analysis had *not* been done, the amount by which the CnS cruise data was biased, i.e., did not reliably estimate basal area, would not be known definitively but the data, as submitted, would still have been determined to be inaccurate because the plots were placed outside acceptable tolerances mandated by the Cruise Manual. The extent of bias would not be known unless one knew the factors which led to the placement. The Panel accepts Dr. Thrower's evidence that plots are only valid if done in a way such that the probability of placement is known and consistent measures are applied, which is foundational to the Cruising Manual.

[286] The Panel also accepts Dr. Iles' evidence that the only practical way to enforce plot placement is to insist on rigid tolerances according to a pre-determined plan, which is what the Cruising Manual specifies in section 3.6.3.2. If plots are moved for unknown or invalid reasons, then the accuracy of the statistical sample becomes unknown, and the accuracy of the estimates derived from those results also becomes unknown. The Panel agrees with Dr. Iles' evidence that plot placement within the tight tolerances of the Cruising Manual is crucial to the

integrity of the stumpage appraisal system. Further the Panel concludes that the SPIT results are corroborative, but not determinative, of the finding that the plot centres of the initial cruise were not placed accurately.

[287] The Panel has considered the information in the Agreed Statement of Facts which adjusted the basal area calculation for CP 421 from 44.3 m^2/ha to 44.1 m^2/ha.[16] (This adjustment was made after Dr. Iles testified.) This adjustment does not alter the Panel's acceptance of Dr. Iles' opinion or the findings noted above.

[288] The Panel finds that field data must be collected in a manner consistent with the cruise plan (in accordance with section 3.6.4 of the Cruising Manual) as a basis for submitting cruise data for an appraisal compilation. If the plot centres are not consistently placed according to the cruise plan – and within the specified tolerances – then the cruise data cannot be relied on for appraisal purposes. The IAM requires compliance with the Cruising Manual. It is viewed as subordinate legislation. Failure to comply with the Cruising Manual means that the licensee has failed to comply with subordinate legislation. Discarding the applicable standards would defeat the objectives of the appraisal process; namely, providing the basis for the calculation of stumpage payable on timber owned by the Crown.

[289] Further, the Panel finds that, because accurate cruise data is the foundation of the system by which the Ministry determines stumpage, using data of unknown accuracy is arguably worse than letting in data that is known to be inaccurate but for which the amount of the inaccuracy is known. As Dr. Iles emphasized, if any inaccuracies that equate to bias of a particular set of data or of particular factors within a data set are known and have been quantified, then the estimate can be adjusted to make the final data accurate. However, if biases are unknown, then no such correction can be made and the reliability of the entire system is no longer known. Since the biases that led to the improper placement of plot centres in the initial cruise of CP 421 are unknown, the data of the submission cannot be corrected and are unreliable as a basis for estimating timber volume.

[290] In making its findings with respect to accuracy, the Panel took into account Apollo's submissions regarding the accuracy of the initial cruise of CP 421. Drawing on Mr. Giesbrecht's expert opinion, Apollo contends that "a plot is a plot is a plot" and that all such plots would be equally valid as long as they fall in the sampled area. The Panel does not accept this view, but adopts Dr. Thrower's interpretation that a "valid plot is a valid plot". The Panel finds that the flaw in Mr. Giesbrecht's reasoning is that he assumed that the placement of a plot, if outside of the allowable tolerances of the Cruising Manual, would be appropriately random and therefore statistically reliable. The comparison of the basal area estimates of the SPIT analysis and Baufor cruise to the original CnS cruise clearly showed that the CnS cruise data were not statistically accurate. The Panel also relies on the opinions of Dr. Iles and Dr. Thrower that the CnS plots had significantly lower tree counts and therefore lower basal areas that would equate to the lower volume estimate, and that this was effectively not possible by random chance.

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[16] The Agreed Statement of Facts indicates that there should be a "net" exclusion of five trees from the SPIT data and that, on this basis, the basal area calculation should be reduced from 44.3 m^2/ha to 44.1 m^2/ha.

[291] The Panel finds that if plot placement is not within the specified Cruising Manual tolerances then it is no longer in a valid plot. To accept Apollo's argument based on Mr. Giesbrecht's interpretation that any plot is valid would be to disregard the precepts of the Cruising Manual.

[292] Apollo asserts that plot movement during cruising is unlikely due to the effort involved. Both Mr. Giesbrecht and Mr. Crichton opined that moving a plot to an area of lower tree density would require more effort that it would be worth. Mr. Smith disagreed, saying estimating whether trees are in or out at a given point required "just eyeballing". The Panel favours Mr. Smith's interpretation. The evidence provided by several witnesses describe the stands cruised for CP 421 to be homogeneous in species and size; the ground and brush was snow-covered so spaces between trees were easily observed; and under these circumstances visually estimating the number of trees in a plot could be easily done. Dr. Iles testified that moving even a small distance (1 to 3 metres) away from where the plot centre should be could result in a completely different result. Based on these factors, and the familiarity that an experienced cruiser or compassman would have with establishing plot centres, the Panel finds that the time and effort required to quickly estimate the tree count at a plot is minimal, and easily achievable in field situations such as those in this case.

[293] Regarding intention, the Government clarified in its closing arguments that it is not alleging intentional wrongdoing by CnS or Apollo. It submits that "bias" in sampling does not require proof of subjective intent; the Panel need only determine that plot centres were located in a manner that resulted in a reduced tree count (and corresponding reduction of basal area).

[294] The Panel notes Dr. Iles' comment that biased sampling does not necessarily involve intent:

> It's simply that there is some reason why your final answer is not the same as the correct answer. So that's what bias means. It's not a question of intent.

[295] The Panel agrees that a party need not demonstrate there was subjective intent to establish the type of bias alleged in this case. Although the Panel notes that, at times, the evidence pointed to a subjective intention, that is not the test that the Panel is applying. As noted above, the Panel accepts the evidence of Dr. Iles and others that the statistical meaning of bias is that an estimate did not achieve the true value. The means by which that true value was not achieved or the factors which caused it are not relevant to the statistical term "bias".

[296] Mr. Giesbrecht and Mr. Staff indicated that there are many factors that contribute to variability (human error, instrument error, errors due to inherent biophysical characteristics of a timber stand) and, because of these factors, the placement of plot centres is not completely reproducible. In assessing this assertion, the Panel considered the evidence of Dr. Iles, who pointed out that in assessing the impact of variability based on these types of factors the expectation would be that the data would show differences in outcome both above and below the accurate result, in roughly equal amounts. Dr. Iles showed that the data from the initial cruise was consistently low, or an underestimate, as compared to the

mean tree count value from the Baufor cruise and the SPIT cruise. On this basis, he dismissed the suggestion that the low estimate of timber was related to the inherent variability in cruising due to the types of factors (human error, instrument error, errors due to inherent biophysical characteristics of a timber stand) that Apollo suggested. As noted previously, Dr. Thrower opined that the factors that Mr. Giesbrecht and Mr. Smith referred to would account for variability of 2% to 5% (up to 10% in stands of high pathology), and errors due to this type of variability would not amount to the total error introduced in the estimate of merchantable timber from the original cruise of CP 421 (over 50%).

[297] The Panel accepts, and relies on, the conclusions of Dr. Iles and Dr. Thrower regarding variability. The Panel finds that the general considerations (human error, instrument error, errors due to inherent biophysical characteristics of a timber stand) suggested by Mr. Giesbrecht and Mr. Staff as a basis for variability in cruise results do not account for the magnitude of the discrepancies at issue in this case. Between Dr. Iles, Dr. Thrower and Mr. Hill, any conceivable sources of error were considered and discounted. Each of these may have contributed to inaccuracy or sampling error, but none could account for the degree noted in the check cruises or the SPIT. By way of example, Mr. Hill considered magnetic interference or the failure to apply a compass declination as factors that could have contributed to the inaccuracy of plot centre placements – but there was no conceivable way that these factors could have contributed to the degree of inaccuracy of plot placement observed. Similarly, Dr. Thrower considered missing a downed tree or two that was covered by snow or misinterpreting pathological indicators could also have contributed to some degree but not to the degree shown by the SPIT. The Panel accepts and relies on the conclusions of Dr. Iles and Dr. Thrower and finds that the only plausible explanation for discrepancies of the magnitude of those detected is that the plot centres were not placed according to the cruise plan.

[298] The Panel further finds that the data in this case was inherently flawed due to the placement of plot centres, even though the first check cruise "passed" the original CnS cruise. The first check cruise did not audit plot location. The data collected by the second check cruise (which established that the location of 12 of 15 original CnS plot centres that were checked did not meet the tolerances of the Cruising Manual) and the data collected from the SPIT (showing that the tree count in the original CnS cruise was not accurate and could not have been for the same population of trees counted by the SPIT) were collected and analyzed after Apollo submitted its application for CP 421. The Ministry undertook these further inquiries into the accuracy of the information submitted, because the first check cruise did not evaluate the element it suspected of causing the inaccuracy, namely the placement of plot centres. The data from the initial cruise was not accurate at the time it was collected because the collection procedures did not meet the standards of the Cruising Manual. This is not a case of relying on hindsight. The standards against which the cruise data was assessed were in place at the time and applicable when Apollo made its submission and did not change during the time the Ministry made its investigation.

[299] As an aside, the Panel agrees with Apollo that cut-to-cruise ratios based on delivered wood volumes cannot be used to assess the accuracy of submitted cruise data for a particular cutting permit application. However, the Panel has not relied

on that evidence to determine accuracy, nor did the Ministry. The historical cut-to-cruise ratios indicated to the Ministry that there might be a problem with the data for the application for CP 421 which required investigation. The Ministry's determination that the original CnS cruise was not accurate was based on the results of the second check cruise, which established that *the cruise* had not been done in compliance with the Cruising Manual. The Ministry's further investigation using the SPIT confirmed that *the data* was inaccurate. The investigations were completed after the inaccurate information was submitted as part of the cutting permit application process.

[300] The Panel finds that the information provided to the Ministry in Apollo's May 2013 appraisal submission was not accurate because of statistical bias introduced into the timber cruise: the field data was collected in a manner that did not meet the standards of the Cruising Manual. It was later when the Ministry determined that the cruise data was inaccurate, but the fact remains that the data was not accurate when it was submitted. Although this appeal is not in the nature of a review, the Panel also finds that the Ministry's actions in assessing the information from the original CnS cruise were not retrospective, the result of hindsight, nor did the Ministry apply unfair standards by re-assessing the data using other procedures to determine if it met the relevant standards when it was submitted.

Conclusion

[301] Although Mr. Crichton testified that he conducted the original CnS cruise in accordance with the Cruise Manual, the results of the second check cruise showed otherwise: the locations of 12 of 15 plot centres checked by the Ministry were found to be outside of the tolerances for placement prescribed by the Cruising Manual. To be accurate, the data must comply with the relevant cruising standards (see *Ainsworth Lumber* and *Western*). In this case, this is the determinative factor in assessing the accuracy of Apollo's submission of cruise data for CP 421. Corroborating this evidence was the evidence showing a difference in tree counts between the original CnS cruise and the SPIT analysis. The difference was so great as to be virtually impossible to result from chance alone, or by any other factors that could reasonably have influenced the tree count and basal area results.

[302] On a balance of probabilities, the Panel finds that the original CnS cruise was statistically biased, i.e., it did not achieve a true or reliable estimate of the basal area, and therefore volume, of the stand. This is a significant finding, where the estimate of merchantable timber volume is the basic premise to a cruise-based sale and the determination of stumpage payable for the right to harvest publicly-owned timber.

[303] In reaching this conclusion the Panel makes no findings on whether the plots were intentionally located in a manner to underestimate volume and reduce stumpage: proof of subjective intent is not required to establish the contravention.

[304] Accordingly, the Panel concludes that the data from the original CnS cruise was not "accurate" at the time that it was submitted as required by section 105.1(3) of the *Forest Act*. The data submission did not provide an "unbiased estimate" of the volume and quality of timber in the cutting permit area. In making

this finding, the Panel has not assessed accuracy as "absolute precision or paramount accuracy" (*Western*). The Panel has also determined that the Ministry may make an assessment of the accuracy of the appraisal data after the submission of data for a cutting permit application where that subsequent assessment is in the nature of an investigation to determine the accuracy of the data without being considered an application of hindsight.

[305] The next question is whether Apollo has established a defence to the contravention under section 72 of the *FRPA*; specifically, whether Apollo exercised due diligence to prevent the contravention.

2. Has Apollo established a defence of due diligence to the contravention under section 72 of the *FRPA*?

[306] Section 72 of the *FRPA* states as follows:

> **72** For the purposes of a determination of the minister under section 71 or 74, no person may be found to have contravened a provision of the Acts if the person establishes that the
>
> (a) person exercised due diligence to prevent the contravention,

What is the test to be met in order to establish a defence of due diligence?

[307] The test to establish the common law defence of due diligence applies to the statutory defence set out in section 72 of the *FRPA*. Of particular note, the parties referred to the following cases: *R. v. Sault Ste. Marie*, [1978] 2 S.C.R. 1299 ["*Sault Ste. Marie*"]; *R. v. MacMillan Bloedel Ltd.*, 2002 BCCA 510 ["*R. v. MacMillan Bloedel*"]; and, in particular, *Pope & Talbot Ltd. v. British Columbia*, 2009 BCSC 1715 ["*Pope & Talbot*"].

[308] In *Sault Ste. Marie*, the Supreme Court of Canada explained the defence as follows (at p. 1326):

> The defence of due diligence involves consideration of what a reasonable man would have done in the circumstances. The defence will be available if the accused … took all reasonable steps to avoid the particular event.

[309] The standard of proof is on a balance of probabilities.

[310] It is well-established in law that what constitutes reasonable care - or reasonable steps to prevent a reasonably foreseeable contravention - requires an objective examination of the circumstances: each case must be determined on its merits to determine whether the person has met the requisite standard of care. In this case, the standard is that which would be expected of a reasonable licensee in similar circumstances.

[311] In a case involving a contractor (in this case, CnS) the law is clear that a licensee cannot escape liability for a contravention by means of contracting tasks out to a third party (see, for example, *Aurora Quarrying Limited v. Catherwood*, [1982] M.J. No. 373 (Co. Ct.); and *R. v. Geo-Analysis Inc.*, [1993] O.J. 4369 (Ont.

S.C.J.) [*R. v. Geo-Analysis*]. In *R. v. Geo-Analysis*, the Court states at paragraph 31:

> … a party which contracts out work may be found strictly liable for offences committed by a third party subcontractor in the performance of the contract. In *Aurora Quarrying Limited v. Catherwood*, the learned Judge Ferg found that: "A corporation cannot escape conviction merely by saying its mind and will was delegated to another, an independent contractor." However, the defendant can utilize the due diligence defence if it can prove that it acted reasonably in its control of the third party. The applicable test is a factual one. It is necessary to look at the activity that the defendant undertook to perform and the surrounding circumstances in which it was contracted out. As Judge Ferg stated: "a superior company may not avoid its duty of due diligence by simply contracting out, but can escape a finding of guilt if it is able to establish as a fact that it put in place a proper system for supervising its servants and its contractors." [Emphasis added]

[312] In *Sault Ste. Marie*, the Supreme Court of Canada also noted the significance of "establishing a proper system to prevent commission of the offence and … taking reasonable steps to ensure the effective operation of the system" (at p. 1331).

[313] Apollo submits, and the Panel accepts, that meeting the standard of reasonable care does not require "superhuman efforts". The Panel also accepts Apollo's concern with determining reasonable care based on hindsight: the standard of care ought to be assessed on the basis of what could be reasonably expected at the time. In *R. v. Canadian Tire Corp*., [2004] O.J. No. 3129 (S.C.J.), the Court stated:

> 85. Accidents or innocent breaches of a regulatory offence inevitably occur. An absolute liability offence is not at issue here. In assessing the efficacy of a due diligence defence, the court must guard against the correcting, but at times distorting, influences of hindsight. In considering the defendant's efforts, the Court "does not look for perfection" … nor some "superhuman effort" on the defendant's part (*R. v. Courtaulds Fibres Canada* (1992), 76 C.C.C. (3d) 68 (Ont. Prov. Ct.) at 77). If the facts suggest a discoverable causative flaw "could readily" have been remedied, due diligence will fail: *R. v. Rio Algom Ltd.*, *supra* at 249, 252. [Emphasis added in original]

[314] In *R. v. Gwaii Wood Products Ltd.*, [2015] B.C.J. No. 2273, the Court stated at paragraphs 116-117:

> Cases post-*Sault St. Marie* have attempted to apply the defence of due diligence in a wide array of contexts. Each situation requires consideration of factors unique to that factual context.
>
> Due diligence does expect a high standard of awareness and action. *Courtaulds Fibres Canada* [(1992), 76 C.C.C. (3d) 68 (Ont. Ct. Prov. Div.)], described it in paragraph 77 as:

> 77. Reasonable care and diligence do not mean superhuman efforts. They mean a high standard of awareness and decisive, prompt and continuing actions.

[315] Similarly, "reasonable care" does not require a licensee to "take every conceivable precaution". In *R. v. British Columbia Hydro and Power Authority*, [1997] B.C.J. No. 1744) [*BC Hydro*], the Court quotes the test from *Sault Ste. Marie* and goes on to state as follows:

> 54. … after the passage of the *Charter*, that [*Sault Ste. Marie]* test was reapproved by the Supreme Court of Canada in *R. v. Wholesale Travel Group Inc.* (1991), 67 C.C.C. (3d) 193; [1991] 3 S.C.R. 154. The principles of law which developed from those cases was summarized by McFarlane P.C.J. in *R. v. Northwood Pulp and Paper* (1992), 9 C.E.L.R. (N.S.) 289 at p. 293:
>
> > … "public welfare offences" are strict liability offences, and once the Crown has proved the *actus reus*, the accused may avoid conviction by proving on a balance of probabilities due diligence or reasonable care. To constitute a defence, all due diligence must be exercised. While not tantamount to absolute liability, more than the care expected of an ordinary citizen is demanded. In the very least, the care must reflect the diligence of a reasonable professional possessing the expertise suitable to the activity in issue (See *R. v. Giftwares Wholesale Co.* (1977) 36 C.C.C. (2d) 330 (Man. Co. Ct.), and R*. v. Placer Development Ltd.* (1985), 4 F.P.R. 336 (Y. Terr. Ct.).) The underlying standard is what is reasonable in the circumstances, but some factors which have been identified are the gravity of harm, the available alternatives, the likelihood of harm, the skill required, and the extent the accused could control the causal elements of the offence. (See *R. v. Gonder* (1981), 62 C.C.C. (2d) 326 (Y. Terr. Ct.).)
> >
> > …
> >
> > In my view, it is not sufficient to speculate on what might have been done, what controls might have been in place, but rather to examine what was done, what controls were [in] place, what was the state of technology that existed through the evidence of lay and expert witnesses to determine if the accused acted reasonably in the circumstances. Therefore, careful examination of the accused's operation through the evidence of the witnesses is required.
>
> 55. In other words, an accused must take all reasonable steps to avoid harm. However, that does not mean an accused must take all conceivable steps.
>
> [Emphasis in original]

[316] In the present appeal, Apollo concedes that it was reasonably foreseeable that errors in the collection of cruising data by a contractor could result in the submission of inaccurate information to the Ministry. Accordingly, the focus of the evidence and argument at the hearing was on whether Apollo took all reasonable steps to prevent the contravention.

Apollo's Submissions

[317] Apollo submits that it took the reasonable care required of a prudent and similarly situated licensee to prevent the submission of inaccurate cruise information. Specifically, Apollo:

a) retained the specialist services of CnS and, in particular, Mr. Crichton - an experienced and qualified timber cruiser and registered professional forester - and incorporated the relevant operating standards into its General Service Agreement with CnS;

b) obtained and relied upon Ministry check cruises, and

c) performed "office checks" of its contractors' field work and data.

[318] Apollo submits that it has an effective system to prevent a contravention of section 105.1(3) of the *Forest Act*. It further submits that the Commission has previously found similar efforts by a licensee to have met the test for due diligence: see *Atco Wood Products Ltd. v. Government of British Columbia*, (Decision No. 2010-FOR-001(a), February 28, 2012) [*Atco*].

[319] The following is a summary of Apollo's detailed submissions on how it meets the reasonable care test.

a) Similarly situated licensee

[320] Apollo argues that it had a reasonable system for preventing the contravention given its size and staffing realities. Emphasizing its size and staffing realities as important factors to consider when determining the "reasonableness" of its care to prevent the contravention, Apollo argues that it would be impractical for it to employ a full-time timber cruiser. It points to the statement in *BC Hydro* that taking all reasonable steps to avoid harm does not mean taking "all conceivable steps". Apollo suggests that it is the norm for smaller licensees to rely on the services of contractors or consultants, as it did with CnS.

[321] Apollo further argues that assessing sampling accuracy or bias is not a straight-forward exercise; rather, it requires expertise, resources and insight beyond what might reasonably be expected of a forest licensee standing in Apollo's shoes.

b) Apollo's Reliance on CnS and Mr. Crichton

[322] Apollo notes that there is no evidence that it directed or approved of CnS carrying out cruising activities in a manner that did not meet the standards of the Cruising Manual. To the contrary, Apollo points to its General Service Agreement with CnS which expressly required CnS to comply with the Cruising Manual, Apollo's Operational Standards, and all applicable laws and regulations.

[323] More specifically, the agreement states in Part 2:

> **2.1 Services of Contractor.** The Contractor will:

> (a) provide all equipment, materials, supplies, labour, supervision and accommodation necessary to perform, and will perform, the Work described in Schedule A at the Contract Price described in Schedule B;
>
> (b) perform the Work diligently, in a workmanlike manner and in accordance with the industry standard practices used in the region in which the Work is done;
>
> ...
>
> **2.5 Compliances.** *The Contractor* will perform the Work, and *will ensure that its subcontractors, agents and employees perform the Work*, in accordance with:
>
> ...
>
> (c) *all lawful directions, guidelines and other requirements of the Forest Service and other government agencies*;
>
> ...
>
> [Emphasis added]

[324] Paragraph 1.3 of the General Services Agreement defines "Forest Service" as "the British Columbia Forest Service of the Ministry of Forests of the Government of British Columbia", which is the Ministry as identified in this appeal. Schedule A to the agreement is a document titled "Apollo Forest Products Ltd. - Operational Standards", dated June 2005. This document includes a page titled "Cruising Standards", which states as follows:

> All cruising is to be completed per the MOF Cruising Manual.
>
> Cruise plans are to be completed and submitted as per the requirements in the cruising manual.
>
> Either a 100 or a 150-meter grid will be used for cruising.
>
> ...
>
> Final cruise compilations will not be put together until Apollo has reviewed the work and finalized the merch [sic] areas. Interim cruise summaries (CP, block, plot volumes, and area summaries) will be provided to Apollo for our internal review process.

[325] Although this agreement expired in 2011, Apollo refers to the evidence of Mr. Crichton and Mr. Leidl who testified that both Apollo and CnS continued to operate as though the agreement remained in place.

[326] Apollo's practice was to engage qualified consultants to carry out timber cruising activities on its behalf: contractors with staff that had acceptable timber cruising experience and qualifications. Apollo submits that it had confidence in CnS because it was an experienced and qualified timber cruising consultant. Mr. Crichton took responsibility for cruising for CnS, and Apollo relied on him because of his experience (over 15 years) and professional designation. Apollo submits:

> 201. … By hiring only registered professionals, Apollo was ensuring that the contractors it engaged to carry out its cruising activities were competent and subject to oversight by the Association of BC Forest Professionals ("ABCFP"), the governing body for forest professionals in the Province.

[327] Apollo relies on Mr. Crichton's evidence that he conducted the first cruise for CP 421 in the manner that he always used for the tight-chain and compass method. Apollo maintains it was reasonable to assume that Mr. Crichton had an adequate level of competency given his experience and qualifications, as well as the fact that the Association of BC Forest Professionals requires its members to adhere to certain standards of professional practice, including: maintaining sufficient knowledge in their fields of practice, exercising appropriate judgment and discretion, exercising due diligence, and adhering to the Association's Code of Ethics.

c) Obtaining check cruises

[328] Apollo further contends that it routinely let the Ministry know when it had completed a cruise, then requested a check cruise by the Ministry, which was a further step towards preventing an infraction. It did this for the original CnS cruise.

[329] Apollo contends that it had no one with cruising experience on its staff and could not afford to employ someone to do check cruising. Apollo refers to the evidence of Mr. Giesbrecht and Mr. Staff that it is not unusual for licensees not to have timber cruisers on staff. While there is no evidence before the Panel, Apollo submits that an internal field check is generally a practice used by major licensees with the resources to employ qualified cruising professionals. Apollo says that checks of tight-chaining to determine whether plots have been placed accurately is rarely done in any field checks; therefore, it is not reasonable to conclude that this is something that Apollo ought to have checked. It also notes that the Cruising Manual does not require internal field checks and that Mr. Leidl took reasonable steps to ensure that Apollo's quality assurance system operated effectively as discussed below.

[330] Apollo points out that the Ministry continued to do check cruising even after having offered an expedited process for issuing cutting permits when the licensee had done its own check cruise. Its quality assurance was the same whether or not the Ministry did a field check.

[331] Regarding the Government's use of a SPIT analysis to determine whether CnS' cruise resulted in accurate data, Apollo argues that the SPIT analysis was a new analytic method to check cruising: it would not be reasonable to expect Apollo to include a SPIT analysis as part of a quality assurance system.

d) Performing "in house" or "office checks"

[332] Apollo says it exercised due diligence by performing office checks of field data CnS provided before submitting it in its application. Mr. Leidl looked over the tally cards, field notes, and the field map and reviewed the cruise compilation. Before submitting the application for CP 421 to the Ministry, he reviewed the results

of the Ministry's first field check (which indicated that CnS had met the standard) and satisfied himself that the results were within the standard of error mandated by the Cruising Manual. Mr. Leidl specifically oversaw the application for CP 421 and certified that "he did not supervise all the work undertaken in its preparation" but that the application was "consistent with … the *Forest and Range Practices Act* and Regulation …".

[333] Apollo further argues that tracking and analyzing historic cut-to-cruise data goes beyond what might reasonably be required to prevent the alleged contravention. Apollo notes that there are many variables that could influence cut-to-cruise ratios: compliance with the Cruising Manual is just one of them. Moreover, according to Mr. Leidl, cut-to-cruise ratios are not a good indicator of whether a cruise is accurate because the data is not available until after the timber from the cutting permit has been harvested, thus eliminating its utility in prevention.

[334] Finally, Apollo submits that the application for CP 421 was routine business for Apollo and there was "no obvious risk of harm, let alone serious harm" to indicate that anything other than a normal level of care was required. In other words, there was nothing exceptional about the circumstances relating to the application for CP 421 that required Apollo to do more than it did which amounts to exercising due diligence.

Summary

[335] Apollo says it did not blindly rely on contractors and did what should reasonably be expected of a similar sized forest licensee. It did what was reasonable in the circumstances to exercise due diligence by adopting a system to prevent harm: hiring experienced professionals to provide cruising services to meet established standards, expecting the Ministry to do check cruises in the normal course of how that was typically done, reviewing the field data, and checking the sampling error from the cruise compilation to see whether the cruise met the sampling error requirements before submitting the appraisal documentation.

The Government's Submissions

[336] The Government summarizes Apollo's arguments on due diligence as follows:

a) Apollo was entitled to rely on CnS and the General Service Agreement between the parties.

b) Apollo was entitled to rely on Ministry check cruises. This was reasonable, and consistent with general industry practice.

c) The type of error in the original CnS cruise data was unlikely to have been detected, even if Apollo had checked the cruise itself.

d) Apollo was not aware of discrepancies in historic cut-to-cruise data, but in any event such discrepancies might be explained by other factors.

[337] With respect to the first of these arguments the Government notes that, according to *R. v. Geo-Analysis*, a licensee can only rely on the performance of the

third party if "it put in place a proper system for supervising its servants and its contractors". The Government argues that there is essentially no evidence of a system of supervision in place nor was it reasonable for Apollo to blindly rely on Mr. Crichton's experience or his professional forester designation.

[338] The Government argues that a system of supervision and review was especially important in light of the 2010 change to cruise-based stumpage calculation. Although Apollo's relies on its General Service Agreement despite it not having been renewed beyond May 2011, Apollo did not supervise CnS' field practices nor take any active steps to ensure a satisfactory level of cruiser competence, let alone compliance. Further, Mr. Leidl's office review of field data should not be considered supervision.

[339] The Government notes that Apollo provided no evidence regarding the standard practices for licensees of any size. The evidence that touched on these matters was in the nature of "general impressions" from Apollo's two expert witnesses and that of Mr. Smith of Conifex, a company somewhat bigger than Apollo, which had a rigorous internal cruise quality program. The Government submits that Apollo's system falls well short of the standard required to demonstrate due diligence.

[340] Regarding reliance on Ministry check cruises, the Government argues that Apollo should have known that it needed a more rigorous way to monitor the reliability of cruise data. Clearly, the majority of Apollo's timber cruises had not been field checked. The Government submits that relying on checks which do not take place cannot be an adequate means of quality control.

[341] The Government submits that even Mr. Staff and Mr. Giesbrecht clarified that licensees generally do their own in-house quality control or rely on contractors to audit field work, and do not generally rely on Ministry check cruises. Rather, licensees tend to use Ministry check cruises as a "final checkbox" before making an appraisal submission, rather than as a substitute for quality assurance. In short, other than Apollo, there is no evidence of any licensee, of any size, relying solely on Ministry check cruises.

[342] As for the argument that the error at issue would not have been discovered even if Apollo had done its own check cruise or otherwise done more to supervise CnS, the Government submits that this argument goes to causation, and that Apollo has not provided any authority as to how causation is relevant to a regulatory proceeding of this nature.

[343] In any event, the Government is not trying to establish that Apollo's failure is its lack of an internal check cruise on these cut blocks, which may or may not have identified the issue with plot integrity. Rather, the Government argues that Apollo's lack of diligence or care includes failure to implement an effective quality assurance program, which may have identified certain red flags, i.e., Apollo should have been more aware of the potential for foreseeable problems. If so, it would have noticed, and followed up on, red flags such as:

- the potential impact of snow cover on cruise results;
- the frequency of plot centres being on trees;

- the absence of anomalous plots and dropped plots;
- consistent, low tree counts; and
- absence of notations for reference trees on the Cruise Tally Sheets.

[344] The Government also submits that Apollo could have been alerted to issues with CnS' performance from internal records used to produce cut-to-cruise comparisons. In this regard, the Government points to Exhibit 14, a spreadsheet created by Mr. Leidl which shows that, at the time of the original CnS cruise, he was already tracking information that was very similar to the cut-to-cruise information compiled by the Ministry. The Government contends that Apollo knew of the high cut-to-cruise ratios for CnS cruises but did not follow up in any meaningful way, if at all, to try to identify the reasons.

[345] Finally, the Government submits that Apollo ought to have led more evidence in support of a due diligence defence such as the evidence of someone from the Sinclar Group of Companies who could have provided the Panel with a broader perspective on Apollo's internal practices. The Government encourages the Panel to draw an adverse inference from Apollo's failure to do so, based on the presumption that "the evidence of Apollo representatives with such broader knowledge would not have been helpful to Apollo."

The Panel's Findings

[346] As previously set out, the legal test for due diligence requires the party claiming the defence of due diligence to prove – on a balance of probabilities – that it has an effective system in place and took all reasonable steps to prevent the contravention. Apollo submits that it had an appropriate system in place to prevent the contravention and, therefore, it has met the test for due diligence.

[347] The Panel has considered Apollo's submissions by answering four questions:

- Was it reasonable for Apollo to rely on CnS and Mr. Crichton's expertise as part of its due diligence?
- Was it reasonable for Apollo to rely on Ministry cruise checks and office checks for quality assurance?
- Would an internal review system identify the cruise data inaccuracies?
- Was it reasonable to expect Apollo to monitor cut-to-cruise trends?

Was it reasonable for Apollo to rely on CnS and Mr. Crichton's expertise as part of its due diligence?

[348] There is no dispute that a licensee cannot simply contract out of its statutory obligations to produce accurate cruise data, however, a party "can escape a finding of guilt if it is able to establish as a fact that it put in place a proper system for supervising its servants and its contractors" (*R. v. Geo-Analysis*, at paragraph 31). The Panel accepts that Apollo had no intention of contracting out of its obligations.

[349] The first step to determining whether Apollo could rely on CnS and Mr. Crichton's expertise is to determine whether the terms of the General Service Agreement, if applied, established that reliance, and secondly, if so, whether Apollo had a proper system of supervision in place to ensure performance of the terms. In regard to the first step, whether the agreement created the reliance on CnS that Apollo suggests, the Panel considered several factors, including:

- the applicability of the terms of the General Service Agreement to establishing reliance,
- the contractor's familiarity with the terms of the agreement and the expectations they represent, and
- whether the agreement would ensure the result Apollo required, i.e., to provide accurate information to the Ministry.

[350] Although the written General Service Agreement lapsed in 2011, the Panel is satisfied that both Apollo and CnS relied on its terms as the basic premise for the delivery of services in combination with the updated schedules for payment as issued by Apollo to CnS. The Panel finds that CnS (and Mr. Crichton) understood the nature and quality of the work expected, and that CnS was required to conduct the work to meet the standards of the Cruising Manual. In evaluating whether Apollo had a proper system of supervision in place, the Panel has evaluated the terms of the General Service Agreement. These terms established that CnS must use the services of a qualified cruiser and meet the standards of the Cruising Manual in conducting cruises. However, the agreement does not provide a mechanism to ensure that the contract will be complied with and, in particular, that accurate information will be provided to Apollo.

[351] There is no dispute that Apollo did not directly supervise the work done by CnS. Although Apollo staff talked to Mr. Crichton (or other CnS employees) at the Apollo office about day-to-day work, there is no evidence that there was any meaningful discussion between the parties about the standards for, or of the performance of, the work. Mr. Crichton indicated that he received a rate sheet in 2010 that was different from the one for previous years but that no one from Apollo had ever reviewed the contract with him, nor his work. Mr. Leidl confirmed this.

[352] Apollo did not renew the General Service Agreement after the first year, as envisioned by its terms. To the Panel, this demonstrates a lack of attention paid to the role of the agreement as a means of ensuring that the contractor met Apollo's performance expectations.

[353] The Commission addressed a similar situation in *McBride Community Forest Corporation* (Decision No. 2014-FRP-002(a), June 1, 2015). To establish a defence of due diligence in that case, the Appellant relied on its contract which required the contractor to (a) comply with the cutting permit, and (b) indemnify McBride for any wrongful acts and omissions. The Commission found as follows:

> 53. … requiring Mr. Goodell [the contractor] to adhere to the cutting permit and to indemnify McBride in the event that he contravenes the provisions of the permit, cannot be equated with McBride taking reasonable steps, and exercising all reasonable care, to avoid the

> contraventions. The contract provisions do not prevent the unauthorized harvest; rather, they provide McBride with a remedy against Mr. Goodell should McBride be found liable for something covered by the indemnity clause in the contract.

[354] The Panel expected some meaningful form of oversight or supervision to ensure that the contractual terms were met and work was being performed to an adequate standard. The terms of the General Service Agreement alone do not ensure the collection of cruising data that meet the standards of the Cruising Manual; the licensee must take steps to ensure compliance through providing some form of oversight. Apollo did not provide such oversight.

[355] The Panel finds that the main objectives of timber cruising are to provide a reliable estimate of the species mix, size, and merchantable volume and quality of timber in a given area. The Panel has found, regarding "accuracy", above, that the original CnS cruise fell short of these objectives in regard to volume. That information is essential to establish stumpage, which is what the licensee pays to the Crown for the privilege of logging on publicly-owned lands.

[356] Apollo relies on the General Service Agreement to say it need not provide oversight because it retained a contractor which in turn relied on a registered professional forester to provide cruising services. The Panel heard from Apollo's expert witnesses that the RPF designation alone does not ensure a cruiser has the appropriate skill and knowledge to perform the cruising function nor is it a requirement of the Cruising Manual that a cruiser have an RPF designation. Two of Apollo's employees, both registered professional foresters, agreed. Something more is required to engender the reliance on the services of a cruiser. Mr. Giesbrecht suggested this would include experience and continuing practical education. CnS' cruiser had experience, but did not participate in annual local educational opportunities.

[357] Mr. Giesbrecht considered it necessary for individual cruisers to maintain their skills through at least annual field peer reviews of their cruising practices. After more than 30 years, and after training hundreds of other cruisers, Mr. Giesbrecht stated he would still have his own field skills checked, at least annually, by having a peer accompany him on a cruise and review his work. Mr. Crichton advised it was his practice to follow up with one of his peers, such as Mr. Giesbrecht, about changes in the Cruising Manual. The Panel finds that it was reasonable for Apollo to assume that CnS should have been able to perform the required cruising services, provided that its cruiser's services met the standards of the Cruising Manual.

[358] In evaluating whether Apollo provided any supervision or oversight to ensure performance of the General Service Agreement, the Panel notes that both Mr. Crichton and Mr. Leidl confirmed that no one from Apollo took the time to review the performance of CnS to determine if CnS met the requirements of the agreement. Both stated that there was no concern with Mr. Crichton's work.

[359] The purpose of a system of supervision - especially for a specialized task such as cruising – is to be in a position to detect problems in order to prevent contraventions. This shows "due diligence". It focuses on the importance of the

General Service Agreement between Apollo and its cruising contractor, and Apollo's reliance on that agreement, to ensure that the performance of the contractor's services met expectations.

[360] Despite Mr. Crichton's experience and professional status, at a minimum the Panel would have expected the inclusion of a periodic review by Apollo of the contractor's performance. For example, this expectation might be met at the time of contract renewal, through the parties having a meaningful discussion about:

- the professional qualifications and specialized skills of the contractor's cruiser,
- changes to the Cruising Manual, and
- changes to how the services were being supplied.

[361] If Apollo had established a system of supervision based on periodic review as outlined above it would lead to "a high standard of awareness and decisive, prompt and continuing actions" (*R. v. Gwaii Wood Products Ltd*.). This is turn may have caused Apollo to notice some anomalies or "red flags" in the field work of CnS, prior to the submission of the cutting permit application. Had this been the case, Apollo could have taken steps to determine whether there were any underlying problems.

[362] The Panel finds that there was an inadequate system of prevention arising from the absence of performance review. Even if the Panel had determined that the system of prevention arising from the terms of the General Service Agreement had been adequate, Apollo took no action in response that could be considered oversight. The Panel finds that, for the purposes of establishing a due diligence defence, contracting with a registered professional – even one with cruising experience – does not obviate the need for some reasonable level of supervision. Without that oversight, the General Service Agreement is not effective in supporting a defence of due diligence.

[363] The Panel notes that the important Ministry policy change from scale-based to cruise-based stumpage calculation for MPB-infested stands would ordinarily prompt some operational reaction from its licensees with respect to cruising practices. Apollo provided no evidence of this; the evidence does not show there was any communication about the change between Apollo and its cruiser. The Panel concludes that such an omission would not ordinarily meet the standard of care that the Panel would anticipate from a licensee while making the operational changes resulting from a Ministry policy change. While not required to make a finding in this regard, the Panel notes that the absence of any communication with CnS about the change to be a valid consideration towards determining if Apollo has established a due diligence defence.

[364] In answer to the question "Was it reasonable for Apollo to rely on CnS and Mr. Crichton's expertise as part of its due diligence?" the Panel concludes that it could have been if Apollo had conducted a review of the expectations as established by the General Service Agreement and a corresponding review of the compliance with the agreement by CnS. Apollo did neither and, therefore, provided no oversight. The Panel finds that Apollo cannot rely on its contractual relationship with CnS nor the professional designation of its cruiser alone to provide a system of

prevention that would support a defence of due diligence in the absence of some form of oversight.

Was it reasonable for Apollo to rely on Ministry cruise checks and office checks for quality assurance?

[365] Given the importance of timber cruising to the determination of stumpage and the cutting permit application process, the Panel finds it is reasonable to conclude that some form of quality assurance is a necessary part of a licensee's operations. Apollo submits that it relies on Ministry cruise checks in combination with office checks of field data to provide that quality assurance. Apollo's expert witnesses advised that they were aware of some licensees in addition to Apollo that relied on Ministry cruise checks for this purpose. They went on to acknowledge that it was more the norm to have someone other than the Ministry performing cruise checks as quality assurance. In some cases this was through internal employees checking the work of others, as corroborated by Mr. Smith, and in others through the use of independent consultants to provide that service.

[366] Apollo points out that the Ministry had not raised any concern regarding CnS' work prior to June of 2013. In other words, Apollo relied on a third party to determine whether its contractor was meeting expectations and to advise Apollo of any deficiencies, since as noted above it did not undertake a performance review of the cruising services it expected under the General Service Agreement. Nobody from Apollo took steps to hold follow up discussion with the Ministry regarding the performance of its cruisers. The Panel finds that Apollo was not diligent in relying on the Ministry to provide advice regarding the performance of its contractor because it did not provide a mechanism to seek out that advice.

[367] The Panel finds that the best evidence regarding the industry standard with respect to supervision of a cruising contractor's work is one of routine checking – either of the cruiser's practices, the results of a cruise, or both. The Panel heard evidence that most licensees rely on internal staff or independent consultants to perform the routine checks. These checks may or may not be in addition to Ministry checks, but they are indicative of due diligence.

[368] In evaluating the efficacy of relying on Ministry checks for cruise quality, the Panel has also considered the quality assurance standards established in the Cruising Manual (section 3.6). The Panel notes that these standards are for several aspects of cruising[17]: cruise plan (section 3.6.2), tree data (section 3.6.3.1), survey and area measurement (section 3.6.3.2), plot slopes (section 3.6.3.3) and data submission (3.6.4). Had Apollo given any consideration to the quality assurance standards of the Cruising Manual, it is difficult to accept that it could have relied solely on meeting the standards for cruise planning (section 2.0) as evidence of cruise quality assurance, yet this appears to have been the case. The Panel finds that relying on checks for only one aspect of cruising, no matter how important that

[17] The quality assurance standards cover the elements of cruising and the relevant standards noted at page 1-1 of the Cruising Manual – the statistical design of the cruise, the accuracy of field measurements and standard compilation procedures.

aspect is to the cruising function, leaves several other important aspects unchecked and the quality assurance program incomplete.

[369] Mr. Koch was unable to determine whether a check cruise had been done for many cutting permits when he tried to compile cruise data in November 2013. He stated that he had to go into the company files or the Ministry's Electronic Commerce Appraisal System to determine if a check cruise had been done. If he could find no evidence of a check cruise, then he had to assume one had not been done. He was aware that the Ministry did not check every cruise.

[370] From this the Panel concludes that Apollo did not have a system to reliably track whether Ministry checks had been done or when done which standards the Ministry had evaluated. On the basis that the percent coverage of the Ministry checks was low (likely under 10% of cruises) and the standards checked were limited and not tracked, the Panel concludes that Apollo's quality assurance program of reliance on Ministry check cruises was inadequate.

[371] The Panel further finds that since any quality assurance program must determine if there is compliance with the cruising standards of the Cruising Manual, there is no basis to argue – as Apollo suggests – that the size of a licensee matters. It is simply a question of whether or not the system will assist the licensee towards ensuring its cruising function meets the standards. Each licensee will adopt a system that gives the necessary assurance; the system must be developed on the basis of the requirements for cruising. The Panel expects that not every licensee will develop the same system of quality assurance, but has no basis to conclude that differences would be due to the size of the licensee.

[372] Apollo submits that an "office check" is part of its system to ensure the submission of accurate information, thereby avoiding a contravention. When Mr. Leidl certified, as a professional forester, that the information accompanying the cutting permit application was accurate, he approached it as an administrative check. He said that he considered whether all of the components required were included, such as the Cruise Tally Sheets, the cruise compilation, and the maps. In that certification, he specifically noted that he did not supervise all of the work.

[373] The Panel finds that an administrative review or "office check" of the field data submitted by a consultant does not address the quality of the field work undertaken to collect the data submitted with a cutting permit application. While an office check is a necessary administrative step in a cutting permit application, it does not provide any assurance that its contractor's field work is accurate.

[374] The Panel agrees that it may not be necessary to perform detailed field checks every time a cruise is completed. Rather, the test is whether the licensee has an effective system in place to prevent inaccuracies. It is the adequacy of the system to prevent contraventions that is important. The Cruising Manual establishes the standards that cruises must meet for field procedures and the standards expected for quality assurance. The Panel finds that any program a licensee develops to assure quality of its cruising must take these standards into consideration and establish how the program will test if those standards have been met. The Panel finds that Apollo's reliance on Ministry check cruises, without taking into account the range of cruising standards which the Ministry has established and

which may not be routinely checked, could not be an adequate quality assurance program. Office checks are an important administrative check on data, but cannot alone provide quality assurance regarding the standards of the Cruising Manual. The size of a licensee is not determinative of whether the quality assurance program the licensee has adopted is adequate to meet the standard of care required. Apollo should have done something more to develop a quality assurance program to meet the standard of care expected of a diligent licensee.

[375] In answer to the question "Was it reasonable for Apollo to rely on Ministry cruise checks and office checks for quality assurance?", the Panel finds that it was not reasonable for Apollo to rely on Ministry cruise checks and office checks for the reasons discussed above.

Would a better internal review system identify cruise data inaccuracies?

[376] The Panel has also considered Apollo's argument that the effort required to determine if plot centres were where they were supposed to be was beyond what should reasonably be expected of a licensee, especially when the Ministry's first check cruise in this case did not identify an issue with the original CnS cruise. Apollo asserts that it would have required the same type of testing as performed by the Ministry to detect the errors that were discovered, including the SPIT analysis which is a specialized procedure, and not one that was generally known at the time of the original CnS cruise.

[377] The Panel finds that this argument is without merit. The due diligence standard is not necessarily to find errors, but to show there is a system in place to try to find – and prevent – them. Finding the error is the goal, but taking reasonable steps to prevent the foreseeable consequences is the means. In this case, as noted previously, Apollo did not demonstrate that it gave sufficient forethought to the scope of a quality assurance program that might prevent the submission of inaccurate data, and did not undertake any type of field supervision.

[378] Based on the strip line audit conducted by the Ministry in accordance with the survey and area measurement quality assurance standards (section 3.6.3.2) of the Cruising Manual, the Panel found earlier in this decision that the CnS cruise plots were not located within the required tolerances. The SPIT analysis merely corroborated the determination of inaccuracy and quantified the inaccuracy, but was not necessary to prove inaccuracy. The SPIT analysis confirmed that the placement of CnS' plots gave a statistically biased result. However, to meet the test of accuracy where the inaccuracy is due to plot placement, as in this case, a licensee only needs to check plot placement. The level of diligence expected of licensees is that of the Cruising Manual, i.e., only the detection of the potential for statistical bias from plot placement need be detected, not the proving of bias that may result. In sum, having a proper system for prevention does not mean that a contravention will always be discovered; however, it shows that the licensee is being diligent in trying to avoid or prevent contraventions.

[379] One of the factors discussed in *BC Hydro* for determining what is reasonable in the circumstances is "the extent the accused could control the causal elements of the offence". Although reasonable care does not require superhuman efforts or

taking "all conceivable steps", it does mean a "high standard of awareness and decisive, prompt and continuing actions" (see *R. v. Gwaii Wood Products Ltd.*, *supra*). The Panel agrees with the Government that the question is not whether Apollo could have arranged for a SPIT analysis or performed the same check cruise as the Ministry did after the SPIT. It comes down to whether Apollo had an effective quality assurance program to prevent the contravention of submitting inaccurate information as a basis for its application for CP 421, in this case performing the cruise to meet the quality assurance standards of the Cruising Manual. This confirms the need for oversight of the cruising contractor's performance, as discussed above.

[380] In answer to the question "Would a better internal review system identify cruise data inaccuracies?" the Panel concludes that a performance review would have served Apollo well in establishing whether or not CnS had met the standards of the Cruising Manual. It may not have identified every error, but it would have ensured that Apollo had a system of prevention to avoid non-compliance.

Was it reasonable to expect Apollo to monitor cut-to-cruise trends?

[381] Apollo contends that it did not collect cut-to-cruise data and, in any event, cut-to-cruise data would not necessarily provide useful information about cruising trends given the number of variables at play, and because the cut-to-cruise ratio comparing the original CnS cruise and harvest of CP 421 would not have been available until after the timber had been harvested. Because of this timing, it could not be a part of a system of prevention for a contravention that occurred before the harvest.

[382] After Mr. Koch became aware of Ministry concerns over the application for CP 421 in mid-June 2013, he created a spreadsheet using internal data that tracked Apollo's cruise-based cutting permits since 2010. The Panel concludes that this demonstrates that Mr. Koch was capable of calculating cut-to-cruise ratios from internal Apollo data. The Panel does not accept that cut-to-cruise data would not provide useful information about cruising trends and finds that, in this case, the cut-to-cruise ratios provided valuable and useful information about cruising trends, notably those CnS cruises that took place shortly before the initial cruise of CP 421. The Panel observes these ratios were well above 1.2:1 which is the point at which Apollo's experts agreed they would further examine the basis for such a result. The Panel finds that these ratios arising from CnS cruises were well above the "normal" cut-to-cruise ratio of about 1:1 or slightly under. Mr. Koch's answers during cross-examination indicate that he could calculate cut-to-cruise ratios without sophisticated analysis.

[383] In 2012, Mr. Leidl had also developed a spreadsheet to track variances between anticipated harvest based on cruise data, and actual log deliveries to the mill based on scale data, stating that he did so to attempt to explain "disruptions in log flow and log inventory resulting from deliveries not matching expected cruise values". He suggested that some logging contractors could possibly be overwhelmed by unexpectedly large volumes to harvest. On cross-examination, Mr. Leidl agreed that the spreadsheet he developed beginning in 2012 to track variances between anticipated harvest (based on cruise data) and actual log

deliveries showed a pattern whereby he changed the expectations of delivered volume from a permit that had been cruised by CnS. Also, when planning for future delivered timber volumes, Mr. Leidl made adjustments specifically for CnS cruise data so that expected volumes to be delivered matched "Gross Cruise" volume, rather than "Net Cruise" volume or other "markdowns", which is what he used for other cruisers.

[384] Under cross-examination Mr. Leidl could not recall why he made adjustments for some lines of his spreadsheets and not for others, and could provide no credible explanation for having made adjustments. He indicated that differences in his treatment of the Kazchek data were related to the nature of the pine stands in the Kazchek but did not fully explain this. The Panel notes that the cut-to-cruise anomalies for CnS cruises are not limited to the Kazchek area. The Panel finds that, although Mr. Leidl did not refer to the data that he collected and calculated as cut-to-cruise data, the data that he tabulated (that is, the difference in delivered to expected volumes based on cruises), was in effect a cut-to-cruise ratio by a different name.

[385] Mr. Leidl's spreadsheet should have raised sufficient questions to trigger Apollo to make inquiries into the discrepancies arising from CnS-cruised cutting permits that showed a greater than 50% difference in Net Cruise volume compared to Delivered volume. The Panel notes that all witnesses who were asked agreed that cut-to-cruise discrepancies greater than 20 to 25% would be reasonable cause for a licensee to investigate further.

[386] The Panel finds that Apollo had access in 2012 to historical information that was similar to cut-to-cruise data because it compared expected harvest (based on cruise data) and harvested timber (based on scale data). The data showed a consistent underestimation of the harvest from CnS cruises. Based on this evidence, the Panel does not accept Apollo's argument that it did not make use of cut-to-cruise data or data very similar to cut-to-cruise. The Panel finds it surprising that Apollo was unaware of the tools available on the Harvest Billing System to assist with tracking such information, but accepts that a licensee is not required to track such data or use the system to do so.

[387] In answer to the question "Was it reasonable to expect Apollo to monitor cut-to-cruise trends?" the Panel concludes that it was, and notes that Apollo did collect similar data in 2012. However, Apollo did not effectively monitor the data nor put it to use to make enquiries regarding the anomalies demonstrated by CnS cruises.

[388] The Panel finds that Apollo's forestry staff ought to have appreciated the underestimation historically associated with cruises by CnS, and it is apparent from Mr. Leidl's evidence that he, at least, did. If Apollo had been diligent in monitoring its data comparing expected and actual harvest, it would have been apparent that there was a trend related to CnS-cruised cut blocks, and that this was likely an issue that needed to be addressed through reasonable inquiries. Certainly an issue was foreseeable. The appeal does not turn on this appreciation of cut-to-cruise trends because the defence of due diligence fails on other points with respect to lack of a sufficient oversight of cruise performance and cruise quality assurance program. Consequently, the Panel need not make a specific determination on

whether the failure to make inquiries based on anomalous harvest data also constitutes a lack of due diligence.

Conclusion

[389] Apollo has not met the test for due diligence; it did not do what is reasonably expected of a licensee to prevent the submission of inaccurate cruise data with its application for CP 421. It did not have an effective system in place to prevent the submission of inaccurate information from a timber cruise.

[390] As discussed above, the Panel finds that Apollo failed to provide any oversight over the performance of the General Service Agreement that it made with CnS and cannot rely simply on the professional qualifications of Mr. Crichton to replace that oversight of performance. The Panel has also found that, without an established mechanism for the Ministry to report under performance of the cruising function to Apollo, Apollo cannot rely on an expectation that the Ministry would report such results to Apollo to replace its need to oversee its consultant's performance. The Panel also concludes that, in this case, a performance review of its consultant would have served as an internal review aimed at identifying inaccuracies.

[391] The Panel concludes that a system to prevent the submission of inaccurate cruise data should include a quality assurance program to ensure that the quality of the data submitted meets the requirements of the Cruising Manual. In order to do so the licensee must at least have considered the standards that the cruise results must meet in adopting a quality assurance program. The Cruising Manual requires that a licensee meet standards for a cruise plan and for conducting a cruise so that a licensee obtains data that accurately estimates harvest volume and quality of timber. While the standards provide for some degree of error or variability, all licensees must meet them, irrespective of size.

[392] Apollo suggested that it should not be held accountable for failing to meet standards set in the Cruising Manual that the Ministry did not routinely check. In relying on the Ministry to provide a quality assurance program through its check cruises, the Panel concludes that a licensee would at least need to consider whether the Ministry program was broad enough to check the range of mandated standards in the Cruising Manual. Apollo did not. The Panel agrees that an office check is an important step in ensuring the submission of accurate data through, for example, catching and correcting transcription errors; however, the Panel concludes that it cannot readily identify or correct underlying errors in field data, such as errors in collecting and recording data regarding tree distances, dimensions or quality or, as in this case, errors in plot centre placement. An office check alone cannot identify errors of these types where the data does not meet the standards of the Cruising Manual.

[393] A system of prevention may not detect every substandard result every time, but the Panel has found that a licensee – in this case, Apollo – must have the capacity to detect substandard work leading to the submission of inaccurate information as a basis for the defence of due diligence. The Panel concludes Apollo was not diligent in developing or implementing a system that could have reasonably foreseen and prevented the contravention.

[394] As an aside, and in light of the Panel's decision, the Panel is of the view that it is unnecessary to consider whether to draw an adverse inference from Apollo's failure to call its Senior Woodlands Manager to give evidence.

3. Should the Panel revisit the quantum of penalty in light of the new evidence presented during the appeal?

[395] As noted in the Background to this decision, Apollo did not appeal the $10,000 penalty. The Government has suggested that, if the Panel dismisses the appeal and given the new evidence before the Panel that was not before the District Manager, it is open to the Panel to consider whether to vary the $10,000 penalty. The Panel is prepared to receive written submissions regarding quantum should the Government make that application.

DECISION

[396] In making this decision, the Panel has considered all the evidence and submissions of the parties, whether or not they have been specifically referred to or reiterated here.

[397] For the reasons provided, the Panel finds that Apollo submitted inaccurate data when it first applied for CP 421 in contravention of section 105.1(3) of the *Forest Act*. Further, the Panel finds that Apollo has not demonstrated that it exercised reasonable care to prevent the contravention.

[398] With respect to quantum of penalty, the Panel will accept an application from the Government to revisit the sufficiency of the penalty imposed by the District Manager should it make one.

[399] Accordingly, the Panel confirms the Determination. Apollo's appeal is, therefore, dismissed.

"Daphne Stancil"

Daphne Stancil, Panel Chair
Forest Appeals Commission

"Les Gyug"

Les Gyug, Member
Forest Appeals Commission

"Norm E. Yates"

Norman E. Yates, Member
Forest Appeals Commission

September 11, 2018