Supplementary Report.

by Rene Van Acker Ph.D., P.Ag., in relation to the Supreme Court of Western Australia Proceeding no. CIV 1561/2012 Marsh vs. Baxter.

January 13, 2014.

Foreword

To produce this report I have relied upon my own expertise and experience relevant to the topic and gained in terms of formal training over the past 20 plus years and work, study and research experience over the past 16 plus years. I have also reviewed the statement of claim for this case and the consolidated statement of agreed and not agreed facts and materials provided related to the nature of the Marsh (Eagle Rest) and Baxter (Sevenoaks) properties. I have also read the reports of other expert witnesses to this case, in particular those referred to in the questions that guided this supplementary report. In addition, I have consulted published reports, studies and documents from around the world that are relevant to this topic and pertinent to the purposes of this report (see list of references cited at the end of my first two reports and at the end of this report). In these respects I consider that I have made all inquiries which I believe are desirable and appropriate and that no matters of significance which I regard as relevant have to my knowledge been withheld or not considered for the creation of this report within its intended scope.

Qualifications

My name is Dr. Rene Van Acker and I am Associate Dean of the Ontario Agricultural College, and Professor in the Department of Plant Agriculture at The University of Guelph (Since September 2009), Canada. I was previously (July 2006 - September 2009) Professor and Chair of the Department of Plant Agriculture and from1996 to 2006 was Professor of weed science and crop management at the University of Manitoba, Winnipeg, Canada. My research areas include weed seedling recruitment biology and ecology, robust cropping systems, and the coexistence of genetically modified (GM) and non-GM crops. I conduct field-based research, supervise graduate students and teach courses at the undergraduate and graduate levels. I have published over 100 peer-reviewed works to date and have made over 300 other non-peer reviewed contributions. My work on the coexistence of GM and non-GM crops and the movement of GM traits from crop to crop has lead to international collaborations, presentations, and consulting work with governments and organizations in Denmark, Australia, Austria, Switzerland, the United States (U.S.) and Canada, including membership on the scientific advisory committees for the International conferences on the coexistence of GM and non-GM crops in agricultural supply chains (GMCC) which has hosted conferences in Denmark (2003), Montpellier (2005), Seville (2007), Melbourne (2009) and Vancouver (2011), with the next conference scheduled for Lisbon in 2013. I have also conducted contained trials of regulated GM crops (from 1999 to 2003) while at The University of Manitoba. I have previously been retained and appeared on the stand as an expert witness on the topic of the movement and containment of GM material in Canada in the case of Monsanto v. Percy Schmeiser, in Canada (Federal Court of Canada 2001) and in the U.S. in the Genetically Modified Rice Litigation (United States District Court 2012). I grew up on a farm in southwest Ontario, Canada. I hold BSc and MSc degrees in crop science and weed management, respectively, from the University of Guelph, Canada and a PhD in crop-weed ecology from the University of Reading in the UK.

This report is structured as answers to questions (as follow) specified in instructions provided to me in the letters from Mr. Mark Walter at Slater and Gordon dated January 6, 2014 and Mr. Ben Hardwick at Slater and Gordon dated January 10, 2014.

Re: The report of Jonathan Slee dated November 18, 2013. We ask that you address the following matters in Mr Slee's report.

1. On page 5 of the report, Mr Slee states that

"All of the organic standards that are in operation in Australia strictly prohibit intentional use of genetically modified organisms (GMO's). This rule appears to be similar to the organic standards that are set in other countries around the world, however it appears that most other countries do allow for some "Adventitious Presence" (AP)".

Do you agree with the statement that "most other countries" allow for some Adventitious Presence. If you do not agree, please provide some examples of organic standards operative in countries other than Australia.

I am not an expert in nor have I done any specific extensive studies to determine what the requirements are around the world in various jurisdictions with regard to the extent of adventitious presence (AP) of GM material that is allowed in products sold, shipped and/or labelled as organic and as such I do not feel competent to comment in regard to these nor to Mr. Slee's representation of these.

2. At page 11 of the report Mr Slee states that,

"In Europe organic production and labelling is governed by the 'Council Regulation (EC) No. 834/2007.' This replaced Regulation (EEC) No. 2092/91. There are a number of certification bodies across Europe that all conform to the above standards. The individual certifying bodies may also have additional requirements that their members have to meet above those requirements set out in EC No. 834/2007. A supplement to the EC No. 834/2007 is (EC) No. 889/2008 which provides more details to the standards as well as supporting materials such as non GM declarations, and that, "In the EU focus for Adventitious Presence is in the product rather than the farming systems. The EU uses the same rules for Adventurous (sic) Presence of GM for organic products as it does for its broader non GM market. The tolerance for Adventitious Presence of GM material is governed by Regulation (EC) No. 18929/2003; Section 2 Labelling Article 12.2."

Please comment on the accuracy or otherwise of these statements. Please attach copies of the relevant standards and declarations to your report. We note that at page 10 of your report dated 6 November 2012 you refer to the EU directive on co-existence. Please explain the relevance of that directive if any, to the view expressed by Mr Slee. Please provide a copy of that directive with your report.

I am not an expert with regard to the EU directives and regulations regarding organic agriculture and the AP of GM material in organic products and as such I do not feel competent to comment in regard to these nor to Mr. Slee's representation of these. With regard to my reference to the EU directive on coexistence in my Nov 6, 2012 report, I referred to these directives in relation to the means of achieving coexistence between GM and non-GM production and for limiting the movement of GM material to farms where it is not intended or wanted. Specifically, I referred to the update of the 2001 EU directive on coexistence (EU 2010) which acknowledges the fact that practical coexistence in some jurisdictions (e.g. because of field sizes and intermingling of field ownership within confined areas) may require the banning of GM crops being grown in these jurisdictions.

Re: Witness statement of Mr Baxter dated 28 August 2013

1. Please comment on the buffer zones referred to in paragraph 48[5] of Mr Baxter's statement and in the Monsanto Roundup Ready Canola 2010 Crop Management Plan to which Mr Baxter refers in the previous paragraph (a copy of which is enclosed).

The buffer zone requirements that Mr Baxter refers to in his statement and in regard to the Monsanto Roundup Ready Canola 2010 Crop Management Plan, is not sufficient for the purpose of containing his GM crop and preventing it (in absolute terms) from contaminating Mr Marsh's paddocks. Monsanto acknowledges this within its Roundup Ready Canola 2010 Crop Management Plan (see p 4) where it is stated "Where an alternative standard....is required in response to market requirements and product specifications...that requires specific management to maintain product integrity (e.g. ....Organic Canola), appropriate management strategies applicable to the growing and processing of the crops should be incorporated as deemed and communicated by the supply chain for the specified product." This statement and recommendation by Monsanto is an acknowledgement of the key conclusion I presented in my first report (dated November 6, 2012) which was that " It is understood by experts that GM containment and preventing incursion by GM material is challenging and no single means of segregation or containment is sufficient to effectively contain GM material especially in cases where low levels of escape can cause harm." By low levels I mean levels substantively below 0.9%.

Re: Report of Professor Stephen Powles dated 6 August 2012
2. We refer you to part 14 of Prof Powles' report. Do you consider direct heading (direct harvesting) of GM canola to be any more or less effective than swathing in preventing the movement of parts of GM canola plants in the wind?

Yes, direct heading (direct harvesting) of GM canola is more effective than swathing in preventing the movement of parts of GM canola plants in the wind. I state this, along with references to support it, in my previous two reports dated November 6, 2012 and May 30, 2013.

Supplementary Report of Professor Stephen Powles dated 4 November 2013
3. We refer you to part 1 of Prof Powles' supplementary report. Are GM canola flowers distinguishable from other plants? If so, how readily distinguishable are they?

Canola flowers are distinguishable from other plants, in particular if the other plants are not from the *Cruciferae* family (to which canola belongs) The *Cruciferae* name means "cross bearing" as in "crucifix" and it is a reference to the four petals on the flowers of plants in this family. Canola may be difficult to distinguish from other *Cruciferae* plants, especially mustard species which have essentially the same yellow flowers. In addition, as Dr. Powles describes in his supplementary report, it may be difficult to distinguish canola plants from other yellow flowering plants at a distance if the other plants have a relatively high density and the canola plants have a relatively low density. However, in reference to Dr. Powles supplementary report, I am not familiar with capeweed and cannot comment specifically on how difficult or not it is to distinguish canola from capeweed other than to state that capeweed flowers are daisy like (not *Cruciferae* like) and they do not resemble canola flowers other than the two being yellow. Certainly, it is easier to distinguish flowering canola in fields that do not contain other plants with showy flowers (i.e. wheat, oat, spelt and barley fields). In fields like these, even low densities of flowering canola could be easily identified from a distance.

4. We refer you to part 2 of Prof Powles' supplementary report. Do you agree with the reasoning and conclusions set out in that part of the report?

I do not agree completely with the reasoning and conclusions of Dr. Powles in this regard. Canola seed is not widely considered to have a short seedbank life. As I explained in my first report (dated November 6, 2012), the persistence of volunteer canola has been studied extensively and it is commonly understood (see the many references to published research studies I provide in my first report) that canola is an

effective and persistent volunteer in part because canola seed can be persistent and canola seed does not have a short seedbank life. Unlike the seed for most common crops, canola seed has the ability to enter into secondary dormancy and its persistence has been shown to range from 2 to more than 12 years (even the Monsanto Roundup Ready Canola 2010 Crop Management Plan asks farmers to expect volunteers for 3 years - see p5). Even if one controls all volunteer plants and prevents any further seed entry it could take many years to eliminate an escaped canola population if it has had a chance to establish a seedbank. I do agree with Dr. Powles that the canola seed residing in the top few centimetres of soil will have its highest percentage germination in the year after entering the soil seedbank. However, there can still be low levels of canola seed emergence from a persistent seedbank for years after a seed shedding incident.

Re: Report of Prof Dr Patrick Rudelsheim dated 2 October 2013
5. We refer you to page 16 of 28 of Prof Dr. Rudelsheim's report. Do you agree with the statement in part 4.2.1 of the report that the impact of dispersed vegetative material from RR canola will be negligible? If not, please explain why and describe the nature and extent of any impact.

What matters for Mr. Marsh in terms of maintaining his organic certification is the requirements for freedom from the presence of GM material. If the requirement is complete freedom from GM (no-GM at all), then any incursion of GM material can have an impact. If the material that is dispersed is completely free from seed and is not capable of establishing a viable plant in anyway (vegetative but not a propagule of any sort), then yes the impact of the dispersed material will create less of an impact because it will be less likely to lead to a persistent problem (a self replicating problem and/or a persistent seedbank). However, if the vegetative material (even if it is not a propagule) is included in crop harvested by Mr. Marsh and it creates a trace of GM material in the marketable organic crop of Mr. Marsh then it will impact Mr. Marsh and whether the amount is trace or greater the impact will be similar if the requirement is absolute freedom from GM.

6. Do you agree with the opinion, reasoning and conclusions in the second to fourth paragraphs of part 4.2.3 of the report relating to dispersed seeds which become part a seed bank?

Volunteer canola is very common (Lawson et al. 2006; OGTR 2008), and is so common in Australia that it is considered a major weed (OGTR 2008). Volunteer canola plants are most commonly found within cultivated fields as the result of growing canola in rotation and subsequent seed loss at harvest as well as the ability of canola seed to persist in the soil and form a seedbank (Lawson et al. 2006; OGTR 2008). Volunteer (or escaped or feral) canola is less common in non-cultivated lands but it still regularly appears in non-cultivated and non-cropped areas, especially in agricultural areas where canola is grown as well as along grain transport routes and in grain handling areas (Knispel et al. 2008). It was previously thought that escaped canola populations had only a limited ability to persist (OGTR 2008) but a number of recent studies have shown that escaped canola populations (growing in non-cropped areas including roadsides) are robust enough to persist for multiple generations and for enough generations to facilitate GM trait stacking within these populations (Knispel et al. 2008; Shafer et al. 2011). All of this is evidence of the potential impact that canola seed poses because it can be persistent (in a variety of scenarios and under a variety of conditions) and it can regenerate to produce seed and pollen that can lead to gene flow and contamination, in this respect I do not completely agree with the opinion, reasoning and conclusions of Dr. Rudelsheim who suggests that the canola seeds will have no impact.

7. Please comment on the statement in the second paragraph of part 4.2.4 of the report that unwanted RR canola plants can be effectively removed with a range of approved herbicides and mechanical weed control methods.

I agree that RR canola plants can be managed using herbicides and tillage (mechanical weed control). Certainly RR canola plants are susceptible to a variety of herbicides (excepting, of course, glyphosate) and there have been studies published on the efficacy of various herbicides for managing volunteer RR canola (e.g. Beckie et al. 2004). However, herbicide applications do not remove viable RR canola seeds from the seedbank and tillage that buries canola seed can cause the seed to enter secondary dormancy which will extend its persistence (Gulden et al. 2003b).

8. Please comment on the statement in the second paragraph of part 4.2.4 of the report that the number of glyphosate tolerant canola volunteers appearing in neighbouring fields as a result of gene flow will be minimal compared to those occurring in the field following the harvest of the RR canola crop.

Certainly the number of volunteers that can appear in a field of RR canola following harvest can be high (an average of 3000 viable seeds m^{-2} - Gulden et al. 2003a). In some cases the numbers of volunteers can be high enough to constitute a viable crop stand and typically the number of RR canola volunteers in a given field of RR canola would be higher than the number of RR canola volunteers appearing in an adjacent non-RR canola field due to pollen mediated gene flow (PMGF). However, even if PMGF averaged only 0.01% across an adjacent field (not an unusual average rate across 500 m - see Beckie and Hall 2008), that would still result in 0.3 RR canola seeds m^{-2} across the entire field; more than enough seed to establish a very significant RR canola population in that field the following year.

9. Do you agree with the conclusion at the end of part 4.2.4 of the report that even if the RR plants flower, no impact on another crop like oats, wheat, barley, lupins, spelt or rye, conventional or organic, is expected? If not, please explain why and describe the nature and extent of any expected impact.

As per my answer to question 5, the impact of the presence of the GM canola on Mr Marsh's property is in relation to the requirements he must meet in order to maintain (or regain) organic certification, or organic status for his marketed crop(s). So the presence of RR (GM) canola in non-canola crops on Mr. Marsh's land does not necessarily have an impact on the crops in which it is growing if it does not have an impact as per above. Although if the canola does grow large enough to flower and it is present at any sort of substantive density then it can impact the yield of any crop. Canola will not outcross and share genetic material with the crops listed above (oats, wheat, barley, lupins, spelt or rye). Pollen mediated gene flow from GM to non-GM crops is only possible if the crops are sexually compatible. However, the presence of RR canola on Mr. Marsh's land does create the possibility for negative impact if, for example; 1) The RR canola is allowed to set seed and further extend the persistence of a GM crop on his land providing the potential for GM contamination in the future; 2) The GM canola is flowering and is allowed to pollinate any organic canola that Mr. Marsh may be growing in proximity; 3) The canola (even if it does not produce seed), is harvested along with any other crop and via harvesting (including threshing) foreign GM material (even dry vegetative material) contaminates the marketable portion of any of Mr. Marsh's organic crops.

Re: The report of Dr Christopher Preston dated 4 December 2013.

1. a. We refer you to part 3 of Dr Preston's report on page 4, relating to the survival of canola seed bank in farmer-managed paddocks in agricultural regions in Australia in which Dr Preston refers to "normal management practices". What management practices might be adopted by farmers to extinguish canola volunteers appearing on their farms?

Farmers may adopt not to grow canola on their farms if their intention is to "extinguish" canola volunteers appearing on their farms. And when canola is not being grown they would use herbicides in the non-canola crops to control canola volunteers that would be emerging from the seedbank. If they wanted to be very diligent they may scout fields after herbicide application and remove (perhaps by hand) any escaped canola plants (especially before they set seed). In addition, if they wanted (or needed) to be very diligent they may also scout field margins to look for escaped canola plants and remove these by hand or by herbicide application along the field margins. They would need to maintain efforts for more than 3-5 years (and maybe longer in terms of monitoring) to ensure that the canola seedbank is relatively exhausted. They may also want to monitor for inadvertent spills of canola seed being transported on their farm or on pathways or roadsides bordering their farm.

b. Would any, and if so which, such practices be unsuited to use on organic farms? If so why?

On organic farms it would not be possible to use non-organic production approved herbicides in non-canola crops or on field margins or on roadsides to control canola volunteers This is because using non-organic production approved herbicides would contravene organic regulations and would threaten (and likely suspend) organic certification of that farm.

c. If any of the practices is unsuitable for organic farming, what if any impact would that fact have on the period of time in which canola volunteer plants might be produced on an organic farm?

It may or may not make any difference in this regard if the organic farmer is diligent in controlling volunteer canola plants through other means including; tillage prior to seeding non-canola crops (to control volunteer canola plants emerging prior to seeding), seeding fields where the canola contamination occurred to pasture or forage crops which would be harvested frequently for forage therefore not allowing any canola volunteers to grow and to set seed, scouting fields and removing any canola plants by hand before they have a chance to set seed, monitoring field margins and roadsides for volunteer canola and removing these by hand before they have a chance to set seed.

If, however, an organic farmer tills a field after harvest in which GM canola volunteers had been growing and had set seed then this tillage could burying some of the canola seed and this could induce secondary dormancy in that seed thereby extending its potential for persistence in the seedbank.

d. On pages 5 and 6 of his report Dr Preston refers to cross pollination between GM canola and wild radish. If both wild radish and GM canola are present on a farm what if any opportunity is there for cross pollination? If cross pollination does occur, will the GM traits be found in wild radish progeny?

Dr. Preston is recognized among weed scientists world-wide for his work on the evolution of herbicide resistance in weeds and for his work on cross-pollination between crops and weeds. I would defer to him and his opinion on these questions.

e. Dr Preston refers to the use of herbicides on wild radish in this context, what if any significance would attach to the fact that an organic farmer does not use conventional herbicides on wild radish?

I am not an expert on wild radish or on managing wild radish and do not feel competent to comment on this question.

f. On page 6 of his report he refers to the level of "resistant individuals" (expressed as a percentage of seed) in circumstances of pollen mediated gene flow. To what extent, if any, can those findings be extrapolated to estimate the proportion or rates of volunteers and or their seed production in cases of seed dispersal?

The studies Dr. Preston refers to on page 6 of his report relate to pollen-mediated gene flow from one canola field to another. If that is the scenario one is interested in then yes these data can be used as suggested; especially the data from the 2008 and 2009 trials (the research study that has been submitted to the journal "Nature Biotechnology" for review for publication) which included more fields than the 2000 study and include the RR trait as the marker. But, the studies Dr. Preston refers to are not studies of seed mediated gene flow or seed escape so they would not necessarily be useful to estimate the possibility of canola seed escaping from one field to another leading to volunteer canola.

g. In the context of seed dispersal, to what extent is the number of seeds that are dispersed relevant to the how many volunteer plants might be produced either in the first year and in subsequent years?

Yes, the number of volunteers is a function of the number of seeds that escape (either escape harvest or are moved by wind or other means). If the seed is buried and the soil is dry then canola seed can go into secondary (physiological) dormancy and this will facilitate longer persistence in the seedbank.

h. Apart from the number of seeds, what other variables are relevant to the question of whether those seeds might germinate?

The conditions that seeds experience will determine if they; germinate, go into dormancy or become non-viable. The key conditions that can affect this are; moisture and depth of burial in the soil where for example, burial under dry conditions can induce secondary dormancy in the seed facilitating persistence.

i. On the assumption that canola seed dispersal occurs by means of the dispersal of canola swaths, to what extent are the number of swaths, the maturity of the plant, the state of the seed pods, and environmental factors (including topography, weather conditions, soil condition) relevant to estimating:

- **i. The number of seeds that have been dispersed; and**
- **ii. Their viability to germinate, either in the first year and or in subsequent years.**

In simplest terms the most seed dispersal and the greatest number of volunteers will occur if there is more swath moved and if that swath contains mature seed. If the swaths move just before they are meant to be harvested then they will have a very high proportion of mature seed.

j. Are there other matters that are relevant to those questions?

See my Nov 6, 2012 and May 30, 2013 reports for more commentary in regard to these questions.

k. In part 11 of his report on page 13, Dr Preston lists recommendations which he would have made for action to minimise the potential for GM canola volunteers on the farm.

i. Do you agree with the recommendations made by Dr Preston?
ii. Would you make any additional recommendations for minimisation of the potential for GM canola volunteers?

It is important to note that Dr. Preston comments in the context of achieving coexistence of GM and non-GM farming at a 0.9% threshold level. In this respect, I generally agree with Dr. Preston's recommendations. However, if the threshold level required is substantively lower than 0.9% then it becomes more challenging to maintain coexistence. Please see my report date November 6, 2012 for further commentary and opinion and my recommendations in this regard. .

I. We refer you to part 13 of Dr Preston's report on page 15, relating to the practicality of screening canola seed from cereal grain seed.

i. Do you agree with the observations of Dr Preston in relation to the use of seed cleaning equipment in commercial farming practice in Australia?
ii. Are there any factors not mentioned by Dr Preston which you consider to be relevant to the practicality of seeds screening and cleaning?
iii. Are there any factors mentioned by Dr Preston which you consider to be especially significant to the question of the practicality of seed screening and cleaning?

As per question "k" above, what is important to consider is the threshold level. Cleaning non-GM seed to ensure absolute freedom from GM can be very difficult. Cleaning seed to meet more typical levels of 0.5% or 0.9%, especially if it is separating seeds of different sizes (e.g. canola versus wheat) is much less difficult (Van Acker et al. 2007).

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**new references - not cited in my previous two reports*

Submitted this 13 day of January 2014.

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Rene Van Acker