



# Yakima Valley Dairies Consent Order Update

June 2016

*For more background and historical information about EPA's Yakima Valley Dairies Consent Order, see previous [Update](#) dated December 2014.*

## Summary

Since 2013, three Yakima Valley dairies have made progress under a Consent Order with EPA to control sources of nitrogen to the Lower Yakima Valley drinking water aquifer, though more work remains to be done.

The work conducted by the dairies is described in plans and reports that can be found at the Yakima Valley Dairies Administrative Order on Consent documents website:

[ftp://ftp.epa.gov/reg10ftp/sites/yakima/Consent\\_Order\\_Deliverables/](ftp://ftp.epa.gov/reg10ftp/sites/yakima/Consent_Order_Deliverables/).

The following is an update on the work conducted by the three dairies under the Consent Order and a discussion of next steps and the work remaining.

**Improved Nitrogen Management.** To reduce nitrate concentrations in the groundwater, the three dairies are working to improve their field manure application and irrigation practices. A professional agronomist hired by the dairies began implementing field-specific plans to reduce nitrogen levels in crop application fields that were shown by sampling analysis to exceed 45 ppm nitrate at the 2-foot depth. Excessive nitrogen levels in many of the dairies' fields have begun to decline significantly. In two years, the number of dairy application fields that exceed 45 ppm at the 2-foot depth decreased from 20 fields to nine.

**Irrigation Water Management (IWM).** The three dairies have installed two electronic sensors at a three-foot depth in each of their manure application crop fields. If irrigation water is detected at a sensor, the dairy is electronically notified, and promptly shuts off the water or diverts it to a different field. IWM is expected to reduce nitrate loading to the aquifer by curtailing water from leaving the root zone. Energy and water savings are also expected as a result of this conservation practice.

**Lagoon Improvements.** To minimize the amount of nitrogen entering the lagoons:

- The Cow Palace Dairy and the Liberty Dairy added centrifuges to their solid screening processes.

- George DeRuyter & Son Dairy added a dissolved air flotation solids removal system to their solid screen process.
- To minimize leakage from the lagoons into the soil, the three dairies are planning to line 41 lagoons. EPA expects that construction of the lagoon liners will begin in 2016, which will further reduce nitrogen loading to the aquifer.

**Safe Drinking Water.** Approximately 110 downgradient well owners with elevated nitrate levels continue to receive reverse osmosis water treatment for their drinking water.

Many documents called for in the Consent Orders have been recently posted online, including:

- Groundwater monitoring data reports
- Irrigation water management plans
- Manure application field management plans
- Soil data reports
- Field capacity soil test reports
- Monthly progress reports
- EPA approval letters

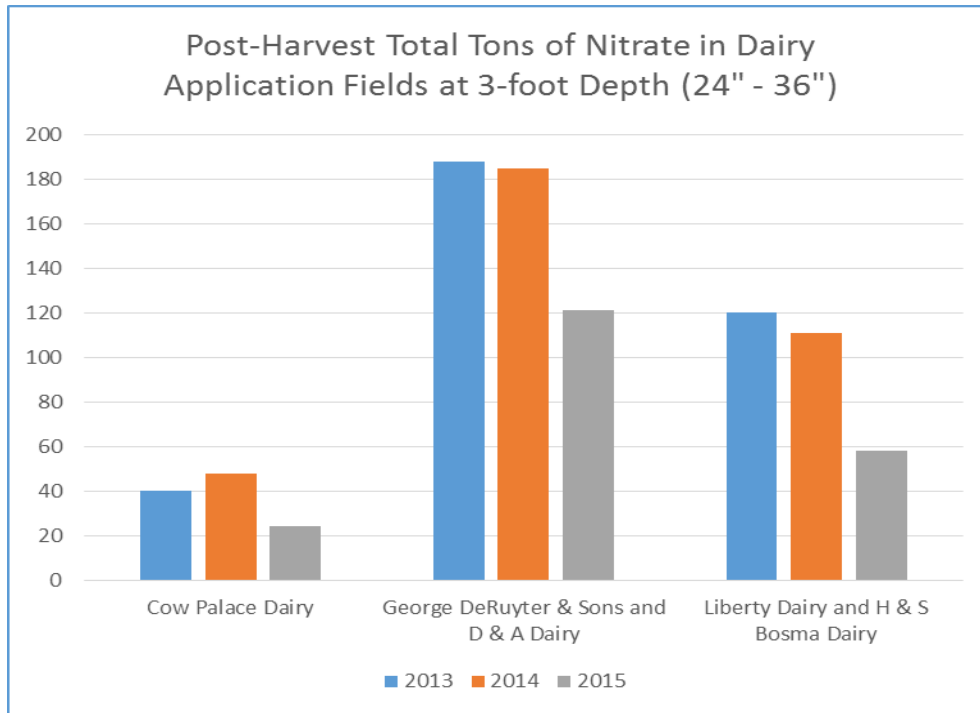
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### **Nitrogen management.**

The dairies have historically applied, and currently still do apply, manure and, in some cases, synthetic fertilizer to their fields. If manure or synthetic fertilizer is over-applied, nitrate can escape the cropping system, migrate past the root zone, through the soil column and pollute the groundwater. The Consent Order states that the three dairies must maintain soil nitrate at the 2-foot (12" - 24") depth below 45 parts per million (ppm). This level was selected because at the time the Consent Order was signed, it was consistent with the level that was used by the State of Washington with regard to dairies in the context of their Nutrient Management Plans.

In accordance with the Consent Order, the three dairies have sampled soil in their 34 application fields twice a year: post-harvest sampling is done at the 1-foot, 2-foot, and 3-foot depths in the fall, and pre-plant sampling is done at the 1-foot and 2-foot depths each spring. In fall 2013, 20 of the dairies' 34 application fields exceeded 45 ppm at the 2-foot depth. Two years later, in fall 2015, the number of fields exceeding 45 ppm at the 2-foot depth was reduced to nine.

The chart below shows the estimated amount of post-harvest nitrate remaining in the three dairies' application crop fields at the 3-foot depth, which is considered to be below the root zone of typical crops.



See the figures in the report below beginning with Figure 4:

[Fall 2014 Application Field Management Reports](#)

EPA expects to approve and post the final 2015 spring pre-plant and fall post-harvest reports soon. The chart above includes data from the draft 2015 fall post-harvest report.

**Irrigation Water Management**

The three dairies have installed [automated irrigation water management](#) (IWM) in all of their on-site manure application fields. These sensors are monitored during irrigation. If water reaches the moisture sensors at 36 inches, irrigation to that field must promptly be shut off. Avoiding over-irrigation is expected to reduce the delivery of nitrate-laden water from the soil column to the groundwater, and has an additional benefit of conserving water.

In accordance with the Consent Order, the dairies no longer flood irrigate any of their fields. Flood irrigation, also known as rill irrigation, can readily transport nitrate and other contaminants to the aquifer because excess water moves through and past the root zone.

**Waste Storage Lagoons.**

Together, the three dairies have 41 earthen animal waste storage lagoons that cover more than 40 acres. To minimize leakage from the lagoons, the dairies are planning to install engineered lagoon liners. EPA expects that construction of the lagoon liners will begin in 2016.

**Drinking water treatment.**

The dairies continue to provide and maintain reverse osmosis drinking water treatment systems at approximately 110 private residences that are on or within one mile downgradient of the dairy facilities. The federal and state maximum contaminant level (MCL) for nitrate in drinking water is 10 mg/L or 10 ppm. These residential wells tested positive for nitrate at levels that exceeded the drinking water standard. The dairies pay the costs of installing and maintaining the treatment units.

**Groundwater monitoring well data.**

Since the fall of 2013, the dairies have been collecting groundwater data each quarter from a network of 26 groundwater monitoring wells. The purpose of the monitoring well network is to assess the effect of nitrate source control actions taken by the dairies on nitrate concentrations in the groundwater.

Each quarterly groundwater monitoring report prepared by the dairies contains charts that show the nitrate concentrations in each monitoring well over time.

In the third quarter of 2013, the first quarter that the dairies conducted groundwater sampling, nitrate concentrations in seven of the downgradient wells were less than the MCL of 10 ppm; nitrate concentrations in 15 of the wells exceeded the MCL. The nitrate concentrations in the wells that exceeded the MCL ranged from 12 ppm to 166 ppm.

Two years later, in the third quarter of 2015, nitrate concentrations in seven of the downgradient monitoring wells were less than the MCL; nitrate concentrations in 14 of the wells exceeded the MCL; no sample could be taken from one groundwater monitoring well.<sup>1</sup> The nitrate concentrations in the downgradient wells that exceeded the MCL ranged from 14 ppm to 180 ppm.

See Figures 16 through 21 in this report:

[Yakima Dairies Third Quarter 2015 Groundwater Monitoring Report](#)

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<sup>1</sup> Monitoring well YVD-14 was not sampled in the third quarter of 2015 because it was destroyed (apparently run over by a truck) and had not yet been replaced.

**Next steps.**

The three dairies will continue to sample their application fields twice a year and continue their work to reduce the amounts of excess nitrogen that can migrate to groundwater.

The dairies will continue collecting groundwater samples from the monitoring wells on a quarterly basis for eight years from the date the Consent Order was signed. At the end of eight years, the dairies will submit an Eight Year Report which will present a chart for each monitoring well that shows the complete set of nitrate concentrations over time. If there are any monitoring wells where the nitrate trend is not downward, the dairies will further assess sources of nitrate, and propose and implement additional source control actions. The [quarterly groundwater reports](#) contain figures and tables that summarize the monitoring data.

The dairies will continue to monitor the irrigation water and the field sensors to minimize the over-application of liquids in the fields with the aim of reducing the amount of nitrate migration into the groundwater.

The dairies will continue to maintain the residential reverse osmosis drinking water treatment units.

The dairies will continue working on plans to line their lagoons.

**More Information.**

For background and historical information regarding EPA's role in working to protect groundwater and drinking water in the Lower Yakima Valley, please visit the Lower Yakima Groundwater website at:

<https://yosemite.epa.gov/R10/WATER.NSF/GWPU/lyakimagw>

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**Related Information**

In January 2015, a federal judge issued a ruling in a lawsuit brought by two non-profit citizens groups against the same three dairies that signed the Consent Order with EPA. In that ruling the judge found that the Cow Palace Dairy had contaminated the drinking water aquifer with nitrate. EPA was not party to this lawsuit.

The lawsuits brought by the citizens groups against the three dairies were settled by the parties and memorialized in three settlement agreements called Consent Decrees. The Dairies agreed to undertake actions in addition to those already prescribed in the EPA Consent Order, including:

- Providing an accelerated schedule for lagoon lining;

- Installing additional groundwater monitoring wells;
- Achieving further reductions of nitrogen levels in their application fields;
- Providing drinking water treatment units or bottled water to affected residences in an expanded geographic area downgradient of the Dairies' facilities.

The three dairies and the citizens groups have asked EPA to oversee the additional work described in the Consent Decrees. EPA is in discussions with CARE, the Center for Food Safety, and the dairies to ensure that the new work is efficiently integrated into the ongoing work that is being implemented under the Consent Order.