

January 30 2009

Wildermuth Report dated March 21 2007
Water Quality Impacts from On Site Waste Disposal Systems
in the CVCOI
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(Review and Conclusions)

ES-1:

- 1) 4, 5, 6 with regards to the "Components of this study" are inaccurate based on the over stated projection of future build out of the CVCOI.
- 2) Nitrate levels in well 16, 21 only spiked in 2005 during one sampling period.
- 3) Last paragraph states that, OSWDS "HAVE BEEN IDENTIFIED AS A POSSIBLE SOURCE OF NITRATES IN THE BMZ"

ES-2:

- 1) Paragraph 4 states "OSWDS ARE THE SOURCE OF NITRATE CONCENTRATION IN THE BMZ" contradicting page ES-1.
- 2) Paragraph 6 indicates that future build out. These are only estimates that take into consideration a false and over inflated account of future build out.

1-1:

- 1) Second paragraph states "OSWDS ARE A POSSIBLE SOURCE OF NITRATES" again contradicting prior language.

2-1

- 1) Paragraph 4 states "septic system design life is usually 12 to 20 years. However, properly maintained OSWDS and SAS have a service life well beyond 20 years. Also conventional systems are designed to operate "INDEFINITELY" if properly maintained. (EPA fact sheet September 1999 #EPA 932-F99-075)

Also the statement is made that OSWDS only remove between 10-20% of Nitrogen. EPA treatment guidelines states "10-20 % Nitrogen is removed before the SAS, and another 10-40% is generally removed within the leach field. Equating to a 20-60% removal rate.

2-2:

1) Second paragraph indicates an annual nitrogen loading per household of four persons at 18lbs. Numerous references indicate that an average of 8-10 lbs is more indicative. This has been extremely overstated. (Matuszeski (1997), Pennsylvania & New Jersey EPA.

2-3:

- 1) First paragraph references soil water concentrations found below the SAS. However this information is NOT useful because it does not represent soil waters in the CVCOI.
- 2) Third paragraph states that "NO WETTED SOIL "was found within the SAS. Well functioning SAS systems generally will have unsaturated areas indicating sufficient percolation rates.

2-4:

- 1) Last paragraph indicates" nitrogen samples collected suggest that the soils were not impacted by the OSWDS". This seems to be contradicting to the entire report.

3-1:

- 1) Well locations were selected based on elevated levels of Nitrates. However, ALL wells were located within areas adjacent to residential homes. Some locations next to flood control channels, down gradient of large known septic tanks, and close to existing septic tanks. Only one well out of nine has a sanitary seal.
- 2) Well sampling procedures were comprised of specific well locations, active/non-active wells (60% non active), and specific equipment. As noted in the report, a Grundfos Redi-Flo2 pump was used. This pump has a pumping capacity of 7.5 gpm at 100 ft. head. The report indicated that the in-active wells were pumped for at least 45 minutes. Assuming 45 minutes of run time equates to a total volume of **338 gallons**. Given a factor of 1 hour minimum, the total volume of water would be **450 gallons**. As stated in the last paragraph, well construction data was never reviewed.

3-3:

- 1) Paragraph five indicates "PPCPS were only found in 6 of 9 wells". Well # 16 has NO PPCPS found; however had the highest levels of Nitrogen Isotopes.

3-5:

- 1) Second paragraph talks about "elevated levels of boron, chloride, potassium, and sodium" relative to OSWDS have been known indicators of OSWDS. However, water quality data provided by the CDPH refutes that any of BCVWD wells were impacted by OSWDS.

4-1:

- 1) Report estimates the complete build out of the CVCOI as over inflated. Thus over estimating the potential OSWDS in the CVCOI.

4-3:

- 1) Based on inaccurate information provided on page 4-1, these nitrogen loads are not accurate to indicate future build out.

Conclusions:

The Executive summary indicates that Well #16, and 21 have concentration levels of Nitrate reaching the MCL. Data provided to the Committee from the CDPH indicates that these levels were ONLY a spike and NOT indicative of the regional aquifer. Also, it states that the presence of OSWDS could be a POSSIBLE source. As you read on the build out of potential OSWDS are over inflated and also indicates that OSWDS "are the source of nitrate contamination in the Beaumont Management Zone" contradicting the previous page. And again on page 1.1, the report indicates the OSWDS as being a "possible" source. Figure 1-3 shows the CVCOI. This area has been used solely for the Wildermuth report. Directly up gradient of the BVMWC and CVMWC wells is a large scale residential track of homes estimated to be around 450. As indicated in Figure 1-1, the groundwater flows directly from a northerly to a southern direction or in other words, from Cherry Oaks tract to the Beaumont Management Zone thus impacting the BVMWC and CVMWC respectfully. Unfortunately, this should have been made a portion of this study as the impacts could be considerable.

The report tends to discredit the effectiveness of septic systems leading the reader to assume the worst. EPA Fact sheet #932-F99-075 contradicts this discredit and clearly explains the functionality and operations of septic tanks including the parameters for failure. Maintained septic systems have an operational life exceeding 30+ years. Also, nitrogen removal was grossly understated and future nitrogen loading was obviously over estimated.

Well locations that were selected for the "Tracer Study" appeared to be only wells that at some time had shown elevated levels of nitrate. Wells in surrounding areas the Beaumont Management Zone were NOT part of this study, nor were any water quality data sampled or recorded as maybe to establish a benchmark. None of the wells except Well 21 (BCVWD) have a sanitary seal. Wells selected were not reviewed for construction data, which would have included: casing diameter, overall depth, screen

intervals, sanitary seal, date of construction, mineral composites, drilling method, estimated yield, ect... Lack of this information whether it becomes part of a final report or just utilized for field study reference, is critical before determining sampling locations. It has been confirmed that most of the wells selected in this report are less than the required 100' distance between a domestic water well and a septic system. Furthermore, flood control channels, active commercial septic systems, and residential activity could have been the determining factor for the sporadic spikes in nitrates rather than a widespread aquifer problem with OSWDS.

When reviewing the sampling procedures, it has been determined that 60% of all wells sampled were inactive. Not having the well construction data, the sampler has no idea if he/she has exchanged the stagnate waters with a representative sample amount of the surrounding aquifer. The pump used in the in active wells is listed as a GrundFos Redi-Flo2 pump. The report indicates that the pump was lowered to 100' BGS and pumped at a minimum of 45 minutes. The total flow equates to 338 gallons @ 7.5 gallons per minute at 100' of total head (TDH). If the pump was ran for two hours, the volume exchange equates to only 676 total gallons. I feel that this is NOT an adequate exchange of casing volume as well as lacking velocity to help cleanse the casing in a stagnate state.

Section 3 references specific ions that would be attributed to the presence of OSWDS. In reviewing water quality data received from the California Department of Public Health with regards to wells referenced in the study, it appears that there is at best a minimal detection of such ions in wells 4a, 5, 16, and 21. These results are from 1996 to 2008. The results are summarized as follows:

Well 4a:

- Chloride: 20-21—MCL 250 mg/l
- Sodium: 21-23—MCL 250 mg/l
- TDS: 300-350—MCL 500 mg/l
- Potassium: 1-2.0—MCL Unknown
- Nitrates (NO₃): 8-11—MCL 45 mg/l (Total of 15 samples) All samples <1/2 MCL

Well 5:

- Chloride: 10-11 mg/l
- Sodium: 15-19 mg/l
- TDS: 290-370 mg/l
- Potassium: 1.2-2.0 mg/l
- Nitrates(NO₃): 11-16 mg/l (Total of 14 samples) All samples <1/2 MCL

Well 16:

- Chloride: 13-16 mg/l
- Sodium: 35-38 mg/l
- TDS: 310-360 mg/l
- Potassium: 1.0-2.0 mg/l
- Boron: Non Detected
- Nitrate: (NO₃) : 6-43 mg/l (Total of 38 samples) <25 samples under ½ MCL-- >13 over ½ MCL

Well 21:

- Chloride: 11-13 mg/l
- Sodium: 24-25 mg/l
- TDS: 270-300 mg/l
- Potassium: 1.5-2.0 mg/l
- Nitrate: 9.5-43 mg/l (Total of 54 samples) <48 samples under ½ MCL-->6 over ½ MCL

Section 4 references future build out and potential nitrogen loading factors. Unfortunately, these factors are grossly overstated due to inaccurate information with regard to potential build out projections. Furthermore, the Cherry Oaks tract should have been included in these equations thus adding to the uncertainty of these projections. Figures 4-1, 4-2, 4-3 are a simulation in time to project the total impact of nitrogen's. However with the data provided in this report to reflect future build out/impacts, this data was part of the model calibration which should be deemed inaccurate.

The report gives conclusions and recommendations on page 6-1 a total of 11. In reviewing these, I would comment in order:

1. According to CDPH water quality records, this is NOT accurate.
2. Again, this is NOT accurate, but over stated.
3. True
4. This is true according to the report, however not noticed in Well 16??
5. High nitrate levels are sporadic at best, and there are NO high levels of specific ions according to CDPH.

6. Accurate under report conditions only.
7. Accurate under report conditions only.
8. Accurate under report conditions only.
9. This has NOT been proven in the CVCOI.
10. This should be left undetermined at this time.
11. This should be left undetermined at this time.

Despite efforts by the local agencies involved in this report and /or those agencies that have deemed this report credible, it is apparent that the OSWDS within the CVCOI should be considered an effective treatment system until otherwise proven by future reports. It is also apparent that within the CVCOI there may be some locations that should be considered a "Point Source" based on their land use which would distinguish predictable concentrations and volumes. As noted, there have been geographical areas that should have been included in this report that were not.

At the County level, Ordinance 864 was passed by the Supervisors on October 16 2006 in response to the Wildermuth "Draft Report" dated July 12 2006 for a 90 day period. Subsequently on February 27 2007 Ordinance 864.1 was passed leading to an extension of a 120 day moratorium. June 19 2007, Ordinance 871 was passed, prohibiting any additional OSWDS unless they can remove 50% nitrogen. The ordinance was then considered a "Prohibition" instead of a moratorium. All action was based on a draft and final report prepared by Wildermuth Environmental.

After lengthily review of all reports and supporting documentation, and participating on the technical board of the Blue Ribbon Task Force, I would recommend that the County Board of Supervisors immediately relinquish Prohibition 871 until further investigations can be completed by an independent resource NOT associated with local agencies or influences. The potential effects of installing sanitary sewers within the CVCOI has not been determined that it will eliminate the degradation of local ground waters. Measure "B" which was defeated by majority vote could have had a devastating effect on the CVCOI. The proposed cost to complete all infrastructures was estimated to be at \$60 million dollars amongst 2000 residents. This equates to \$30,000 per resident and based on the final report by Wildermuth Environmental. The tragedy to this would be if measure "B" had passed, infrastructure built, and the problem NOT resolved.