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August 9, 2013

Environmental Health Assessment Program
800 NE Oregon St., Suite 640
Portland, OR 97232

Re: Public Comment Release
Public Health Assessment
Highway 36 Corridor Exposure Investigation

Dear Members of the Environmental Health Assessment Program:

I am submitting these comments regarding the public comment release of the report of the public health assessment done as part of the Highway 36 Corridor Exposure Investigation.

As part of a project in which I am assisting the non-profit group Beyond Toxics, I have examined all of the pesticide application records provided by the Oregon Department of Forestry to citizens in May, 2012, as a result of various public records request, as well as 26 additional records provided to me and to Beyond Toxics by Kevin Weeks (now deceased) of the Oregon Department of Forestry in February, 2013.

My review of those records suggests that there are at least three records of pesticide applications in the study area during 2011 that were not reviewed by the investigation team.

Missing Spray Records:

Three ground spray records that were labeled by ODF as 2010 sprays actually are records of sprays that, according to the content of the records, took place in 2011. It appears that in two instances, ODF incorrectly labeled the spray record, and that in one instance, a spray notification was filed in November of 2010 but the spray actually occurred in 2011.

None of these sprays appear to be reflected in the Figures and Tables on pages 61 – 65.

The record labeled by ODF as “2010-781-00332-1” is actually a record of a spray done pursuant to notification number 2011-781-00332. The record itself does not show the acreage sprayed, but the FACTS data system maintained by the ODF shows that it was intended that 400 acres be sprayed. The FACTS database shows that this pesticide application was called “2011 Noxious Weed Treatment” by the landowner, Plum Creek Timberlands. The application record shows application by Nick’s Timber Services of a total of 2.9 gallons (27.26 pounds) of 2,4-D and 3.63 gallons (32.66 pounds) of Triclopyr on June 7, 2011, within the study area. A copy of this record is included as Exhibit A.

Perhaps most importantly, this record shows 2,4-D being applied in the watershed later than was assumed in the draft report, in June, 2011, whereas the draft report shows the last application of 2,4-D to be in May, 2011.

The record labeled by ODF as “2010-781-00516-8” is actually a record of a spray done pursuant to notification number 2011-781-00516-8. The map accompanying the application record shows a total acreage of 120 acres, although a very small portion is shown as within Township 18S, which is not within the study area. Again the record shows the landowner as Plum Creek Timberlands and the pesticide applicator as Nick's Timber Services. The record shows an application of a total of 9.75 gallons of Imazapyr (90.29 pounds) occurring over 7 days from July 26 through August 22, 2011. A copy of this record is included as Exhibit B.

The record labeled by ODF as “2010-781-00830-2” appears to be accurately labeled. A notification with that number was filed on October 12, 2010. The application record shows an application on 4 acres owned by Ruth Millard of .75 pounds of Oust XP (sulfometuron methyl) on May 5, 2011. A copy of this record is included as Exhibit C.

These additional records showing application on 520 additional acres of 27.26 pounds of 2,4-D, 32.66 pounds of Triclopyr, 90.29 pounds of Imazapyr and .75 pounds of sulfometuron methyl should be included in the investigation's database, as well as the charts and tables currently on pages 61-65 of the report.

Pesticide Application Record Inconsistencies:

There are a number of other conflicts, inconsistencies and obvious errors in the pesticide application records provided by ODF.

In May, 2012, ODF originally provided a total of 79 application records labeled as being for 2011 for the Triangle Lake Study Area to community members who had requested them. 35 of those records were for aerial applications within the study area. The additional 44 were for ground and roadside applications within the study area.

In February, 2013, in response to an inquiry, ODF provided 26 additional application records, of which 6 were for the year 2011, all ground sprays.

Thus ODF has provided to the public a total of 85 application records labeled as 2011, 35 for aerial sprays and 50 for ground sprays.

However, Table 20 on page 66 of the draft report shows only 82 files received from ODF. In addition, as was discussed earlier in these comments, there were 3 additional records from ODF labeled as 2010 but showing applications in 2011. Thus there should be 88 records from ODF in OHA's database, not 82. It cannot be determined from the information in the draft OHA report precisely which of these ODF records OHA lacks.

In reviewing all of the pesticide application records provided by ODF, I found that of the 244 records provided, at least 65 (27%) lacked one or more of the items of information required by ODF rules for pesticide applicators on forest land. That is a dismal compliance rate, and has clearly affected the ability of investigators to accurately determine what products were applied, when, and where. The OHA's recommendation that “ODA and ODF work with pesticide applicators to develop consistent

pesticide application record-keeping processes to ensure that application record data are accurately maintained and usable” is absolutely critical to protecting the health of Oregonians.

Two Application Records With Same ODF Label:

In May, 2012, ODF provided a copy of an application record labeled 2011-781-00221-2, which showed an aerial application of herbicides by Weyerhaeuser to a unit named Templeton North on September 20, 2011. A copy of this record is included as Exhibit D. Later, in February, 2013, ODF provided an additional record, also labeled 2011-781-00221-2, which showed a ground application of herbicides by Weyerhaeuser to a unit named Borland NE on May 16, 2011. A copy of this record is included as Exhibit E. Both of these units are within the Triangle Lake study area.

A review of the FACTS database shows that the record originally provided by ODF was probably mislabeled and should have been labeled 2011-781-00567-2, which is the number of a notice of aerial herbicide application filed by Weyerhaeuser on July 22, 2011, for application to a unit named Templeton North between August 8 and December 31, 2011. The later record provided by ODF in February, 2013, labeled 2011-781-00221-2, for the unit Borland NE, is probably labeled correctly.

ODF's representative stated that all these records had been provided to OHA, but the report does not contain enough information to verify that this is true.

Units of Measurement of Pesticides:

The OHA draft report contains total amounts for various pesticides, but using two different units, pounds and gallons, based on the pesticide formulation used. Then in Table 19, colors are used to indicate which pesticides were used the most. That table indicates that hexazinone was the pesticide used the most in the study area in 2011.

It is possible to convert the liquid chemicals from gallons to pounds by using the density or other information contained on the product's label or MSDS (Material Safety Data Sheet). I was able to do this for the pesticide applications documented on the ODF records for 2009 through 2011. The following table summarizes my results for 2011:

Pesticide	Aerial – Original Units	Aerial - Pounds	Ground – Original Units	Ground - Pounds	Total - Pounds
2,4-D	324.87 gallons	3,165.77 pounds	3.4 gallons	31.96 pounds	3,197.73
Aminopyralid	0	0	5 gallons	47.55 pounds	47.55
Atrazine	701.63 gallons	6,449.06 pounds	0	0	6,449.06
Clopyralid	9.95 gallons	96.42 pounds	0	0	96.42
Glyphosate	371.32	3772.99 pounds	126.20 gallons	1,280.05 pounds	5,053.04
Hexazinone	86.81 pounds	86.81 pounds	1,154.04 pounds	1,154.04 pounds	1,240.85

Imazapyr	118.17 gallons	1,049.33 pounds	102.48 gallons	936.22 pounds	1,985.55
Metsulfuron Methyl*	51.62 pounds	51.62 pounds	17.10 pounds	17.10 pounds	68.72
Sulfometuron Methyl*	104.42 pounds	104.42 pounds	28.76 pounds	28.76 pounds	133.18
Triclopyr	0	0	555.61 pounds	555.61 pounds	555.61
Total Pounds of Pesticides Applied in Study Area in 2011					18,827.71
* Combination products containing these two ingredients were allocated based on the proportion of their active ingredients.					

Thus, the application records provided by ODF show that forestry accounted for over 9 tons of pesticide products applied in the Triangle Lake Study Area during the year 2011.

It is also clear, after converting the products to the same units, that hexazinone was not the most-heavily used pesticide in the watershed. In fact, atrazine was the most-used pesticide in the watershed, followed by glyphosate, then 2,4-D, then imazapyr, and only then hexazinone. It should also be noted that while the amounts of metsulfuron methyl and sulfometuron methyl applied were relatively small, that the application rates for these two chemicals are far lower than the other chemicals used. These chemicals kill plants at extremely low concentrations.

Sources of Atrazine:

The forestry records show a total of 701.63 gallons (6,449.06 pounds) of atrazine applied in 2011, all aurally. This is the same total as shown by OHA in Table 19. Therefore, all of the recorded applications of atrazine in the study area during the year 2011 were from forestry aerial sprays.

The Environmental Protection Agency has classified atrazine-based products as Restricted Use Pesticides, meaning that only certified or licensed applicators may apply these products. Thus if atrazine were used for other purposes in the study area in 2011, those uses should have been reported to the Oregon Department of Agriculture. Since all of the atrazine identified by OHA was applied by forest operators, it follows that none was used by licensed operators for other purposes.

OHA's Conclusion 8 is that urine samples from spring of 2011 had detectable levels of atrazine, but in Conclusion 9, the agency indicates that there is insufficient information to confirm that local pesticide applications are the source of pesticides found in the urine of participating Highway 36 investigation area residents. The justification states that “. . . because we did not have site- and time-specific information about atrazine persistence and distance traveled, we were unable to confirm a specific source for the pesticides that were detected in residents' urine.”

It is incomprehensible how the agency could avoid concluding that forestry aerial sprays were the source of the atrazine metabolites found in residents' urine. The only documented use of atrazine in the study area was in forestry aerial sprays, and urine levels tested shortly after aerial applications of atrazine showed significant increases above earlier levels, as documented in the draft report. Atrazine is a Restricted Use Pesticide, making it highly unlikely that residents in the study area use it on their

property in any way.

Sources of 2,4-D:

Further, the vast majority of 2,4-D use documented in the study area was from forestry operations. ODF application records show that 328.27 gallons (3,197.73 pounds) of 2,4-D were used for forestry in 2011, compared to the total of 345.4 gallons shown in Table 19, meaning that over 95% of the 2,4-D in the study area came from forestry.

Again, it is incomprehensible how the agency could avoid concluding that forestry aerial sprays were the source of the 2,4-D found in residents' urine. Urine levels tested shortly after spring aerial applications of 2,4-D showed increases above earlier levels, although the difference was not considered statistically significant.

Drop in Levels of Pesticides in Urine:

On page 4 of the draft report, ODA makes the following statement: "This investigation documented the presence of 2,4-D and atrazine in the urine of residents. There was a drop in those levels between the spring and fall 2011 *for reasons that are currently unknown.*" [Emphasis added.] This statement is very hard to understand, given that the application records examined by OHA show very clearly that atrazine and 2,4-D were applied aerially in the spring but were not applied at all in the fall. Table 19 on page 64 of the draft report shows no applications of either of these chemicals after May (although another section of these comments show that there was an application of 2,4-D in June which had been mislabeled by ODF and was therefore overlooked by the OHA).

The reason for the drop in atrazine and 2,4-D in urine levels is obvious: the timber industry uses these chemicals only in the spring. It is extremely puzzling why OHA could not draw that very obvious conclusion. Maintaining a rigorous scientific study does not require abandoning logic and common sense.

Adjuvants:

The report does not document the use of adjuvants (various additives) that were applied concurrently with pesticides. These products, which are not subject to the same labeling requirements as active ingredients, are used for a variety of purposes, including making the product stick to vegetation, reducing foam, and reducing drift. Many of these products are considered toxic in their own right, yet OHA did not examine their use in the study area.

Synergistic Effects:

The OHA report mentions only briefly the potential synergistic effects of combinations of pesticides such as the frequent combinations of 2,4-D and atrazine used aerially in the study area. So-called "tank mixes" are very common for both ground and aerial sprays, as the application records document clearly. Another combination of four pesticides (glyphosate, imazapyr, metsulfuron methyl and sulfometuron methyl) is frequently applied in the study area, sometimes in combination with additional adjuvants such as methylated seed oil.

Cancellation of Spring, 2012, Urine Testing:

The original investigation design, as described on page 16 of the draft report, was to include urine sampling before and after nearby ground or aerial spraying in the spring of 2012. However, as explained on page 23 of the draft report, the spring sampling was suspended on March 8, 2012, “because the areas that were slated for applications of 2,4-D and/or atrazine were in remote locations which have very few residents.” On page 7 of the draft report, OHA states that “It is not known if the Exposure Investigation resulted in changes to pesticide application practices in the investigation area, and therefore if exposure conditions have changed for Highway 36 corridor residents.”

In fact, the pesticide application records provided by ODF for the years 2009 through 2011 document very clearly that for all three years, atrazine and 2,4-D were heavily applied in the study area during the spring. The records document that the following amounts of 2,4-D and atrazine were applied in the study area for the years 2009 through 2011:

Year	Atrazine – aerial	Atrazine – ground	Total – Atrazine	2,4-D – aerial	2,4-D – ground	Total – 2,4-D
2009	183.75 gal. (1,718.06 lb.)	0	183.75 gal. (1,718.06 lb.)	66.44 gal. (624.51 lb.)	2.63 gal. (24.76 lb.)	69.07 gal. (649.27 lb.)
2010	300.75 gal. (2,760.89 lb.)	0	300.75 gal. (2,760.89 lb.)	98 gal. (921.20 lb.)	0.01 gal. (0.09 lb.)	98.01 gal. (921.29 lb.)
2011	701.63 gal. (6,449.06 lb.)	0	701.63 gal. (6,449.06 lb.)	324.87 gal. (3,165.77 lb.)	3.4 gal. (31.96 lb.)	328.27 gal. (3,197.73 lb.)
Total	1,186.13 gal. (10,928.01 lb.)	0	1,186.13 gal. (10,928.01 lb.)	489.31 gal. (4,711.48 lb.)	6.04 gal. (56.81 lb.)	495.36 gal. (4,768.29 lb.)

Application records from 2012 are not available; however, according to the OHA report, no sprays of 2,4-D or atrazine were planned for the spring for the study area. This is totally contrary to the pattern which is clearly established by the records for 2009 through 2011, showing heavy use in the study area of atrazine and 2,4-D in the spring. Thus it seems fairly clear that the timber companies in the study area changed their practices by avoiding the use of 2,4-D and atrazine (the only two chemicals which OHA can test for in urine) and instead using other chemicals in their place.

Volatilization of Pesticides:

The OHA draft report mentions, but does not discuss, the possibility of volatilization of pesticides as a possible source in the study area. A recent study by the U.S.D.A.'s Agricultural Research Service indicates that under certain conditions, more pesticide product can be lost to volatilization than to surface runoff. **Comparison of Field-scale Herbicide Runoff and Volatilization Losses: An Eight-Year Field Investigation**, Timothy J. Gish, John H. Prueger, Craig S.T. Daughtry, William P. Kustas, Lynn G. McKee, Andrew L. Russ and Jerry L. Hatfield, *Journal of Environmental Quality* 2011 40: 5: 1432-1442 doi:10.2134/jeq2010.0092. The study showed that revolatilization is significant when ground moisture is high and temperatures are increasing, the exact conditions in Oregon in the spring. A pre-publication version of this study is included as Exhibit F.

Community Conflict:

The draft report contains two conclusions regarding community conflict over the issue of pesticide use in the study area. In my opinion, this is what is popularly called a “red herring” designed to distract attention from the fact that stress in the study area has resulted from the abject failure of Oregon's state agencies to responsibly address the concerns of study area residents for up to seven years before this investigation began. While I believe that the OHA staff who are participating in this investigation are approaching their work professionally and responsibly, there is no doubt that the residents of the study area have been ignored, insulted, and treated badly for many years by the Oregon Departments of Forestry and Agriculture, as well as the multi-agency Pesticide Analytical and Response Center (PARC). In my 18 years as a water quality specialist for the Oregon Department of Environmental Quality, I saw first hand how individuals who complained about pesticides to state agencies were ignored, vilified, and demonized by staff from ODA and ODF in particular. It is the nature of regulatory agencies in this country to develop strong ties with the regulated community, and in this case, those ties have interfered with the ability of ODA and ODF in particular to appropriately respond to community concerns regarding potential ill effects from pesticides.

The following statement is taken from page iii of the draft report:

The Highway 36 Corridor EI is a multi-agency effort to respond to several community members' requests to investigate possible exposures to pesticides and herbicides used in applications in the Highway 36 corridor.

In fact, the impetus for this investigation was not the requests of community members to investigate possible exposure to pesticides and herbicides; it was the testimony of a national expert in pesticide exposure that residents' urine tested positive for 2,4-D and atrazine, at levels higher than found in the general population. Requests by residents for investigation were routinely ignored by state agencies for years, and it was only when exposure was already documented by urine testing that the state took notice.

With all due respect, I suggest that starting out this report with such an obviously self-serving statement that stretches the truth will do little to add to the report's credibility. It would be refreshing, indeed, if the authors would acknowledge the truth—that it was only after pesticide exposure had been documented by urine tests from an acknowledged national expert that state officials took any action at all.

Miscellaneous Concerns:

On page 1 of the draft report, it is stated that community collected urine, water and air samples were analyzed by privately contracted analytical laboratories at Emory University in Atlanta, Georgia. That statement is correct only regarding the urine samples; the air and water samples were analyzed by Anatek Laboratories in Moscow, Idaho.

On page 62 of the draft report, the paragraph between the figure and table summarizes Table 18, but fails to mention the 18 documented roadside applications of pesticides. It should also be noted that

most of these roadside applications were done on private timberland by industrial timber companies.

Conclusion:

Due to the actions of the timber companies in the study area, this investigation has barely started. I urge those in charge of this investigation to expand the study area to include all of the state, and to redesign the study in such a way that the timber companies and pesticide applicators will not know when or where samples are being taken. I urge those in charge to invest appropriate resources so that adequate air, water and biological samples can be taken that will provide answers rather than simply raise more questions. I urge those in charge to pursue air testing for all chemicals used on forest and agricultural lands in Oregon, and to conduct such tests in adequate numbers that conclusions can be drawn.

Finally, I urge that an additional recommendation be added: That ODF adopt as a temporary emergency rule a two-mile buffer zone for pesticide application around existing residences and schools. This will provide some measure of protection during the potentially years it will take for this investigation to be completed given the active resistance of the timber and pesticide industries in Oregon.

Respectfully submitted,

Roberta J. Lindberg

RJL:bl

Attachments