



Gallatin Local Water Quality District

1709 W. College Street, Suite 104 – Judge Guenther Memorial Center – Bozeman, MT 59715
(406) 582-3148 www.gallatin.mt.gov/GLWQD



October 16, 2008

Mr. James Greenbaum, Esq.
Gallatin County Deputy County Attorney
Guenther Memorial Building
1709 West College Street
Bozeman, Mt 59715

Subject: Review of Draft Phase II Environmental Assessment Report-Ethanol Plant Property Churchill,
Gallatin County, Montana (AJM Inc., Oct. 2008)

Dear Mr. Greenbaum:

I have reviewed the above referenced draft report. My review was focused on the well information and water quality information provided in the report, and I provide the following comments:

I. Location and Identification of Plant Water Supply Wells

The report indicates two well logs have been filed for the property. One well (90809) was drilled in 1981 and is reported to be 143 feet deep, while the other (90810) was drilled in 1982 and is reported to be 180 feet deep. However, only one well was located and a ground water sample was collected from it. The report suggests that the well found on the property is the 180-foot deep well. The depth of the sampled well should be verified by sounding the well. This can be done at minimal cost. Verifying the depth that the ground water sample came from is important for evaluating the laboratory results. I did note on the well logs that the 143 feet deep well actually had a higher reported production rate (60 gpm vs. 10 gpm). The report suggests the 180 foot deep well was the main production well for the site.

In addition to verifying the depth of the well that was sampled, an effort should be made to locate the other well or verify that it was properly abandoned. If the missing well was simply abandoned by cutting off the well head and burying the well, it could provide a route of contamination from the surface to the aquifer. I would recommend additional site inspection to try and locate the missing well, and consider conducting a magnetometer survey of the property. This survey could locate the well, and it could also locate other unknown features on the property such as abandoned underground storage tanks or landfill sites.

The report also indicates that the ethanol plant was operated from the mid 1970's through the mid 1980's. However, both of the wells mentioned above were drilled in 1981 and 1982. An effort should be made to determine the source of water used at the plant prior to 1981. It is possible there is an older well that is not recorded, or one of the newer wells may have been replaced or deepened. Neither of the well logs indicates replacement or deepening of an existing well.

II. Ground Water Quality

The report indicates that the well that was sampled produced water that was black in color and had a strong organic (sewer) odor that persisted over a two-hour period while pumping 250 gallons of water out of the well. Both the black color of the well water and the sewer odor are consistent with chemically reducing conditions either inside the well casing, in the surrounding aquifer, or both. As reported, it sounds like the well produces water that would be unfit for human consumption. Additional work needs to be completed to determine the cause(s) of the discoloration and odor. This is important because if the poor water quality is not due to stagnant water in the well casing, it could be an indication that significant quantities of hydrocarbons were released into the aquifer in the past. Natural degradation of ethanol or other hydrocarbons would also result in reducing conditions in the aquifer. Given the amount of time that has lapsed since the site was active, it would have to have been a significant release to still be causing the water quality issues noted in the well.

I suspect that the problem is due to stagnant water sitting in the well casing for many years and reacting with the steel well casing. The report indicates that three well volumes were removed from the well prior to sampling and that only a small amount of drawdown was noted, indicating a highly productive well. Purging three well volumes is a standard accepted method of purging prior to sampling. However, I don't think the well was properly purged prior to sampling, and it definitely was not stressed to evaluate productivity. The report indicates that a total of 250 gallons of water were pumped from the well over a two hour period. This would suggest an average pumping rate of only 2 gallons/minute, which would not have stressed the well enough to evaluate productivity of the well. Also, given the diameter of the well casing (8-inch), the reported static water level of the well (21 feet), and the well log information, three well volumes would be about 1,245 gallons if the well is 180 feet deep, and about 960 gallons if the well was 143 feet deep.

Given that it appears the well was not properly purged, the water sample collected is probably not representative of ground water quality near the well. I recommend that a high capacity pump be installed in the well and at least 1,500 gallons be purged to try and clean up the well. One possibility would be to have a pump service truck install a production pump in the well temporarily to purge it. After this is completed the well should be re-sampled to evaluate ground water quality.

III. Summary

In summary, an effort should be made to identify other possible wells on the property. The well that has been located and sampled should be sounded to determine depth, and well purged to evaluate the cause(s) of the poor water quality observed. I recommend a high capacity pump be installed and the well be re-sampled after purging at least 1,500 gallons. Finally, given all the unknowns about the site history and the potential liability for Gallatin County, I recommend a magnetometer survey to follow up on the surface inspections and test pit work to assure there are no hidden problems. Please feel free to contact me if you have any questions about this letter.

Sincerely,



Alan English, Manager



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MEMORANDUM

DATE: February 4, 2009

TO: Mr. James Greenbaum, Esq., Deputy County Attorney

FROM: Alan English, Manager 

SUBJECT: Review of Draft Phase II Environmental Assessment Report-Ethanol Plant Property Churchill, Gallatin County, Montana (AJM Inc., December 2008)

I have reviewed the above referenced draft report. My review was focused on the ground water assessment portion of the report and I provide the following comments:

I. September 2008 Well Sampling Event

In September 2008 the contractor collected a water sample from a 140-foot deep well on the property. The sample was analyzed for extractable petroleum hydrocarbons and volatile petroleum hydrocarbons, by Advanced Analytical Associates (AAA) in Bozeman, Montana. Samples were also analyzed for nitrate and metals but I am not sure what laboratory did the analysis. As we have previously discussed, it is my opinion that the well was not properly purged prior to collecting these samples, and the results are not representative of ground water quality at the site.

II. October 2008 Well Sampling Event

In October 2008 water samples were collected from the 140-foot deep well and second, 180-foot deep well on the property. The contractor completed extensive purging the wells prior to collecting these samples. The samples were analyzed by Energy Laboratories in Billings Montana. Earlier problems with well purging appear to be related to the fact that the wells have been inactive for many years, and at least one of them had signs of rodents falling into the well. I reviewed the laboratory reports for these water samples, and they appear to be reliable and representative of ground water conditions at the time of sampling.

Nitrate levels were low in both wells, as were arsenic levels, which are elevated in some wells in the Churchill area. However, both wells contained methylene chloride, a volatile organic compound commonly associated with paint strippers and degreasers. Volatile chemicals are chemicals that readily evaporate in air. The source of the methylene chloride, which was detected at 5.8 ug/l in the 180-foot deep well and 3.3 ug/l in the 140-foot deep well was not determined. The maximum contaminant level (MCL) for methylene chloride, established by EPA for public water supplies, is 5 ug/l. While this regulatory standard would not apply to these wells unless they were to be used for a public water supply, it is a common practice to refer to these standards for private wells as guidance.

III. December 2008 Well Sampling Results

A third round of water sampling was completed by the contractor in December 2008 to confirm the presence of methylene chloride in the two wells. These samples were collected as grab samples using a bailer. The wells were not purged and the reason for not purging the wells prior to sampling is not stated. The levels of methylene chloride detected in the wells during this sampling event were lower than the results in October. However, since the sampling method was different (grab sampling vs purging and sampling), and the chemical easily evaporates, it is my opinion these results are also not representative of ground water quality at the time of sampling.

IV. General Conclusions

The laboratory results for water samples collected from the two wells on site in October 2008 are the only samples that I would rely on to assess water quality at the site. These sampling results, along with the other assessment work completed by the contractor are sufficient to characterize environmental conditions at the site.