

Pall Life Sciences – Little Lake Area

Evaluation of a Reduction in the Batch Purge Frequency at the Ann Arbor Cleaning Supply Well

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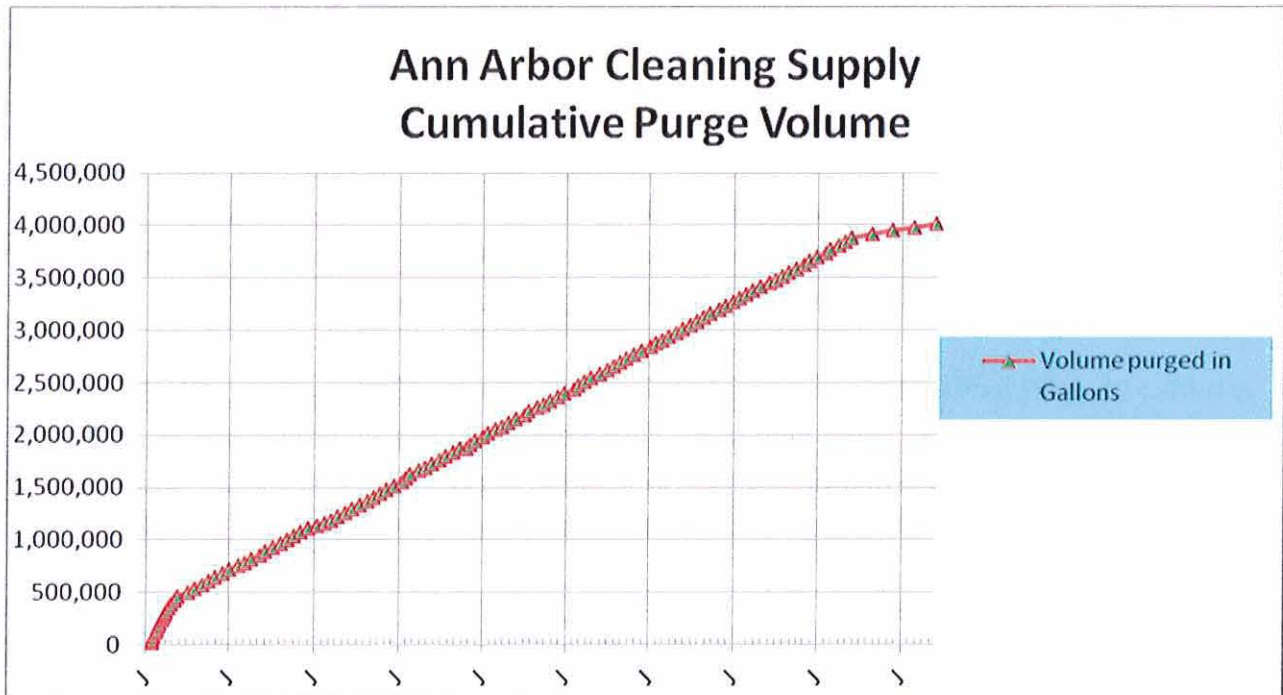
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BACKGROUND

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Pall Life Sciences, Inc. (PLS) “batch” purges from a well in the Little Lake area referred to as the A2 Cleaning Supply Well (A2 Well). The purpose of this active remediation system is to meet the non-expansion objective of the Consent Judgment (CJ) (V.C.1).

In general, the current batch purging involves pumping a volume of water in this case approximately 36,000 gallons of groundwater from the well into a tanker truck and transporting the water to the PLS facility for treatment. PLS has been utilizing this form of active remediation since February of 2003. Over 4,000,000 gallons have been purged/treated using this process. The following graph shows the cumulative volume of water purged from this well.



Pursuant to the recent amendments to the CJ (Section V.C.2), Pall Life Sciences (PLS) resubmitted its November 3, 2010 request to the Michigan Department of Environmental Quality (MDEQ) to reduce the batch purge frequency at the A2 Well from monthly to quarterly for a year.

The following justification was provided in our November 3, 2010 request to reduce the batch purge frequency:

1. There is only one well (the A2 Cleaning Supply [extraction] Well) in the Western System (Little Lake Area) that is near the MDNRE Drinking Water Criterion (85 µg/L). 1,4-Dioxane concentrations in all monitoring wells in the Western System have been below 85 µg/L for a considerable time. The most recent groundwater sample from the Ann Arbor Cleaning Supply Well had a 1,4-dioxane concentration of 83µg/L (September 13, 2010). 1,4-Dioxane trends in this well and MW-53i remain downward. Given the current levels of 1,4-dioxane and the historic trends at this location, reducing the batch purging at this time is appropriate.
2. No matter what the frequency is, batch purging is disruptive to the neighbors. Lowering the frequency will lower the disruption. Additionally, lowering the batch purging frequency reduces the potential for a transportation accident related to this process.
3. Recent drilling by PLS in the area of Eagle Point strongly suggests there is no relationship between 1,4-dioxane in the Western System and other plumes west of Wagner Road.
4. Batch purging appears to have been valuable in reducing 1,4-dioxane levels in groundwater sampled from the Ann Arbor Cleaning Supply Well and MW-53i, although there remains a weak correlation between the purging and 1,4-dioxane trends. Changing the frequency will provide insight into how the 1,4-dioxane trends at this location respond under new conditions, and whether the objective of reducing 1-4-dioxane concentrations can be made with less disruption to the area neighbors.

In a May 31, 2011 letter, MDEQ approved PLS' request to move the frequency of batch purging to quarterly. This approval came with some conditions, including monthly sampling of the A2 Well. Pall switched from a monthly to quarterly batch purging frequency in June 2012. Since that time, PLS has been collecting and evaluating data, the findings of which are discussed in this report.

LITTLE LAKE AREA CJ OBJECTIVE

With the adoption of the Third Amendments to the CJ, the objective of the LLA was amended to preventing expansion of the groundwater contamination in this area, as measured at the compliance wells identified in PLS' April 29, 2011 LLA Monitoring Plan (LLAMP), which the MDEQ approved, with conditions on July 28, 2011. Figure 1 from the LLAMP, which identifies

the compliance wells, is attached as Attachment 1). The MDEQ added MW-51 as a Compliance Well when they approved the LLAMP. Thus, the effectiveness of the A2 Well purging program as a whole and the reduced frequency purge program must be evaluated based on the data from the designated compliance wells.

DATA COLLECTION

Batch purge events took place on the following dates:

Purge Date	Volume Purged (gallons)
6/2/2011	36,000
9/1/2011	36,000
12/1/2011	36,000
3/1/2012	24,000
6/7/2012	42,000

Groundwater samples have been collected from the designated compliance wells, MW 61s/d, MW-93, MW-51, and the Swim Club wells (4601 Park 4 and 6 inch). Supporting water quality data and trend graphs are attached (Attachment 2).

Since reducing the batch purge frequency, there has been no significant 1,4-dioxane trend changes in any of the Little Lake Area Compliance wells and concentrations of 1,4-dioxane in groundwater sampled from these wells remain well below 85 µg/L. These findings indicate that the reduced frequency of batch purging has not affected the Little Lake System's continued compliance with the non-expansion objective of the Consent Judgment (V.C.1).

Non-compliance well locations, the A2 Well and the nearby monitoring well MW-53i, have also been analyzed for 1,4-dioxane. Listed below are the data from the A2 Well that were obtained during the quarterly purge events:

Ann Arbor Cleaning Supply Well While Purging	
Date	1,4-Dioxane Result (µg/L)
6/2/2011	97
9/1/2011	88
12/1/2011	101
3/1/2012	70
6/7/12	77

(Note - Sample collected from the discharge approximately mid-way through the purging).

The following table shows the sampling dates and results for the A2 Well obtained during non-batch purging and MW-53i:

Ann Arbor Cleaning Supply Well (non-batch purging times)	
Date	1,4-Dioxane Result (µg/L)
8/5/2011	42
10/7/2011	56
11/11/2011	52
1/18/2012	62
2/6/2012	68
4/17/2012	76
5/23/2012	82
MW-53i (non-batch purging times)	
Date	1,4-Dioxane Result (µg/L)
8/5/2011	46
10/6/2011	42
1/19/2012	58
4/17/2012	63

Samples that were not collected during batch purging were collected after approximately 100 gallons of purging.

DATA ANALYSIS

1,4-Dioxane concentrations in groundwater sampled from the A2 Well during the monthly purging were on the decline from 2005 until around July of 2010. Around July of 2010, the 1,4-dioxane trend changed and began to slightly increase. This increase, which predates the reduction in batch purge frequency, does not appear to correlate to any specific event in either the Little Lake area or other portions of the PLS site. After June 2011, 1,4-dioxane concentrations in groundwater sampled from the well during purging have decreased. Samples collected on 6/2/11, 9/1/11, 12/1/11, 3/1/12 and 6/7/2012 were collected during batch purging. These data were collected in a manner consistent with prior data and therefore can be compared to previous trend data. The following graph shows only those A2 Well samples collected during batch purging events. This graph suggests 1,4-dioxane concentrations

