COMMISSION OF INQUIRY INTO THE DECLINE OF SOCKEYE SALMON IN THE FRASER RIVER

In the matter of Her Excellency the Governor General in Council, on the recommendation of the Prime Minister, directing that a commission do issue under Part I of the *Inquiries Act* and under the Great Seal of Canada appointing the Honourable Bruce Cohen as Commissioner to conduct an inquiry into the decline of sockeye salmon in the Fraser River

---

B.C. SALMON FARMERS ASSOCIATION

ISAV SUBMISSIONS

Counsel for the BC Salmon Farmers Association:

K. Alan Blair
Gowling Lafleur Henderson LLP
Suite 2300
550 Burrard Street
Bentall 5
Vancouver, British Columbia
V6C 2B5

Phone: (604) 683-6498

SUBMISSIONS

1. Currently, the state of scientific knowledge can inform the Commission that a genetic sequence that bears some resemblance to ISAv may have been found, but it cannot be said whether what has been found is truly an orthomyxo virus, whether it is a divergent strain of ISAv that is endemic to British Columbia, or whether it is an error and not a scientific finding at all. Throughout the Commission's hearings it has become abundantly clear that scientific knowledge is often slow to progress. Where novel and unverified scientific methods are being used, particular caution must be exercised in making findings of fact.

2. As explained by Dr. Nylund, the Infectious Salmon Anemia virus ("ISAv") is very different than the Infectious Salmon Anemia disease ("ISA"). One thing remains clear from the evidence: ISA has never been detected in British Columbia ("**BC**"), including through recent testing. Dr. Nylund, as well as the other experts called to testify, said that even a detection of ISAv itself does not mean that ISA is present:

> 11 Q In our previous, in particular I'm thinking of the
> 12 hearings held on the disease topic, we had
> 13 evidence about the very important distinction
> 14 between a disease and a virus. Dr. Nylund, can I
> 15 ask you, please, does the presence of ISA virus,
> 16 if it is present, does that mean the disease ISA
> 17 is present?
> 18 DR. NYLUND: No, there is **a large difference** between
> 19 detection of the virus, or the viral genome, and
> 20 the actual disease. **And usually you will only**
> **21 find disease development in Atlantic salmon. And**
> **22 none of the other salmonid species are really**
> **23 suffering from ISA infection.** You may have some
> 24 disease developing in rainbow trout, or steelhead,
> 25 as you call it, but **most of the other species** will
> 26 be carriers or they will have a viremia, but they
> 27 **will not show any clear signs of disease**.

Kibenge & Gagne, Transcript December 16, 2011, p. 14, ll. 25 – 47; p. 27 ll. 31-45; Transcript, December 15, 2011, p. 10, ll. 11 – 27 [emphasis added]

3. Drs. Kibenge, Miller, and Nylund appear to agree that whatever has been detected could be an ISAv-like virus, potentially endemic in the Pacific, and not ISAv itself, although Ms. Gagne did say it is too early to even know whether this is even an orthomyxo virus that has been detected, or something else. Dr. Kibenge referred to what is being detected as "orthomyxovirus-like". Significantly, Dr. Klotins also testified that none of the samples tested have been consistent with clinical signs of ISA. Furthermore, Dr. Nylund also noted the possibility that a

native ISAv may exist in BC, but specifically cautioned against relying on Dr. Miller's tests, particularly because of the presence of a stop codon in segment 7:

> 3 But of course, they may not pick out any natural
> 4 occurring viruses in the Pacific. And if you look
> 5 at all the viruses, for instance, the HSV virus,
> 6 the Paramyxovirus and so on that you find in fish,
> 7 you will find one type of strain in the Pacific
> 8 and then another in the North Atlantic. **And there**
> **9 may very well be a Pacific ISA virus** that we have
> 10 not yet detected and it could be very different
> 11 from the North Atlantic ISA virus. But I think
> 12 the method that they are using are quite good,
> 13 **except the one that has been used by Miller. I**
> **14 think that can more easily be picking out things**
> **15 that are not ISA virus, but that are more random**
> **16 RNA DNA in the sample. I think there's a danger**
> **17 of that**, but then again, I have to say that I
> 18 don't have any experience with that method, but
> 19 **intuitively, it sounds like it could be a problem**
> **20 the way it was designed. …**

Gagne, Transcript December 15, 2011, p. 68 ll. 20-27;
Kibenge, Transcript December 15, 2011, p. 69 ll. 17-18;
Klotins, Transcript December 19, 2011, p. 29 ll. 46 – p. 30 ll. 28;
Nylund, Transcript December 15, 2011, p. 104 ll. 1 – p. 105 ll. 6 [emphasis added]

4. Pacific salmon are resistant to ISA, whereas Atlantic salmon are particularly susceptible to the disease. ISA has never been diagnosed in farmed Atlantic salmon in BC. Ms. Gagne was of the opinion that the test run by the Provincial Government of BC (the "**Province**") at the Animal Health Centre used a good primer that would detect most ISA except for some rarely detected strains, and would have detected the sequence Dr. Miller reported. The BCSFA submits that the fact that researchers suspect they have detected a viral signature in Pacific salmon that Dr. Miller believes was already divergent from known strains of ISAv in 1986, when commercial salmon aquaculture first started to import eggs, is suggestive of a previously-unknown (i.e. "novel") virus that may be native to BC, or that may have been imported to BC when the federal government first tried to introduce Atlantic salmon to the Pacific beginning in the early 1900s. In any event, what has been detected is not and cannot be associated with salmon farms. It is too early to know what has been found, if anything.

Transcript December 16, 2011, p. 4 ll. 28-44

I. Canadian Food Inspection Agency ("CFIA") Investigation

5. Dr. Wright explained that an unbroken chain of custody is necessary to assure that the reported test results match what was taken from the field, rather than obtaining an erroneous result. It is furthermore intended to prevent the deliberate contamination, or unintentional cross-contamination in labs. In the present instance, there are significant problems in the chain of custody of the 48 samples tested by Drs. Kibenge, Nylund, and the CFIA in Ms. Gagne's lab. The CFIA's internal situation reports, for example update number 10 dated October 31, 2011, noted that "this case will likely remain suspect to CFIA given chain of custody issues", and furthermore that additional samples sent by Ms. Morton appeared to have similar chain of custody issues.

Wright, Transcript December 16, 2011, p. 97 ll. 27 – p. 98 ll. 18;
Exhibit 2107-09, ISA Situation Report (Internal), Update #10 Oct 31 2011, at 1

6. Furthermore, although Dr. Miller claims that there is no potential source of ISAv contamination in her lab, those same 48 samples from Dr. Routledge were delivered to Dr. Miller's lab for parvovirus testing prior to being sent for ISAv testing. The BCSFA suggests that if those samples were already contaminated, it is possible that they may have contaminated Dr. Miller's lab as well. If Dr. Miller's lab was not properly decontaminated, it is possible that her further tests for ISAv were the result of unintentional contamination.

Exhibit 2044 *Miller, Rivers Inlet Sockeye Notes*, Oct 21 2011

7. The BCSFA says that the means of storing the samples such that they became too degraded to give conclusive results, and the fact that Dr. Kibenge detected a positive ISAv sequence notwithstanding that degradation, should raise significant suspicions as to the reliability of the testing of those samples. Ms. Gagne noted that the samples submitted by Dr. Routledge to Dr. Kibenge were probably collected at the same time and kept in the same manner, and that they were "compromised" such that instead of giving no results at all, which is what should have occurred based on the level of degradation, the samples gave a positive result that could not then be replicated. As Ms. Gagne suggested, "it is hard to imagine that if there was traces of ISA viral genome in there, that it has survived due to that degradation", but a contaminant can be detected in a degraded sample. She furthermore observed that Dr. Kibenge did not take the necessary precautions to rule out cross-contamination, and deviated from standard diagnostic lab practices.

Gagne, Transcript December 16, 2011, p. 16, ll. 1 – p. 18 ll. 34;
Ibid. p. 19, ll. 39 – p. 20, ll. 10

II. Recent ISAv Testing

8. One area of consensus among the witnesses was that much more research is needed before any conclusions can be drawn. Dr. Nylund testified that there was "no hard evidence" that ISAv is present in BC. . Dr. Kibenge testified that a specific diagnostic test is needed before surveillance activities will be effective, and that the results to date may be a high level of false positives or false negatives.

Nylund Transcript, December 15, 2011, p. 57, ll. 20-40;
December 16, 2011, p. 47 ll. 3 – 31

9. Ms. Gagne's lab is in the process of seeking ISO accreditation or certification. Although it is a multi-year process, she explained that this requires them to already be in compliance with the ISO procedural standards. The ISO certification also includes blind sample testing to ensure the lab is getting good results. According to *Exhibit 2000, OIE Validation and Certification of Diagnostic Assays – NonRT,* page 5, the Moncton lab's ISO 17025 accreditation process started in 2005 and is expected to be complete in 2017.

Transcript December 16, 2011, p. 73 ll. 13 – p. 74 ll. 1;
Exhibit 2000, OIE Validation and Certification of Diagnostic Assays – NonRT, at 5

10. Similarly, the Province's Animal Health Centre lab, which had conducted almost 5,000 PCR tests of farmed salmon in 2010 and according to one document marked for identification has now conducted 7,002 PCR tests of farmed salmon, is accredited by the American Association of Veterinary Laboratory Diagnosticians ("**AAVLD**") which uses the OIE and ISO 17025 standards. Ms. Gagne said that the PCR tests run by the Province's lab were good, and that they should have been able to detect whatever sequence Dr. Miller detected if it were a form of ISAv. Furthermore, Atlantic salmon are extremely susceptible to ISA, meaning that if it were present in BC, there would be significant mortalities in salmon farms, which is disproven by the evidence already before the Commissioner. The Provincial lab has never detected ISAv in farmed salmon.

Exhibit 1471, *Publicly Available PCR Test Results for ISAV in BC Farmed Salmon, 2003-2010;*
Gagne Transcript December 16, 2011, p. 6, ll. 18-21;
Wright, Transcript December 19, 2011, p. 18 ll. 25 – p. 19 ll. 6

11. Conversely, the OIE reference lab designation of Dr. Kibenge's lab does not prescribe the same procedural standards, ensure the quality of the testing, or preclude cross-contamination of samples. It is a voluntary designation sought by a lab, and granted on the basis of whether a lab is needed, for the purpose of providing diagnostic testing for countries who lack the necessary infrastructure to do testing themselves.

Wright, Transcript, December 16, 2011, p. 100, ll. 18-25

12. As Dr. Wright explained, Dr. Kibenge's lab is not accredited by the OIE, it is only designated. There are no site visits by the OIE, and labs only submit annual reports on their activities. Furthermore, it is a voluntary designation. Dr. Wright testified that there is now a movement to increase the quality requirements of the OIE labs with the introduction of more stringent standards, which could include a requirement that those labs have ISO 17025 certification as Ms. Gagne's lab is in the course of obtaining. Dr. Wright in fact implied that there is some concern that the quality of OIE labs needs to be brought up to better standards, and that failure to meet whatever standards may be imposed could result in the withdrawal of the OIE reference designation. According to the CFIA's assessment of Dr. Kibenge's lab and Ms. Gagne's opinion of its deviations from standard practices, the OIE designation is not a guarantee of reliable results.

Transcript December 19, 2011, p. 25 ll. 8 – 29;
Ibid., p. 32 ll. 3-43

13. Dr. Nylund and Ms. Gagne testified that their labs have implemented extensive measures to avoid potential contamination of samples. Ms. Gagne's lab, for example, separates rooms, regions and equipment to avoid contamination and uses ISO 17025 standard practices in their testing. Similarly, Dr. Nylund has a specially designed lab to prevent contamination through separation of parts of the testing procedure into different rooms.

Gagne Transcript, December 15, 2011, p. 63 ll. 19-32; p. 76, ll. 38 – p. 77, ll. 40;
Transcript, December 15, 2011, p. 75 ll. 41 – p. 76, ll. 34

14. Dr. Kibenge did not point to any practices such as those of Dr. Nylund or Ms. Gagne who prevent contamination by using separate rooms for various stages of containment, preparation, and testing. Dr. Kibenge's lab appears to function without the same safeguards against contamination of samples, and in the CFIA-commissioned assessment it was concluded that Dr. Kibenge's lab practices could permit contamination of samples. However, Dr. Kibenge was defensive of his lab and the possibility that his samples were contaminated. He testified that there is no cross-contamination in his lab's practices and disagreed with some parts of the CFIA-commissioned audit. He also generally disagreed with the statement that ISAV RNA can potentially contaminate samples and can make distinguishing between true positives and controls are difficult, which Ms. Gagne did agree with. Respectfully, it makes little sense for Dr. Nylund's lab and Ms. Gagne's lab to create and enforce such strict protocols to avoid contamination of samples if Dr. Kibenge's assessment is correct.

Kibenge Transcript December 15, 2011, p. 13 ll. 20-25;
Transcript, December 16, 2011, p. 11 ll. 20 – p. 12, ll. 6;
Ibid., p.13 ll. 27 – 44;
Exhibit 2087: *Untitled chart comparing AVC and DFO methods for ISAV testing*

15. Dr. Nylund tested the same samples as Dr. Kibenge, and testified that he was unable to repeat the positive result in the first 48 samples tested by Dr. Kibenge. Dr. Nylund has a specially-designed lab to avoid contamination. He was not able to sequence ISAv, which is necessary to be able to confirm the presence of ISAv, and using a real time assay that would be able to detect most forms of ISAv, he was not able to verify that what was found was ISAv. According to Dr. Nylund, there is no hard evidence of ISAv in Pacific salmon.

Nylund, Transcript December 15, 2011, p. 14 ll. 30-40;
Ibid. p. 15 ll. 3-20;
Ibid. p. 57 ll. 29-34

16. The CFIA conducted its own PCR testing of the same samples examined by Drs. Kibenge and Dr. Nylund, and determined the tests to be negative for ISAv. According to the CFIA policy, those results had to be reported as "inconclusive" because of the RNA degradation that occurred as a result of their storage by Dr. Routledge prior to sending the samples for testing. However, Dr. Wright clarified that the "inconclusive" in Exhibit 2038 means despite the degradation the interpretation of those tests is analytically and diagnostically "negative".

Exhibit 2038: *Technical Information for DFO Moncton based on sample sets for lab assessment regarding ISA in BC salmon*;
Gagne Transcript December 16, 2011, p. 16, ll. 6-24;
Wright, Transcript December 19, 2011, p. 119 ll. 31 – p. 120 ll. 6

17. Dr. Kibenge testified that in testing the 48 samples provided to him by Dr. Routledge, he was not able to culture ISAv. Dr. Kibenge explained that the non-pathogenic or non-virulent strain of ISAv cannot be cultured, but can be detected by RT-PCR. Neither Dr. Kibenge, Dr. Nylund, Dr. Miller, nor the CFIA have confirmed the presence of ISAv in BC.

Kibenge Transcript December 15, 2011, p. 45 ll. 3-5;
Ibid., p. 46 ll. 4 – 12

18. Ms. Gagne was also of the opinion that the 48 samples sent to Dr. Kibenge and herself "were compromised" in terms of contamination, and that due to the degraded condition of the samples received by herself and Dr. Kibenge, that no ISAv should have been detectable. Dr. Gagne also explained that it is possible to "detect a cross-contaminant in a degraded sample" and suggested that Dr. Kibenge had failed to run blanks with the sample to rule out cross-contamination. The BCSFA submits that this suggests the possibility that what was detected was not in fact ISAv within those degraded tissues, but may have been contamination either prior to those samples being sent to the labs or at Dr. Kibenge's lab itself.

Gagne Transcript December 16, 2011, p. 16, ll. 1 – p. 17, ll. 2;
Ibid., p. 18, ll. 21-34

III. Dr. Miller's Research

19. Dr. Miller believes that she has detected a novel strain of ISAv in wild and farmed salmon using a different kind of test than the one used by diagnostic labs. Dr. Wright said that Dr. Miller's test for ISAv was a new technique that had not been validated, and suggested that it would be a lengthy process before it is an acceptable means of detecting ISAv. The validation process, he explained, is necessary to determine, for example, whether Dr. Miller is actually detecting what she believes she is detecting. Ms. Gagne's lab, for example, uses validation testing acceptable to both Canada and the OIE for ISA. Conversely, Dr. Wright notes that PCR techniques such as Dr. Miller's are "changing every day", and that by changing the techniques it can become too difficult to interpret the results:

> 17 [DR. WRIGHT] So it's not all cut and dry. And any new
> 18 protocol that comes in, if you think of something
> 19 like the ELISA, which is for antibody detection
> 20 that's now fairly commonplace, that took almost 20
> 21 years to get it to a point of international
> 22 standardization where it became an accepted tool.
> 23 And the **PCR techniques are still much younger than**
> **24 that, and technologically they're changing every**
> **25 day.** So to get them to a point where they're
> 26 internationally **standardized** is going to be **long**
> **27 past my retirement**.
> 28 Q So it's **a little too early, then, to be running to**
> **29 the newspapers** with this, in your view?
> 30 DR. WRIGHT: At this point, **especially if you're**
> **31 changing up the techniques and you're going**
> **32 further and further into analytical sensitivity**
> **33 down to a point where it's very difficult to make**
> **34 a diagnostic interpretation, you have to be**
> **35 extremely careful on any conclusions that you draw**
> **36 from it.** In many cases, if you go too
> 37 analytically sensitive, you get yourself into a
> 38 world of hurt, because **the actual interpretation,**
> **39 it just exponentially becomes far more difficult**
> 40 in terms of, you know, interpreting with respect
> 41 to disease. I mean, **there's pathogens everywhere.**
> **42 They don't all cause diseases**.
>
> Wright Transcript December 16, 2011, p. 110 ll. 34 – p. 111 ll. 5;
> Ibid., p. 138 ll. 34 – p. 139 ll. 37;
> Transcript, December 19, 2011, p. 31, ll. 17 – 42 [emphasis added]

20. Dr. Miller also described an analysis performed in her lab by which she formed the opinion that the fish with the ISAv 7 segment she detected using her novel RT-PCR test, were responding to an influenza infection. However, Dr. Miller

herself described this as "a bit of a novel approach", said that she had never seen this type of approach in published literature, and that she herself had the data less than a week before testifying and had not compared her results to other published studies.

Miller Transcript December 15, 2011, p. 49 ll. 11 – p. 50 ll. 15

21. Based on Dr. Miller's own testimony and that of Dr. Wright, the BCSFA submits that Dr. Miller's results are not based on the "reliable foundation" for novel science to be admissible as evidence which, according to the Supreme Court of Canada, requires that the technique can be and has been tested, has been subjected to peer review and publication, the known or potential rate of error, and whether the theory or technique used has been generally accepted. At best, Dr. Miller's tests are a starting point for further research and validation of her methods by experts in diagnostic methods. Given the extreme concern expressed by Drs. Nylund, Klotins, and Wright at her testing methods, the BCSFA submits that her evidence with respect to the presence of any type of ISAv in BC should be accorded very little weight.

R. v. Trochym, 2007 SCC 6 at para. 36, citing *R. v. J.-L.J.* [2000] 2 S.C.R. 600, 2000 SCC 51 para. 33

22. Furthermore, Dr. Miller was qualified "as an expert in molecular genetics, immunogenetics and functional genomics with a specialty in salmon." She is not qualified to diagnose ISA, and as Dr. Klotins and Dr. Wright explained, considerably more expertise and time will be needed to begin to interpret Dr. Miller's results. Dr. Wright and Dr. Klotins expressed some concerns with respect to Dr. Miller's testing. Dr. Klotins said that Dr. Miller is a molecular geneticist, not a virologist or diagnostician, and that people with necessary expertise would have to be consulted to interpret the results and examine Dr. Miller's methods:

> 31 Q And at this point, have you determined what those
> 32 other areas of expertise would be that would be
> 33 necessary to interpret her results?
> 34 DR. KLOTINS: Basically, we would like to use expertise
> 35 that have specific experience and knowledge of the
> 36 PCR testing and the various primers that can be
> 37 developed, the various methodologies that can be
> 38 used during PCR, and to help us assess -- it's a
> 39 **very technically different, difficult test to run**
> **40 and it requires a lot of checks and balances, and**
> **41 so we need to identify where those areas, where**
> **42 the errors can occur that give results that we**
> **43 are, you know, we may not be expecting**.

Qualification of Dr. Miller, Transcript December 15, 2011, p. 9 ll. 33-37;
Klotins, Transcript December 19, 2011, p. 28 ll. 16 – 43 [emphasis added]

23. Much of Dr. Miller's testimony with respect to any potential findings of ISAv falls outside of her area of expertise. Although Dr. Nylund expressed grave concerns at a stop codon being in the middle of the protein instead of at the end, one area which does appear to be within Dr. Miller's area of expertise in molecular genomics is the divergence of the genetic fragment she believes she has sequenced, from known strains of ISAv. Dr. Miller reported that her novel test allowed her to obtain an ISAv sequence from the ISA segment 7 which is "divergent from all known ISA strains" and is only 95 percent similar to all known ISA variants." She believes that she has discovered a "somewhat divergent strain of ISA that is not universally picked up … with the assays that are presently in use." Dr. Garver was not able to get a positive for ISAv, but did detect the same genetic segment as Dr. Miller using her test."

Miller Transcript December 15, 2011, p. 21 ll. 9-17;
Ibid., p. 22, ll. 22-25;
Ibid., p. 23, ll. 31-36

24. It is interesting to note, however, that the virus fragment that Dr. Miller's novel test appears to have detected is divergent from any known strain of ISAv. Dr. Miller testified that a "very small product", a "fragment", which she noted was only 16 bases between two primers was a match to some known European isolates. However, having compared the product to all known isolates, Dr. Miller found that the "minimum level of divergence" is five percent. The BCSFA says that Dr. Miller's research suggests at most that if something has been detected, it is not ISAv, but a potentially endemic ISAv-related orthomyxo virus that is divergent from all known strains of ISAv and has been present considerably longer than 25 years. Commercial aquaculture first began importing Atlantic salmon eggs to BC in 1985, meaning whatever Dr. Miller has detected, if it is related to ISAv, cannot have been introduced by aquaculture.

Transcript December 15, 2011, p. 47 ll. 19 – 35;
Exhibit 2051: *Presentation to Fish Health Group on status of molecular screening for Orthomyxoviruses performed by the Molecular Genetics Laboratory, November 24, 2011*;
Transcript December 15, 2011, p. 48, ll. 15 – 27

25. Ms. Gagne noted the divergence of European and Atlantic Canada strains of ISAv over one hundred years. Dr. Miller testified that because of detected divergence from known ISAv strains, what she is now detecting has probably been in BC considerably longer than 25 years. Furthermore, she reported prevalence in pink salmon of the viral segment she claims to have identified. The BCSFA submits this suggests whatever Dr. Miller has detected was already endemic in BC prior to the first importations of eggs to BC for aquaculture.

Gagne Transcript, December 15, 2011, p. 59-61;
Miller Transcript December 15, 2011, p. 52 ll. 20 – 33

26. The BCSFA notes that several of the witnesses called before the Commission, particularly Dr. Nylund, expressed concern at Dr. Miller's testing methods and cautioned against too much reliance on what is considered novel science. Dr. Nylund noted a stop codon in the middle of a sequence identified by Dr. Miller. He explained that this means it cannot be ISAv that Dr. Miller detected:

> DR. NYLUND: Yeah, well, if you look at that
> 18 presentation by Miller, she has an alignment of
> 19 the ISA-7 showing three fixed differences.
> 20 Actually, if you look at that alignment, and I
> 21 meant alignment because I have a lot of sequences
> 22 in my lab that hasn't been published yet, there
> 23 are seven differences in the space between the two
> 24 primers and those seven differences cannot be
> 25 found in Canadian or European ISA virus. But
> 26 **unfortunately, those differences also introduces a**
> **27 stop codon into this sequence, which means that**
> **28 it's not a functional sequence, it can't be coding**
> **29 for an ISA virus or another virus protein because**
> **30 you don't have stop codons in there**. A stop codon
> 31 means that it's the end of the sequence, coding
> 32 sequence and **this is not the end of the coding**
> **33 sequence for an ISA virus**.

Transcript, December 15, 2911 p. 58-59;
Ibid., p. 100, ll. 17-33 [emphasis added]

27. Dr. Nylund furthermore expressed the opinion that Dr. Miller's pre-amplification procedure "may increase the chances for getting arbitrary RNA or DNA instead of specific ISA virus". He said that there is "no hard evidence" of ISAv in Pacific salmon, and expressed concern at Dr. Miller's results, noting they are "a bit strange". Specifically, Dr. Nylund noted that Dr. Miller's method, especially her pre-amplification, was "a bit worrying" and said that it could "lead to false positives" because the primers could attach to random RNA or DNA and later become positive in the real time PCR.

Nylund Transcript, December 15, 2011, p. 68, ll. 32-42;
Ibid., p. 57, ll. 20-40;
Ibid., p. 94 ll. 27 – p. 95, ll. 29

28. Dr. Miller's lab has not yet been assessed as Dr. Kibenge's lab was, but Dr. Klotins said that it would be subject to the same scrutiny. This means the possibility of contamination or problems with Dr. Miller's novel method which has produced false positives has not been ruled out. For example, Dr. Nylund

expressed some concern that Dr. Miller might just be detecting her own primers because of her pre-amplification methods. While this may not be cross-contamination, it would produce a false positive.

Klotins, Transcript December 16, 2011 p. 110 ll. 30-32;
Klotins, Transcript December 19, 2011, p. 28 ll. 7 – 15;
December 15, 2011, p. 94 ll. 27 – p. 95, ll. 29

29. Dr. Miller testified that there was no possibility of ISA contamination in her lab, and that she has never worked with ISA. However, she appears to have overlooked the samples which she obtained from Dr. Routledge which were also sent to Dr. Kibenge and Dr. Nylund for ISA testing. The CFIA is extremely concerned at the chain of custody of those samples. If those samples were contaminated prior to being delivered to her lab, it is possible that without proper decontamination using bleach as described by Ms. Gagne, any further tests by Dr. Miller's lab would detect the same contaminant.

Miller, Transcript December 15, 2011, p. 21, ll. 2 – 8; p. 46 ll. 36 – p. 47 ll. 5

IV. Conclusion

30. In conclusion, the BCSFA says that the recent tests for ISAv in BC have produced inconclusive results that must be further researched and studied to be properly interpreted prior to placing any evidentiary weight on them. The experts are unanimous in that if something has in fact been detected, then it is unlikely to be a known form of ISAv, and the weight of evidence supports a Pacific strain of an ISA-like virus, possibly an orthomyxo virus, that has been present on Coastal BC water for many years before commercial aquaculture of Atlantic Salmon but was undetected. Atlantic salmon have not tested positive for ISAv or been diagnosed with ISA even though they are extremely susceptible, and have shown no clinical signs of the disease. Furthermore, the clinical signs of the fish tested by Miller are inconsistent with ISA.

31. The aquaculture industry in BC has offered to provide samples of farmed salmon

for ISAv testing, and will comply with the CFIA's investigation into these tests, and with future surveillance efforts as required.

Exhibit 2081, *Letter from M E Walling, BCSFA to K Ashfield, Minister DFO, Nov 25 2011*

All of which is respectfully submitted,

This 29th of December, 2011,

K. Alan Blair
B.C. Salmon Farmers' Association

B.C. SALMON FARMERS ASSOCIATION

ISAV SUBMISSIONS
DECEMBER 29, 2011

LIST OF AUTHORITIES

1. *R. v. Trochym*, [2007] 1 S.C.R. 239, 2007 SCC 6