



## Minnesota Golf Course Superintendents Association

*Affiliated with the Golf Course Superintendents' Association of America*

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#### Vice-President

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### Executive Director

#### Jack MacKenzie CGCS

MGCSA  
10050 204th Street N  
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651-324-8873

July 25, 2016

To: Kevin Cavanaugh  
Pesticide Management Advisor  
Minnesota Department of Agriculture  
625 Robert Street North  
St. Paul, MN 55155-2538

Thank you for the opportunity to represent the golf community, as well as the public, during the recent Pesticide Management Plan Committee meeting. Once again I was impressed with the expansive amount of worthwhile information generated, studied and provided by the Department of Agriculture with the importance of public safety in mind. Your presentations continue to improve, as do the educational materials that include better graphing for easier consumption.

And I was happy to be on hand to defend the golf industry when concentrations of thiophanate methyl products were detected. Although used in a limited application upon turf due to resistance issues, this material is commonly used in other industries including nursery management. I was grateful to be present as further research indicated that golf wasn't the source.

In answer to the predominant questions provided:

*Is there a need for new Minnesota Department of Agriculture determinations that would trigger development of pesticide water quality Best Management Practices or related actions for groundwater or surface water?*

No, not at this time as the detection procedures and management in place currently are sufficient.

*Is there a need for pesticide product restrictions to protect water quality as a condition for registration?*

No, not at this time as there. Programs in place, such as BMP guidelines and continued emphasis upon responsible product use, are adequate, thus in my mind there is no need for additional restrictions as a condition of registration for the materials reviewed.

Perhaps, however, there is a need for enhanced communication to the public regarding the scrutiny the MDA places upon their sampling efforts and review practices. While the information is available to those who seek the details,



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most do not pursue this line of inquiry. Considering how well the agricultural community is doing in their voluntary implementation of BMPs and various positive programs intended to assure responsible chemical and fertilizer use, more can be said to promote their efforts. I understand this is easier said than done.

With great appreciation, it is my pleasure to participate upon this PMP committee to review and comment on the MDA's procedures. Thank you.

Respectfully Submitted,

Jack MacKenzie  
Executive Director, MGCSA

**David Flakne**  
Sr. Director, State Affairs

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July 29th, 2016

Gregg Regimbal  
Minnesota Department of Agriculture  
625 Robert Street North  
St. Paul, MN 55155

Re: MN Pesticide Management Plan Committee (PMPC) 6/30/16 – Comments & Recommendations.

I wanted to thank MDA for the opportunity to comment regarding the recent PMPC meeting, the 2015 Water Quality Monitoring Report, data summaries and the questions posed to the committee. The MDA continues to have one of the best groundwater and surface monitoring programs in the nation and the presentations provided to the committee were very informative. The annual monitoring reports clearly demonstrate the success of the MDA's pesticide management and prevention efforts. Concentration trends are generally stable or declining over the long term and MDA charts, which show some short term fluctuations based on many factors such as precipitation differences year to year, must be put into broader context and viewed over the longer term. (MDA's data date back into the 1990's and should be available to evaluate longer term trends. Abbreviating these charts can be deceiving). The data continues to demonstrate that pesticide detections are generally very low relative to established water quality standards. This is in large part due to the success of MDA's prevention efforts and the voluntary BMP education that has been promoted by the MN Dept of Agriculture, University of Minnesota Extension, the pesticide registrants and the entire agricultural industry.

Committee members were asked to respond with our comments and recommendations to the Commissioner of Agriculture. MDA staff specifically asked committee members to address the following two questions:

1. Is there a need for: "New MDA determinations (Common Detection for Groundwater or Surface Water Pesticide of Concern determinations using the listing criteria articulated statute and in the MN Pesticide Management Plan) that would trigger development of pesticide water quality BMP's or related actions for groundwater or surface water?"
2. Is there a need for: "pesticide product restrictions to protect water quality as a condition of registration?"

As noted above, the success of the MDA's pesticide management efforts and the implementation of generic and pesticide specific BMP education, as part of the MN PMP, have been well documented and extremely effective. These efforts have resulted in detected concentrations of pesticides which are "generally very low" relative to water quality standards in both groundwater and surface water. Furthermore, trend analysis has clearly demonstrated that concentrations have declined or remain relatively stable at very low levels. The MN Department of Agriculture, pesticide registrants and MN farmers should be commended for continued efforts to protect MN water resources. The current voluntary BMP education and outreach efforts are clearly working and should remain targeted toward the most vulnerable soils and geographic regions of the state.

***Based on the monitoring data shared at the 6/30/16 PMP Advisory Committee meeting there is no need for additional declarations of "Common Detection" in ground water or "Surface Water Pesticide of Concern" determinations for surface water. Furthermore, given the continued success of the current BMP educational efforts there is no need or justification for restrictions as a condition of registration for any pesticide reviewed.***

The MDA should continue to promote voluntary Generic & Pesticide Specific BMP's which have proven effective at minimizing detected concentrations in both groundwater and surface water. Furthermore, the MDA should continue to look for opportunities to communicate the success of the MN PMP efforts with producers, dealers, and the public including key policy makers. It is important that the public understands how the agricultural industry and MN farmers continue to be good stewards of our land and water resources as they continue to produce a safe and abundant food supply.

After reviewing the data provided to the PMP Committee I would offer the following comments in support of my comments and recommendations above.

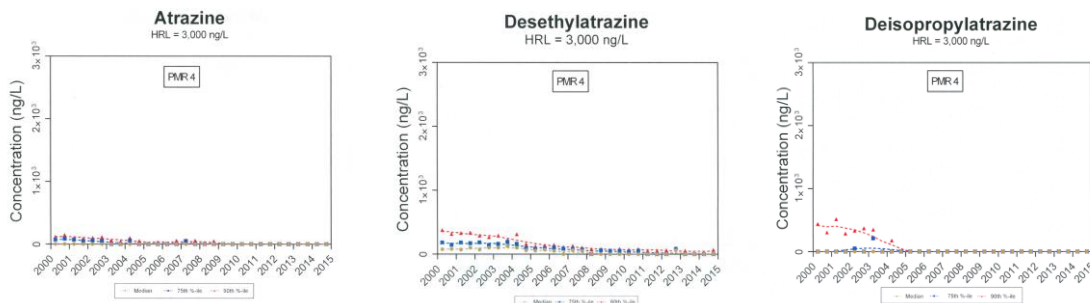
### **Groundwater Comments**

**General Comment:** The data summaries and charts were well designed with charts generally showing concentration & data trends ranging from 2000 through 2015 (some graphs start in 2004 or 2006). Raw data summaries were provided with the median, 75<sup>th</sup> percentile, 90<sup>th</sup> percentile, and maximum concentrations for the most recent year, 2015. MDA staff has continued to update and refine the presentation of this data, charts and trend analysis and these improvements should continue. This should include the addition of graphs, which members of the committee have been requested for many years, showing detections relative to established standards (This is further articulated below). We have discussed issues with the trend lines over the years and the bias toward the first and the final sample. This issue will likely diminish each year as new data is added and longer term trends are displayed, however MDA should not abbreviate these charts and should include the longer term concentration trends in each of these graphs and charts. The format of the data and graphs provided was well done. MDA clearly has an impressive database dating back many years and MDA should present the long term data and trends beginning at the earliest possible date. In addition, MDA needs to maintain this long term data record especially for those products that are in Common Detection. It will continue to be an asset when evaluating and communicating the long term success of MDA programs and prevention efforts. Concentrations clearly remain very low relative to established standards and concentrations are either stable or declining over the long term. The best example of this continues to be atrazine where we have seen significant declines in concentration to a point where the maximum 90<sup>th</sup> percentile concentration of atrazine was 0.08 ppb (atrazine + degradates = 1.16ppb) from PMR 9, which is considered to be groundwater under the influence of surface water. All other PMR's had extremely lower concentrations often at or very near the method detection limit (PMR 4, which is considered to have the most vulnerable soils had 90<sup>th</sup> percentile concentrations that were all less than the limit of detection for parent atrazine and each of the degradates and the maximum concentration detected of parent plus degradates was 0.07ppb). These results serve as a testament to the success of the effort implemented by MDA, the registrant, and the producers of Minnesota to protect groundwater through proper management and use of this important production tools. The data clearly demonstrates that stewardship efforts to protect water quality in MN have been extremely successful. Therefore, no further action is needed or justified by the monitoring data.

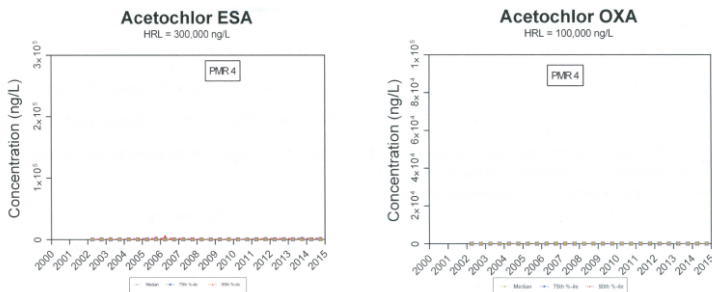
In 2015, after several years of comments and requests the MDA staff developed and provided the PMP Committee with data graphs utilizing the HRL or MCL as the upper bound on the vertical axis. These graphs however were not included in the 2014 Water Quality Monitoring Report. I specifically requested in my comments last year that these graphs be developed once again and that they also be included in the 2015 report. I was very disappointed during our 2016 meeting and data review to find that not only were these graphs not provided to the committee they were also not included in the 2015 monitoring report. These graphs demonstrate the success of MDA's overall prevention efforts and provide visual context to the monitored concentrations relative to established health based standards. The public, which only sees the annual Water Quality Monitoring Report, should be provided with these graphs as part of the official report. This is even more important today given that MDA, for the past two years, has decided to report detected concentrations in PPT rather than PPB. This change results in values that '*appear larger*' and require context (for example; 300.00 ppt appears to the layperson as much larger than 0.30 ppb) and the public should be provided with these graphs in the official report. This continues to be a very reasonable request and I can think of no reason for excluding these graphs from the report. These graphs provide clear evidence as to the effectiveness of MDA's prevention efforts and the public and

policy makers have a “right to know”. The industry felt that the graphs provided last year were a good first step and we are very disappointed to find that these graphs were not included in the 2015 report.

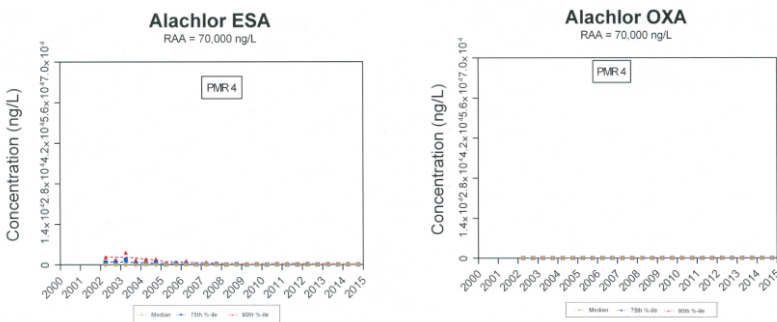
**Atrazine:** As mentioned above, the data clearly demonstrates that the detection of atrazine and its’ degradates, despite continued widespread use, have declined significantly since the 1990’s. Generally when detected, levels are very low, at or near the method detection limit, and even maximum detections, in shallow monitoring wells in the most sensitive soils, are far below the Federal MCL & State HRL (See the 2015 MDA graphs below for PMR 4). Voluntary efforts by the registrant, producers and the MDA’s voluntary BMP education have proven to be highly effective at protecting groundwater. There is clearly no need to change the status of atrazine.



**Acetochlor:** The data trends for acetochlor and concentrations in groundwater also remain relatively stable at very low levels. Median concentrations were below limits of detection in almost all PMR’s. Detections can be expected to fluctuate over time given changes in weather conditions and associated groundwater recharge, however over the longer term acetochlor trends are relatively stable and/or declining and detected concentrations are well below the established HRL (See the 2015 MDA graphs below for PMR 4). There is no need to change the status of acetochlor.



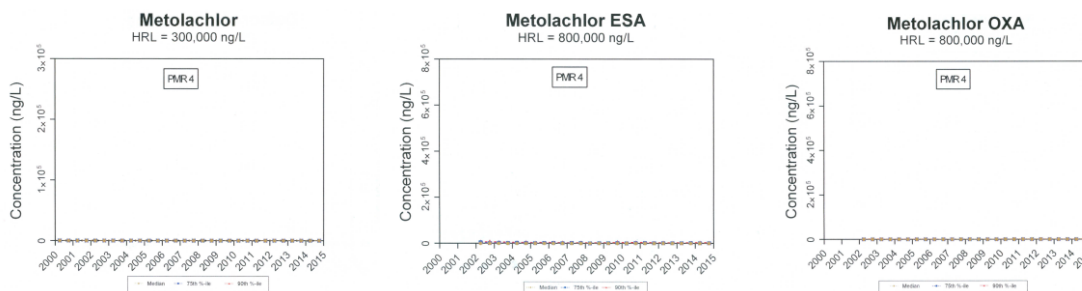
**Alachlor:** The use of alachlor has sharply declined. It has been replaced in the market by other grass herbicides. Detected concentrations have also declined. Detected concentrations are very low with maximum concentrations ranging from ND (None Detected) for parent alachlor to levels which are significantly below the health based standards for both the ESA and OA degradates. (See the 2015 MDA graphs below for PMR 4). Once again there is no need to change the status of alachlor.



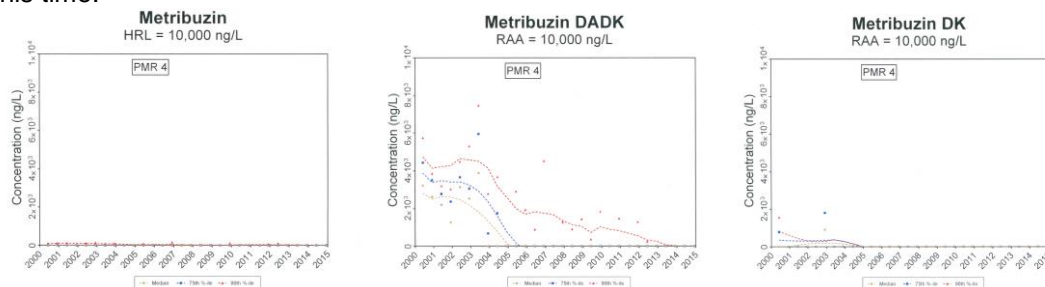
**Dimethenamid:** Dimethenamid data has been presented since 2002 and to date dimethenamid has not been determined by the Commissioner to be in “Common Detection” for groundwater. Dimethenamid does not currently have an HRL which by statute a prerequisite to a declaration of “Common Detection”. The detections are limited with only a few detections of the parent product since 2002 and concentrations of parent plus degradates are very low relative to the HBV and RAA established by the Dept of Health. Since no HRL exists and the data does not indicate a concern there does not appear to be a need for a “Common Detection” declaration at this time. I am confident that the MDA will continue to monitor for Dimethenamid and the PMP Committee can continue to watch dimethenamid detected concentrations and trends over time.

**Metolachlor:** The use of metolachlor changed significantly in 1997 when EPA granted the registration for the “Reduced Risk” S-Metolachlor as a replacement for the older metolachlor formulations. S-metolachlor received the “Reduced Risk” classification from EPA due to the significant reduction in use rates (30-40% less per acre than the rates used for the older metolachlor). This has resulted in a significant reduction in pounds used in Minnesota and has driven declining trends in detected concentrations.

Detections of parent metolachlor have historically been infrequent and concentrations are very low relative to established standards. In 2015, the Median, 75<sup>th</sup> & 90<sup>th</sup> percentile for metolachlor in all PMR’s with the exception of PMR 9 is ND (None Detected) and maximum concentration detected are extremely low relative to the MN HRL of 300,000.00 ppt. PMR 9 is groundwater under the influence of surface and the detected concentration were still well below the established water quality standards (See the 2015 MDA graphs below for PMR 4). US EPA has also established an HAL for Metolachlor at 700,000.00 ppt. Detected concentration of metolachlor ESA and OA degradates are also very low relative to the MN HRL of 800,000.00 ppt. In addition, the long term trends have shown that detected concentrations have been stable or have declined over time in most PMR’s. The MDA noted an increased detection frequency in PMR 1 for metolachlor and degradates yet the percent detections are still very low relative to other regions of the state. These new detection in PMR 1 are indicative of the fact that corn production is moving further north and west within the state. Clearly there is no further action necessary or justified for metolachlor.



**Metribuzin:** The use of metribuzin has been relatively stable over time and detected concentrations have been declining. It has only been detected in PMR 4. (See the 2015 MDA graphs below for PMR 4). The MDH has a RAA for Metribuzin and its degradates of 10,000.00 ppt and detected concentrations remain very low and concentrations continue to decline. There is no need to change the status of metribuzin at this time.



**Additional Detections:** On page 2-67 and 2-68 of the Water Quality Monitoring Report MDA discusses detections of six additional compounds. The detection frequency generally ranges from 6% to 17% of the samples and maximum detected concentrations ranged from less than 1% to 17% of the HRL or RA values established by MDH. Bentazon is currently the only compounds with an established HRL, but it is my understanding the MDH is working to establishment HRL's for several additional compounds. MDA first began monitoring for these compounds in 2010 and should continue to include these compounds in their monitoring program, however no product specific action appears to be necessary or justified at this time. MDA should also continue to promote general pesticide BMP's and follow their use and any associated trends over time.

### Surface Water Comments:

**General Comment:** Once again, the data summaries for surface water were helpful in evaluating detected concentration relative to established standards. The MDA staff also provided the committee with a summary of Tier 1, Tier 2, and Tier 3 monitoring which is completed annually to demonstrate how MDA has targeted limited resources toward priority Tier 3 locations throughout the state.

The Tier 1 & 2 monitoring data was presented for 2015 for selected compounds and additional data was provided for 2011 through 2015. Tier 3 monitoring data was shared with the committee with detections evaluated and summarized into detected frequency, maximum and median concentrations as well as a summary of samples exceeding 50% of the Chronic WQ Standard established by MPCA. Historical data was also summarized for acetochlor, atrazine and chlorpyrifos which have been listed by the MDA as "Surface Water Pesticides of Concern".

Historical data was also presented for metolachlor, however prior PMP committees and the Commissioner of Agriculture has determined that metolachlor "does not" justify listing based on low level detections relative to the established WQ standards. Metolachlor is very rarely detected at concentrations of relevance to water quality standards and there were no samples exceeding 10% or 50% of the chronic aquatic life criteria in 2015. Since 2010 metolachlor has averaged 4 detections per year over 10% of the standard with a high of 10 samples in 2014, no samples were detected over 10% or 50% of the standard in 2015. During the period of record presented, 2010 – 2015, there have been no samples exceeding 50% of the chronic criteria. While detection will vary from year to year based on timing of application relative to precipitation events, the data clearly demonstrates that metolachlor does not present a risk to MN surface water based on established water quality standards. There were only 4 detection over 10% in 2010, 2011, 2012 and 2015 combined and there have been no detections over 50% for more than 6 years.

The PMP articulates under what conditions a pesticide, detected in surface water, should be considered for “Pesticide of Concern” status in surface water. The PMP states: (I have underlined portions for emphasis)

*“To provide flexibility in evaluating and responding to concentrations that might lead to future impairment listings of water bodies, and in recognition of the complex variables that can contribute to peak concentrations, there is no single value or percentage of a reference value that will trigger the development of preventive actions such as voluntary pesticide-specific BMPs or educational campaigns. Instead, preventive actions will be considered when surface water monitoring results for a pesticide exceed 10% to 50% of its reference value. The commissioner will consider a number of factors in determining if an exceedance means that the pesticide is a surface water pesticide of concern requiring initiation of specific preventive actions. The most important factors will be monitoring and use trends. For example, if the use of a pesticide is stable or increasing, and the concentration is at 10 to 50% of its reference value and exhibits an increasing trend, then preventive actions may be taken to ensure that the water body does not become impaired.”*

Furthermore the PMP instructs the Pesticide Management Plan Committee to consider:

- 1. The scientific validity of the data upon which the recommendations are based.*
- 2. The extent of use and general use profile and the anticipated status of registration of the pesticide.*
- 3. The existence of a water quality standard, water quality criterion, or water quality guideline for the pesticide or breakdown product set by the MPCA. In the absence of a standard, an analysis will be conducted to determine whether to request a standard, if one has not already been requested.*
- 4. Trends and concentrations of the pesticide in surface waters and the relationship of the detected concentrations relative to a water quality standard, water quality criterion, or water quality guideline.*
- 5. Consider all other associated land use factors which may be considered unique or unusual such as agronomic, meteorologic or hydrologic events.*

*Surface water pesticide of concern status may not be appropriate in a number of cases where a pesticide has been detected in surface water in Minnesota. Detections which are low relative to a surface water reference value or which are sporadic and not indicative of widespread presence as a result of use in accordance with label directions will need to be evaluated by the committee and the commissioner. It may not be appropriate for determining a surface water pesticide of concern and developing BMPs for a product which is being phased out or likely will have its use significantly reduced. The commissioner may promote generic (core) BMPs, and the MDA and the registrant may coordinate additional prevention efforts.”*

**Atrazine Comments:** The data clearly demonstrates that the detected concentrations of atrazine in surface water remain well below the current MN PCA Chronic Criterion of 10ppb. These concentrations are also well below the values established by US EPA. In fact, atrazine has rarely exceeded 10% of the MN Chronic Criterion (only 3 samples in 2015) and only 2 sample have exceeded 50% of the Chronic Criterion in the last 6 years. Furthermore, atrazine concentration trends have been declining in Minnesota and nationwide as producers have adjusted use practices and utilized setbacks and buffers required on the label and promoted as part of MDA’s Surface Water BMP’s for atrazine. The success of MN BMP promotion and the registrants voluntary label changes have clearly resulted in declining concentration trends in surface water at levels that are well below established water quality criteria. This has been validated by both USGS and MDA monitoring. Clearly the Atrazine BMP’s have been effective and the educational and outreach continues. No further action is necessary or justified.



**Acetochlor Comments:** The data presented for acetochlor shows a number of detections exceeding 10% and 50% of the standard. In 2015 there were 7 samples over 10% in tier 3 monitoring and 8 samples over 50% and 5 samples above the chronic criteria at tier 1 and 2 monitoring sites. These detections will need to be evaluated by MN PCA to determine if they will result in a specific impairment listing. MDA, the registrants and the grower community continue their education and monitoring efforts in several targeted water bodies shown to be historically vulnerable. MDA Surface Water BMP's for acetochlor were recently revised and MDA should continue with its efforts to promote setbacks and buffers in these vulnerable areas. These practices have proven effective for other pesticides and MDA should continue to monitor trends for acetochlor to further evaluate the success of these BMP education and outreach efforts.

**Metolachlor Comments:** As stated above, the use of metolachlor changed significantly since 1997 when EPA granted the registration for the "Reduced Risk" pesticide S-Metolachlor. S-metolachlor received the "Reduced Risk" classification from EPA due to the significant reduction in use rates that could be achieved with this new active ingredient. The rates of S-metolachlor are 30-40% less than the rates used for the old metolachlor. This has resulted in a significant reduction in pounds used in Minnesota and has also helped over the long term to insure that detected concentrations of metolachlor in surface water remain low relative to established water quality criteria.

The Commissioner of Agriculture decided in 2002 that metolachlor was not a "Surface Water Pesticide of Concern" and MDA decided to continue to watch detections over time to evaluate trends. This decision has been confirmed in each subsequent year. Detections have continued to fluctuate from year to year based on timing of rainfall events, however detections remain very low relative to established standards. In addition, the MN PCA increased the Chronic Criterion for metolachlor in 2011 from 10ppb to 23ppb. This further supports the conclusion that detections of metolachlor do not pose a risk to MN surface water.

The PMP contemplates a "Pesticide of Concern" determination when the "*concentration is at 10 to 50% of its reference value and exhibits an increasing trend*". Since the introduction of S-metolachlor detected concentrations have declined and concentrations are infrequently detected above 10% of the chronic criteria. There were no samples exceeding 10% or 50% of the chronic aquatic life criteria in 2015. Since 2010 metolachlor has averaged only 4 detections per year over 10% and there have been no detection over 50% of the standard in the last six years. The longer term trends since the introduction of S-Metolachlor have clearly shown a decline in concentrations. Therefore, there continues to be no scientific basis or justification for listing metolachlor as a "surface water pesticide of concern". To do so would be inconsistent with the guidance outlined in the MN PMP.

**Chlorpyrifos Comments:** The Commissioner determined in April of 2012 that Chlorpyrifos should be listed as a Surface Water Pesticide of Concern. Since that time MDA has made adjustments to its monitoring and has completed the development of Pesticide Specific BMP's for chlorpyrifos. Prior to 2010 chlorpyrifos had rarely been detected at levels above the MRL. While detections have increased starting in 2010 there have been only occasional detections in 2010, 2011, 2012, 2013, 2014 and one detection in a Tier 3 site in 2015. When you look at all 2015 monitoring data from tier 1, tier 2 and tier 3 sites there was 1 sample above 50% of the chronic standard, 2 samples over the chronic standard and 5 samples over the acute standard in 2015. MDA should continue the promotions of Chlorpyrifos BMPs targeting education toward PMR's 6, 7, and 8 where the majority of detections occur. MDA should continue to monitor and evaluate trends. MDA should also gather local use data in affected areas to determine if additional BMP's could be warranted. However, no further action regulatory actions appear justified at this time.

Once again I would like to thank MDA staff for all the hard work that went into preparing for the PMP committee meeting. Furthermore, I would also like to thank the Commissioner of Agriculture for the opportunity to serve on this important committee.

If you have any questions please don't hesitate to call.

Sincerely,

*David Flakne*

David Flakne  
Senior Director, State Affairs  
Syngenta

CC: Commissioner, David Frederickson  
Kevin Cavanaugh, MDA  
Dan Stoddard, MDA  
Warren Formo, MAWRC  
Chris Radatz, MFB  
Jeff Case, CLA

**Addendum: MDA's Supplemental Report provided to Committee in 2015, but not included in Water Quality Monitoring Report and not updated for 2016 committee deliberations:**



## Ground Water Common Detection Pesticides

Concentration by Year in Central Sands (PMR 4) Region

Maximum Y-axis Value = MDH Drinking Water Guidance

Prepared by

Brennon Schaefer and Loretta Ortiz-Ribbing

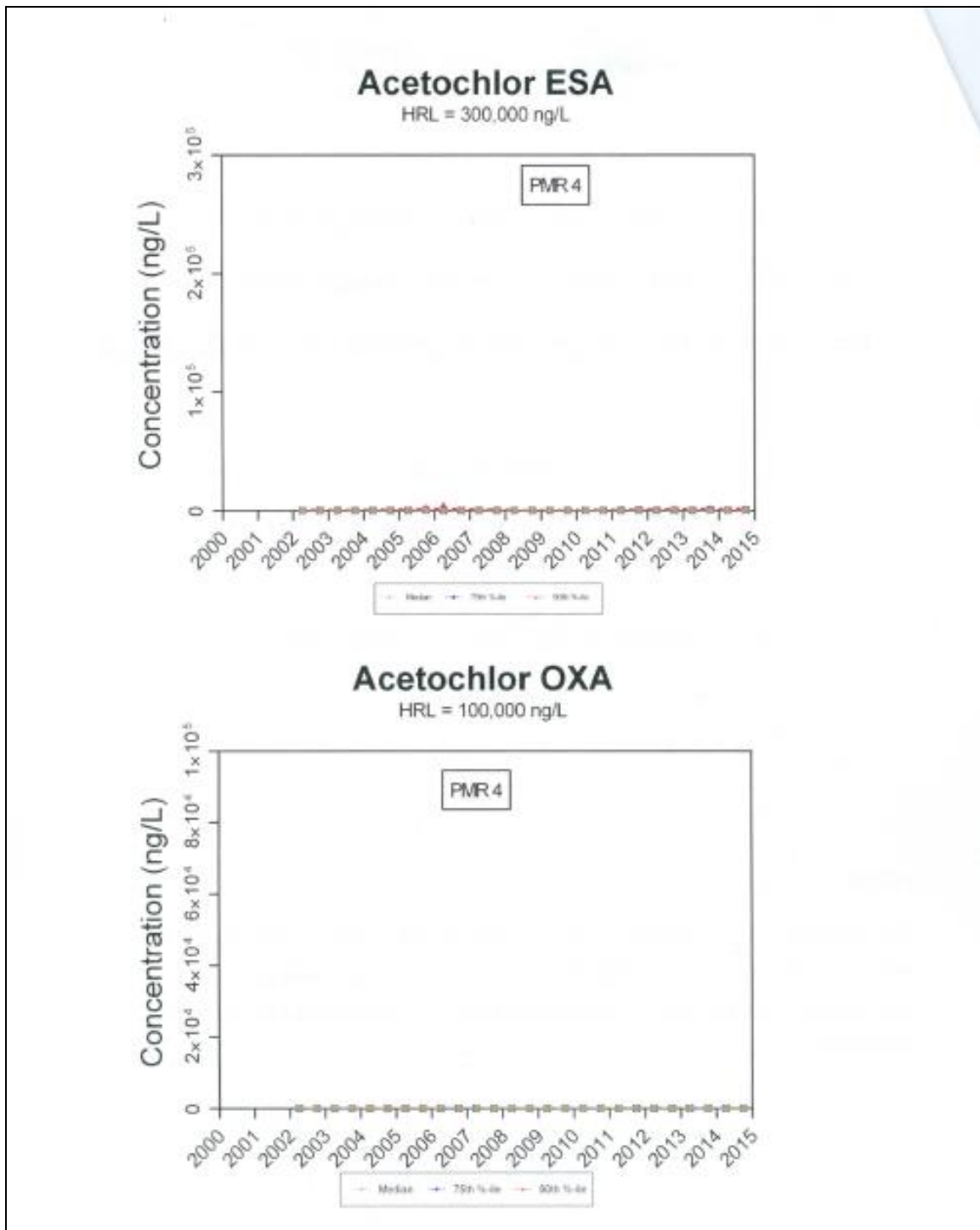
MDA Pesticide Management Plan Committee

June 25, 2015

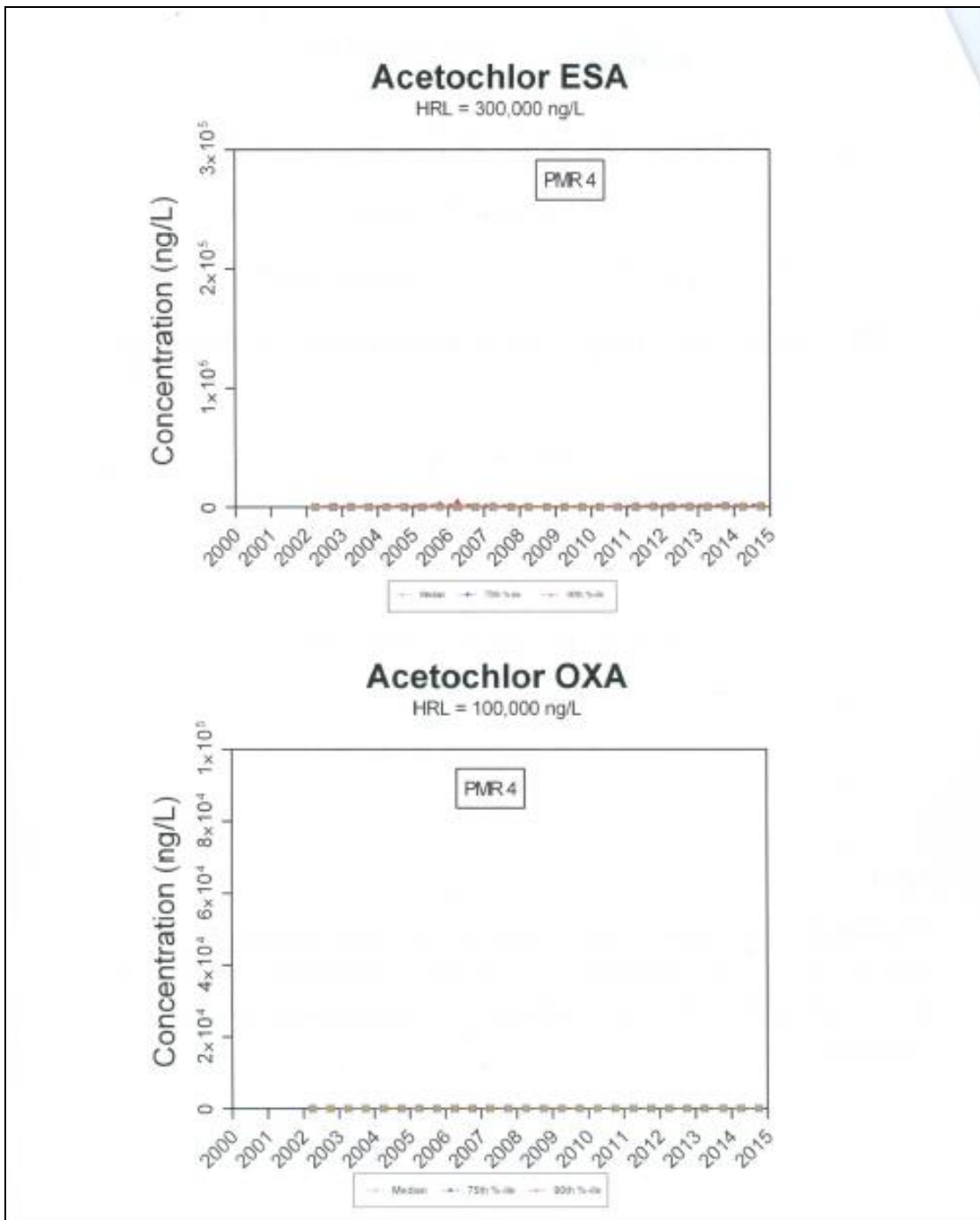
**NOTE:**

The acetochlor and alachlor parent concentration graphs, displaying the median, 75<sup>th</sup>, and 90<sup>th</sup> percentile concentrations, were not produced for these compounds because these percentile concentrations were all less than detection.

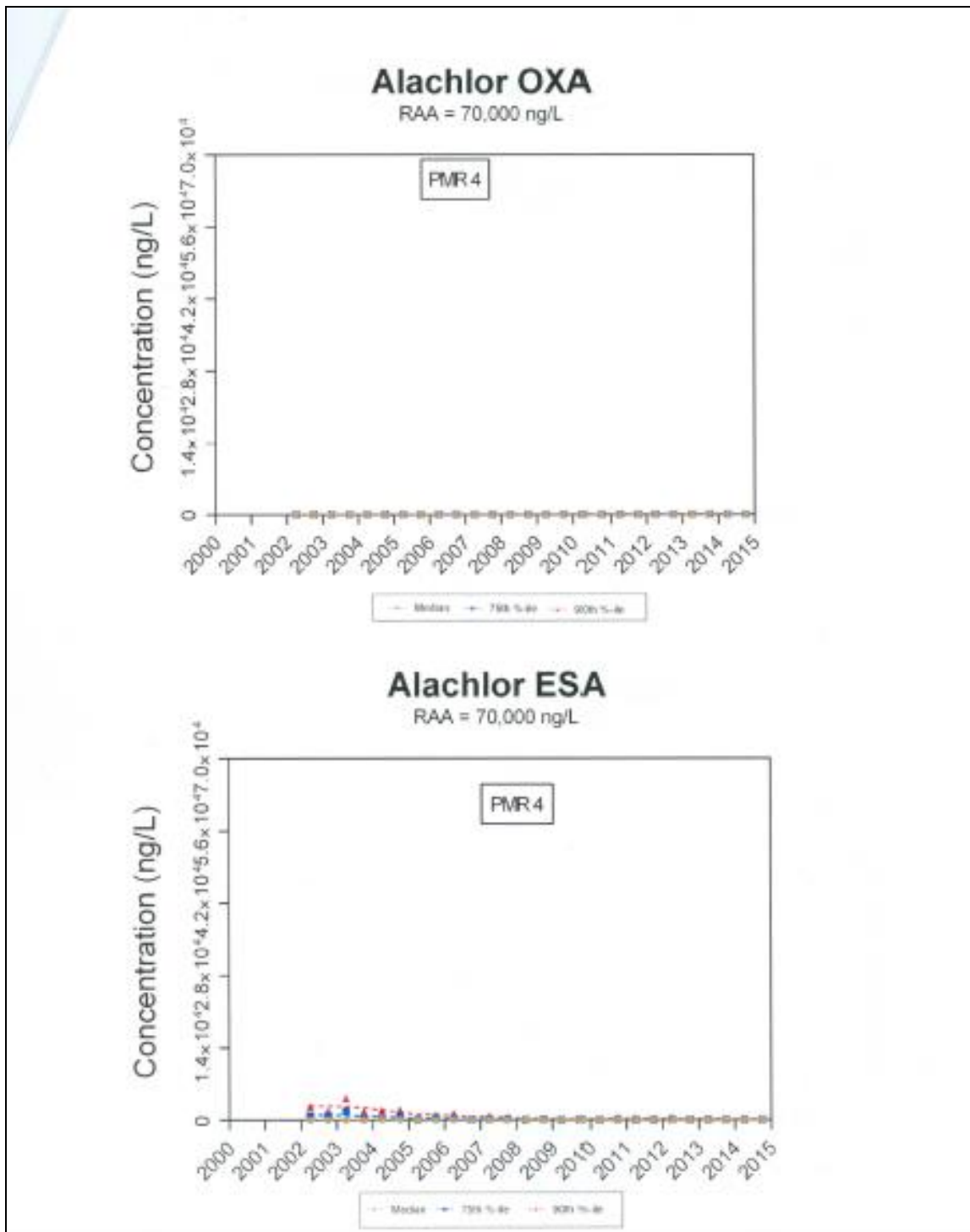
**Addendum: (continued)**



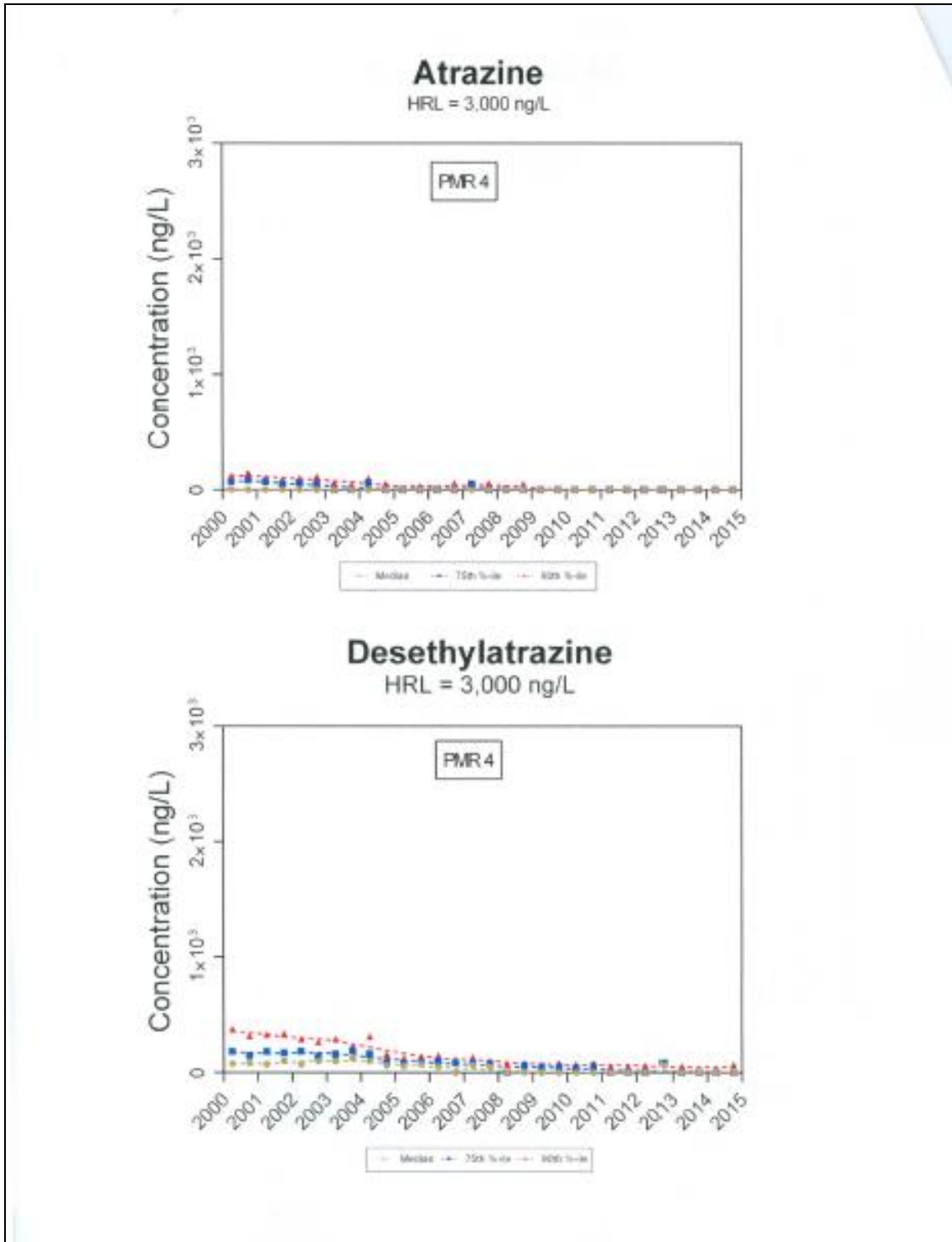
**Addendum: (continued)**



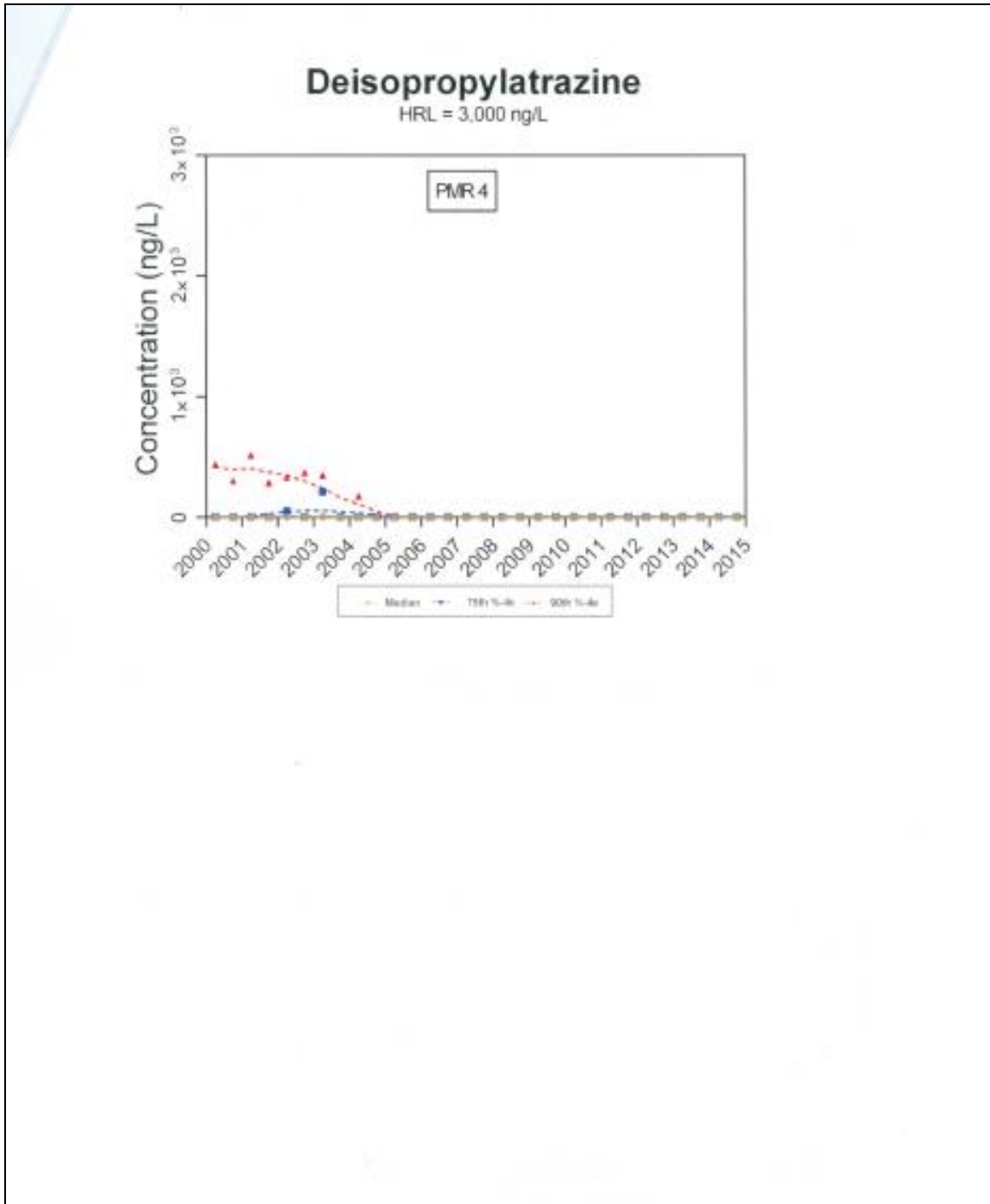
**Addendum: (continued)**



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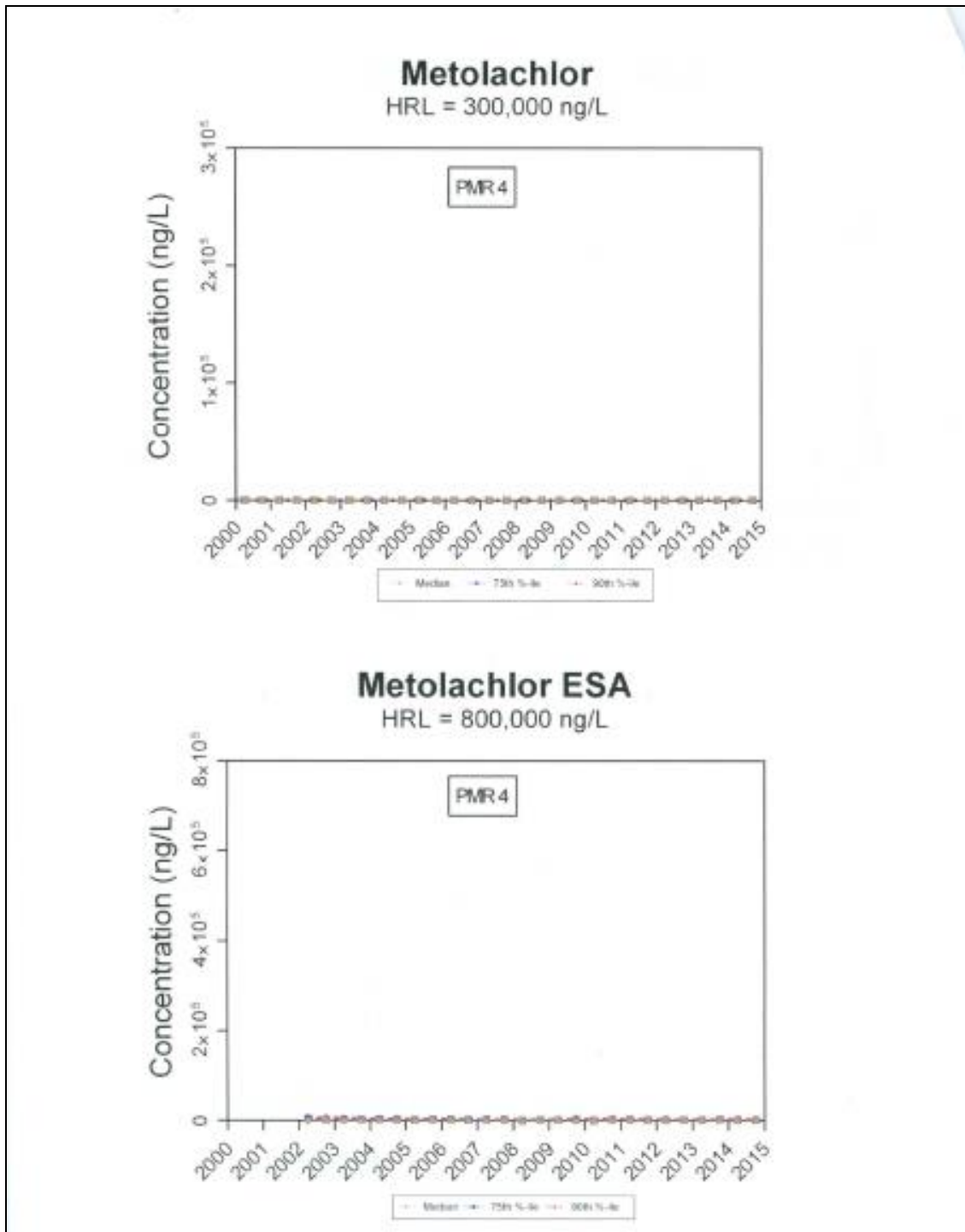


**Addendum: (continued)**

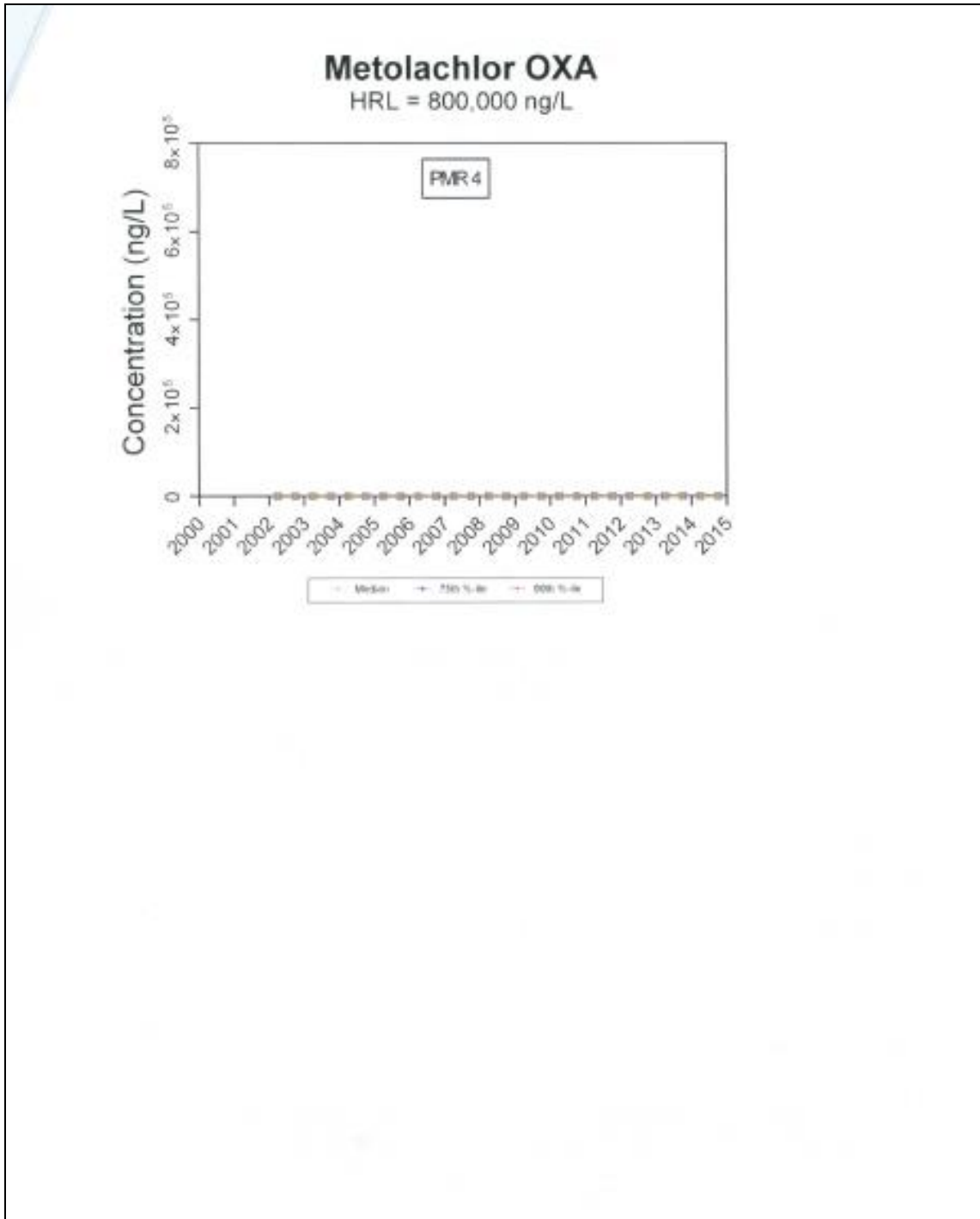




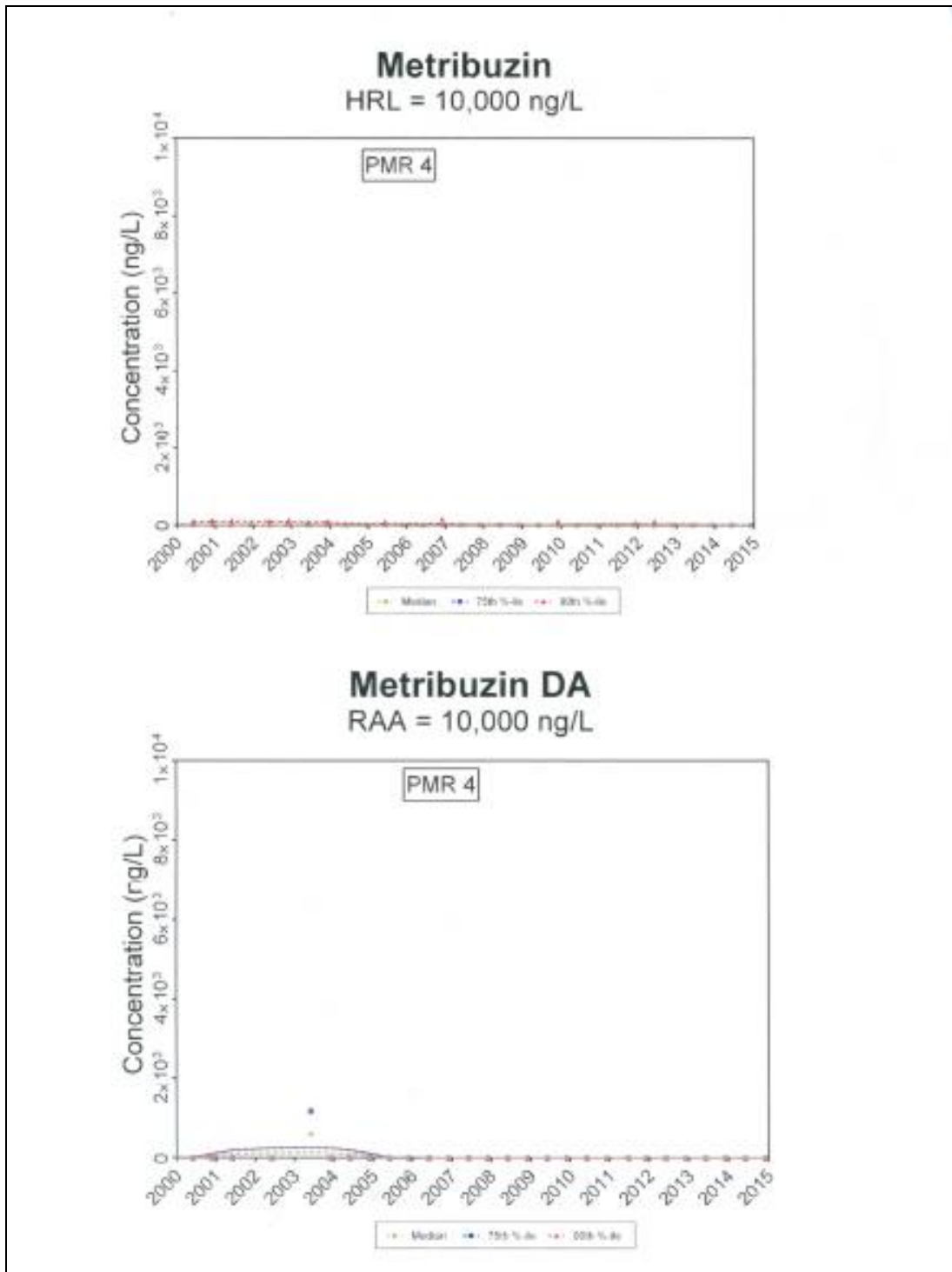
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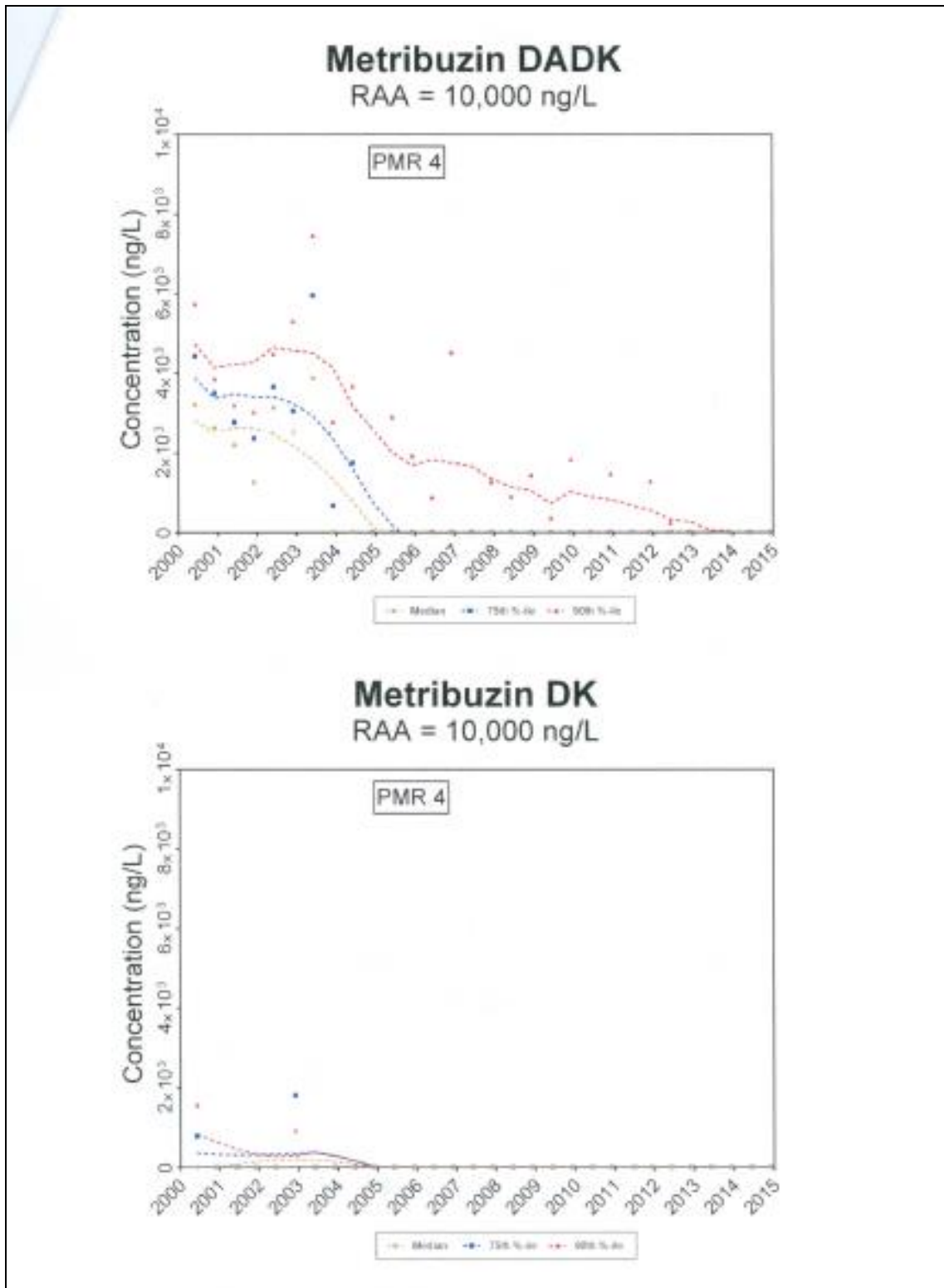
**Addendum: (continued)**



**Addendum: (continued)**



**Addendum: (continued)**





Minnesota  
Department  
of Health

PROTECTING, MAINTAINING & IMPROVING THE HEALTH OF ALL MINNESOTANS

August 5, 2016

Gregg Regimbal  
Minnesota Department of Agriculture  
625 N. Robert Street  
St. Paul, Minnesota 55155

RE: Meeting of the Pesticide Management Plan Committee, June 2016

Dear Mr. Regimbal:

Thank you for the opportunity to review and comment on the information provided to the Pesticide Management Plan Committee (PMPC) on June 30, 2016. I prepared the following comments on behalf of the Minnesota Department of Health (MDH).

I. Groundwater

In 2015, maximum concentrations of pesticides and their degradates in groundwater were below MDH's Health Risk Limits or other MDH health-based guidance, with the exception of metribuzin (plus degradates) in one sample from Pesticide Management Region (PMR) 4. The 17,090 ng/L result from a spring season sample exceeded the metribuzin HRL of 10,000 ng/L. The 90<sup>th</sup> percentile metribuzin+degradates concentration of 877 ng/L in PMR 4 indicates that this result was an outlier. Subsequent sampling of the same well in the fall found that metribuzin+degradates decreased to 6,347 ng/L. Since MDA staff plan to investigate factors that contributed to this exceedance, I recommend updating PMPC members on any findings at the next meeting.

Metribuzin detection frequencies and concentrations in PMR 4 have decreased since their peak in the early 2000's. However, statewide sales data over the past five years show a consistent, increasing trend, from less than 20,000 lbs. sold in 2011 to close to 140,000 lbs. sold in 2015. To the extent that sales reflect use, it is unlikely that the decreasing concentration trend seen in PMR 4 over the past several years will continue and may even begin to reverse course in this region. Metribuzin is already classified as a common detection pesticide. Based on evidence of strongly increasing sales, increased outreach on metribuzin-specific best management practices in PMR 4 is warranted as a preemptive measure. Determination of future exceedances should take into account other pesticides present in the same sample that share a common exposure duration-specific health endpoint with metribuzin<sup>1</sup>. Other common groundwater chemicals with thyroid effects include acetochlor ESA/OXA and bentazon<sup>2</sup>.

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<sup>1</sup> MDH risk assessment methods require evaluation of potential health risks from combined exposure to chemicals with the same health endpoint. A ratio is calculated by comparing the groundwater concentration to the exposure duration-specific health-based guidance for each chemical. These hazard quotient ratios are then grouped by duration and summed within each health endpoint group to create a Health Risk Index (HRI). An HRI over one indicates a possible exceedance. See MDH's "Water Guidance Additivity Calculator" for assistance: [www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html](http://www.health.state.mn.us/divs/eh/risk/guidance/gw/table.html)

<sup>2</sup> This list excludes pesticides with rapid assessment values.

Sections 2.4 and 2.5 of the 2015 Water Quality Monitoring Report presents results for several pesticides that are not in common detection status but are routinely found in groundwater. MDH offers the following comments on these findings:

1. The neonicotinoid insecticides: clothianidin, imidacloprid, and thiamethoxam

- Increases in detection frequencies and concentrations in PMR 4 groundwater have occurred since monitoring began in 2010/2011. For example, detection frequencies increased from 20 percent (2011) to 37 percent (2015) for clothianidin. Imidacloprid 90th percentile concentrations increased from less than the method reporting limit (MRL) in 2010 to 81 ng/L in 2015. For thiamethoxam, 90<sup>th</sup> percentile concentrations increased from <MRL (2010) to 103 ng/L (2015). Since developmental effects are seen in animal toxicity studies for both clothianidin and thiamethoxam, hazard quotients for these pesticides must be aggregated. Other commonly-occurring pesticides exhibiting development effects (varies by duration) include acetochlor (parent only), bentazon, dimethenamid parent and degradates, metholachlor parent, and metribuzin degradates<sup>3</sup>.
- Based on usage trends, increases in detection frequency and concentration in PMR 4 groundwater are expected to continue into the future:
  - Use of neonicotinoid insecticides has dramatically increased over the last decade, especially in the Midwest.<sup>4</sup> This is reflected in the Minnesota sales data, which show large increases in lbs. sold since 2010.
  - The use of treated seed in the U.S. has tripled in the last decade. Nearly all corn and roughly a third of soybeans planted in Minnesota have a neonicotinoid seed treatment.<sup>5</sup>
  - Foliar application to potatoes is routine in Minnesota, a crop predominantly grown in PMR 4. In recent years, more than 50 percent of potatoes in Minnesota have received foliar applications of thiamethoxam each year.<sup>5</sup>
- The neonicotinoids have chemical properties that impart high leaching ability.<sup>6</sup> This is a particular concern for sandy soils in PMR 4.

In summary, trends in detection frequency, concentration, and use; combined with the environmental fate characteristics of these chemicals, suggest that concentrations of clothianidin, imidacloprid, and thiamethoxam will continue to increase in groundwater in the future.

In 2015, I recommended that clothianidin, imidacloprid, and thiamethoxam as a group be classified as pesticides in common detection status in PMR 4 to provide additional protection for groundwater in this area. I also noted some factors that merited possibly delaying a decision. One factor was MDA's pending special registration review decision for the neonicotinoids (review still on-going). Another factor was MDH's plan to develop health-based guidance values for clothianidin and thiamethoxam in 2016. New information is now available to allow comparison of neonicotinoid concentrations to health-based guidance values.

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<sup>3</sup> This list excludes pesticides with rapid assessment values.

<sup>4</sup> Hladik ML et al. (2014). Widespread occurrence of neonicotinoid insecticides in streams in a high corn and soybean producing region, USA. *Environmental Pollution* 193: 189-196.

<sup>5</sup> Personal communication with Tim Kiely, EPA Office of Pesticide Programs Biological and Economic Analysis Division, July 28, 2015.

<sup>6</sup> Bonmatin JM et al. (2015) Environmental fate and exposure; neonicotinoids and fipronil. *Environ Sci Pollut Res* 22:35-67.

The new health-based value for clothianidin (HBV<sub>16</sub>) is 200 µg/L. Although thiamethoxam is currently in a final phase of internal review, the health-based guidance value is anticipated to be significantly higher (more than 10x higher) than the current rapid assessment value of 20 µg/L. The rapid assessment value of 90 µg/L for imidacloprid has not changed. In 2015, 90th percentile concentrations of these neonicotinoids were less than 1% of their individual health-based guidance values. Individual concentrations of these neonicotinoids in groundwater are also relatively low compared to levels of pesticides currently in common detection status (e.g., 90th percentile concentrations less than 1 µg/L). Additional new information was also presented during the 2016 PMPC meeting. MDA reported results from the 2015 Reconnaissance Study of Pesticides in Community Public Water Supply Wells. No neonicotinoids were detected in any of the 101 drinking water supply wells, including those in PMR 4.

While current neonicotinoid levels in PMR 4 groundwater are relatively low at this time, proactive approaches are needed to limit continued increases in contamination. Therefore, I recommend that MDA undertakes targeted prevention activities as part of Minnesota's groundwater degradation prevention goal (Minn. Stat. § 103H.001). Actions could take many forms depending on what is deemed practicable. As one example, MDA could determine if guidance related to insecticidal seed treatment should be included in its best management practices for agricultural insecticides.

## 2. Dimethenamid

Dimethenamid detections continue to be heavily concentrated in only a few areas within the larger geographic area of PMR 4. Statewide, it is detected only sporadically. This suggests that a more localized approach to identifying and/or managing agricultural practices that lead to increased groundwater contamination in specific areas may be more appropriate than state-wide or regional BMPs. A slow increase in dimethenamid ESA detection frequency in PMR 4 since 2000 merits continued annual evaluation of dimethenamid.

## 3. Bentazon

In 2015, bentazon was found in 12 percent of groundwater samples statewide and 22 percent of samples in PMR 4. No increasing trends in concentration or detection frequency are seen in PMR 4; nor in the statewide sales data. However, continued annual evaluation of bentazon is warranted since maximum bentazon concentrations in 2010-2012 approached 50% of the HRL. Based on its occurrence in groundwater and the smaller margin between maximum and guidance value concentrations, I recommend presenting more detailed results for bentazon (i.e., same format as dimethenamid) in future monitoring reports.

## 4. Imazamox

Imazamox is detected in 10% of groundwater samples statewide but is most commonly detected in PMR 4. While 90<sup>th</sup> percentile concentrations have increased in PMR 4 over time, there has been no increase in imazamox detection frequency over the past few years and sales data show no increasing trend. Imazamox has no to very low mammalian toxicity.<sup>7</sup> I have no recommendations at this time for imazamox.

## 5. Metalaxyl

In 2015, metalaxyl was detected in 8 percent of groundwater samples statewide and 17% of PMR 4 samples. PMR 4 detection frequency and 90th percentile concentrations have slightly increased

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<sup>7</sup> U.S. EPA. Memorandum: Imazamox. Human-Health Scoping Document in Support of Registration Review. June 5, 2014. Docket ID: EPA-HQ-OPP-2014-0395

since monitoring began in 2010. Statewide sales data for metalaxyl show that pounds sold has not increased and is relatively low. MDA's analytical method aggregates mefenoxam and metalaxyl concentrations. To avoid confusion, it may be helpful to clarify that metalaxyl results represent metalaxyl+mefenoxam in future reports. Sales and usage data for both metalaxyl and mefenoxam would help PMPC members interpret trends in monitoring results.

Tables 2-1 through 2-4 of the 2015 monitoring report are useful for evaluating trends in detection frequency and concentration for pesticides *currently* in common detection status. Some trends are concerning, such as an increase in acetochlor ESA and metolachlor ESA concentration in multiple PMRs. Other trends are encouraging, including decreased detections and concentrations of alachlor ESA. It would be helpful to hear how these trend analyses are used by MDA to target BMP education and promotion or to evaluate and refine management strategies.

## II. Surface Water

MDH's evaluation of the data did not identify the need for new determinations of pesticides of concern in surface waters which would trigger development of additional water quality BMPs or product registration restrictions to protect water quality. MDH supports continued outreach and evaluation of BMPs for pesticides of concern in surface water.

MDH commends MDA on its rigorous monitoring program. It is a valuable asset to our state and critical to protecting Minnesota's groundwater and surface water resources. As always, MDA staff has done an excellent job organizing and presenting a tremendous amount of complex data. Thank you again for the opportunity to provide comments.

Sincerely,



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cc: James Kelly, Manager, MDH Environmental Surveillance and Assessment Section





# Minnesota Pollution Control Agency

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July 22, 2016

Mr. Gregg Regimbal  
Minnesota Department of Agriculture  
625 Robert Street North  
St. Paul, MN 55155

RE: Meeting of the Pesticide Management Plan Committee, June 2016

Dear Mr. Regimbal:

Thank you for the opportunity to participate in the Minnesota Department of Agriculture's (MDA's) Pesticide Management Plan Committee (PMPC) meeting on June 30, 2016. The PMPC is an important component of pesticide management activities in Minnesota. PMPC meetings provide a constructive environment to review the most recent pesticide monitoring data and learn more about pesticide monitoring and management activities in Minnesota. Along with other Minnesota Pollution Control Agency (MPCA) staff, I have reviewed the meeting materials including the 2015 Water Quality Monitoring Report.

Specific to the responsibilities of the PMPC, the MDA has asked the committee to provide comments on the following two questions:

As a result of your review of pesticide water quality, is there a need for:

- 1) New determinations that would trigger development of water quality best management practices or related actions?
- 2) Pesticide product restrictions to protect water quality as a condition for registration?

The Pesticide Management Plan (PMP) provides the guidance for identifying a pesticide as a "common detection pesticide" in groundwater or a "surface water pesticide of concern." Based on the guidance and our review of the data, the MPCA does not recommend any new designations of common detection pesticides or surface water pesticides of concern.

The MPCA applauds MDA's continued efforts to adapt its monitoring of surface water where chlorpyrifos has been detected. The 2016 draft impaired waters list does include a new site listed for chlorpyrifos, and the 2015 MDA monitoring report shows additional sites to be considered for future assessments.

As mentioned at the meeting, MPCA and MDA are collaborating this summer to include pesticide monitoring in 25 wetlands across the state. In addition, MDA has cooperated with the MPCA to sample select MDA monitoring wells to evaluate the presence of contaminants of emerging concern in agricultural areas and track well nitrate concentrations. This complements the monitoring being done by MPCA in urban, residential, and other non-agricultural land uses.

Mr. Gregg Regimbal

Page 2

July 22, 2016

The MPCA has provided the U.S. Environmental Protection Agency the impaired surface water sites recommended for delisting as part of the 2014 draft 303(d) list, which includes the acetochlor-impaired sites in the LeSueur watershed. In a related effort, the MPCA continues to explore the next steps with the MDA in its effort to address the additional sites listed or proposed to be listed as impaired for pesticides, one for acetochlor and four for chlorpyrifos. We acknowledge and appreciate the MDA's education and outreach efforts along with your work to develop best management practices, sampling, and other activities in response to impairments.

In addition to participating on the PMPC and providing comments on the above questions, the MPCA is committed to working with MDA on topics of joint interest regarding pesticides. Over the next year, MPCA anticipates further collaboration with MDA, including:

- 1) Work during the coming months to assess surface water detections of pesticides using existing state water quality standards to determine if additional waters should be listed as impaired.
- 2) Continued collaboration to identify and address needs for screening values or water quality standards for pesticides.
- 3) Ongoing coordination of groundwater and surface water monitoring activities, both in general and with the watershed monitoring and assessment approach including the recent efforts in sampling wetlands.

Thank you again for the opportunity to comment. I look forward to future PMPC meetings and continued MDA-MPCA collaboration on monitoring, assessment and protection activities. In the meantime, if you have any questions about our comments, please contact me at 651-757-2607 or at [catherine.neuschler@state.mn.us](mailto:catherine.neuschler@state.mn.us).

Sincerely,



Catherine Neuschler  
Manager, Water Assessment Section  
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August 2, 2016

To: Kevin Cavanaugh  
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Thank you for hosting the 2016 Pesticide Management Plan Committee to review 2015 monitoring work. To the point of the two key questions to address:

***As a result of your review of pesticides and water quality, is there a need for:***

***1. New Minnesota Department of Agriculture determinations that would trigger development of pesticide water quality Best Management Practices or related actions for groundwater or surface water?***

None.

***2. Pesticide product restrictions to protect water quality as a condition for registration?***

None. The monitoring work of the MDA currently does not point to specific active ingredients that merit additional restrictions.

Additional comments:

I appreciated the additional data summarization and trend maps provided this year. I know it's even more material for staff to generate, but it does help in understanding the data provided towards providing guidance and policy recommendations.

Considering their persistence and mobility, acetanilide ESA degradates may pose more risk to groundwater than parent material. Alachlor use in Minnesota by 2011 was 3% of use in 1998<sup>1</sup>, 0.7% of use in 1991<sup>2</sup>, and I suspect that little to no alachlor is used currently. Alachlor ESA was still detected in 87% of PMR 9 groundwater samples, and in 29 to 44% of groundwater samples in the other corn-soybean growing regions except 7, which had no detections. If MDA could validate the remaining use of alachlor and where it is used, MDA has a rare opportunity to monitor real world acetanilide ESA degradation once use of the product is no longer used. This could occur due to market forces as in the case of alachlor, or due to label modifications or environmental restrictions. Better understanding the metabolism of alachlor degradates provides an opportunity to better understand behavior on a landscape scale, providing insights into expected behavior and degradation of other acetanilides still widely used.... and detected, should their use need to be modified to address ESA contamination. Metolachlor is currently used for

example. Metolachlor ESA shows an increasing trend in some instances and is detected in 95% of groundwater samples in PMR 9, 94% of samples and at higher concentrations in PMR 5 - though still well below HRLs. Alachlor ESA degradation could be indicative of the time needed for acetanilide ESAs to dissipate if use were discontinued.

Owing to the sandy soils and unique agriculture in PMR 4, groundwater in PMR 4 merits continued scrutiny of the pesticides less commonly detected elsewhere, e.g. the herbicides: bentazon, imazamox, and metribuzin, the insecticides clothianidin, imidacloprid, and thiamethoxam, and the fungicide metalaxyl. Though likely done to some extent, I recommend a thorough follow-up to determine the cause of the only groundwater exceedance in 2015, one well that exceeded HRLs for metribuzin in PMR 4 in May of 2015, even though a subsequent sample in October was below the HRL. Attributing the exceedance to point sources such as pesticide handling near wells, or to non-point sources would inform future research, monitoring, and education activities in PMR 4.

Including a determination of statistical significance such  $R^2$  would aid in interpretation of data presented in Table 2-46 on page 2-87 regarding a potential interaction between pesticide and nitrate detection. Ditto for Figure 2-47, pg. 2-88, include std. error bars at a minimum.

Continue the work with BMPs for chlorpyrifos in surface waters, and continue to scrutinize the neonicotinoid and organophosphate insecticides. Continue the excellent work monitoring herbicides in surface waters. Trends appear to be evolving regarding detections in surface water, several may be the beginning of upward trends in detections. This may possibly be due to practice change and likely due to changing rainfall patterns and localization of severe events. The work of the MDA will provide a basis from which to evaluate the confluence of BMPs and changing climatic norms in Minnesota towards protecting our surface water resources.

Sincerely,



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<sup>1</sup> Minnesota Pesticide Sales Information, Database for Sales of Crop Chemicals (1996 to Present) and Other Pesticide Categories (2006 to Present)  
<http://www.mda.state.mn.us/chemicals/pesticides/useandsales.aspx>

<sup>2</sup> Minnesota Pesticide Sales Information, 1991-1995 by Chemical Name  
<http://www.mda.state.mn.us/chemicals/pesticides/useandsales/useandsales91to95.aspx>