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Interim Report
Bureau of Microbiology
Milford Flats Water Project
January 20, 1999

The Bureau of Microbiology for the State Department of Health has been asked to assist with the identification of the source of private well contamination in the Milford Flats area. During the months of December and January, water was sampled from private wells, from the Circle 4 sewage lagoons, and from the town's river and canal by the Department of Environmental Quality.

The **plan of action** has been to:

1. Identify all organisms from the private wells, the sewage lagoons, and the river/canal and see if the source of contamination can be determined via this identification.
2. To perform molecular fingerprinting on identified organisms and see if they are related at a molecular level.
3. To perform antibiogram typing of the fecal streps to determine if they are more likely due to human or animal fecal origin.
4. In addition, the Bureau of Microbiology strongly recommends that Microscopic Particulate Analysis, which is designed to determine if ground water is under the influence of surface water, should be done on some wells.

It should be emphasized that the results from these four steps may or may not result in a determination of the source of private well contamination.

Progress on the plan of action is:

1. COMPLETE - At this time, all organisms from the wells of private citizens, as well as organisms from the Circle 4 sewage lagoons, and the town's river and canal have been identified. No frank pathogens have been identified; all organisms identified to date are indicator organisms, which means that their presence may (or may not) be accompanied by pathogens.

Fecal streps found in the private wells match some fecal streps found only in the pig lagoons AND some found only in the river/canal samples.

Fecal strep species identified in wells include:

Enterococcus gallinarium
Enterococcus durans
Enterococcus faecium
Enterococcus faecalis

Fecal strep species identified in the river/canal water include:

Enterococcus gallinarium
Enterococcus durans
Enterococcus faecium

Fecal strep species identified in the sewage lagoon include:

Enterococcus durans
Enterococcus faecalis

Antibiogram patterns of the fecal strep required the purchase (and delivery) of multiple different antibiotics. This has been done. Now, 36 types of media must be made and the analysis performed.

4. NOT DONE

Conclusion:

The following conclusions are from the laboratorians and are based upon laboratory data.

1. The species found in the drinking water wells are the same as those found in most water distribution systems as biofilms which adhere to the pipes. They are not pathogenic and do not cause disease in humans.
2. In December, nineteen wells had bacteria in them. After chlorination, when these wells were resampled in January, seventeen of the nineteen had significantly reduced numbers of bacteria – most of them no longer had bacteria present. Only two wells were unaffected, and one of the two was not chlorinated.
3. The molecular fingerprinting indicates that the source of fecal strep in the wells was NEITHER the river NOR the sewage lagoon.

Therefore, taking this data under consideration, the most logical explanation is that the bacteria in the drinking wells represents normal biofilm formation and that owners of private wells need to adopt preventive maintenance measures, such as routinely chlorinating their wells on a yearly schedule.

We see NO DATA to support the hypothesis that the ground water is contaminated.

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Milford Flats - Water Quality Data Summary - Private Wells

Well/Number	Dec. 11 & 12, 98			Dec. 11 & 12, 98			January 12, 99			Surfactant (mg/LAS)	Chlorinated	Caffeine	Nitrogen mg/L
	T.C	FC	FS	NC	Nitrate	T.C	FC	FS	NC				
1	<4	<4	<2	0.23	0	0	0	0	0	0	no		0.231
2	36	<4	>200	<0.1	3.1	0	8	0	0	0	12/17/1998	<0.015	<0.1
3	<4	<4	8	0.27	40.6	0	3	0	0	0	12/23/1998	<0.015	0.308
4	<4	<4	<2	1.45	0	0	0	0	0	0	* 12/5/1998		1.33
5	4	<4	<2	1.11	7.5	0	>200	0	0	0	12/5/1998	0.064	1.05
6	4	<4	<2	<0.1	0	0	0	0	0	0	unknown		<0.1
7	<4	<4	<2	0.25	9.9	0	0	0	0	0	* 12/5/1998		0.251
8	<4	<4	>200	4.92	200.5	0	0	0	0	0	no		0.897
9	<4	<4	<2	1.33	40.6	0	4	0	0	0	no	0.038	5.51
10	<4	<4	<2	2.2	200.5	0	>200	0	0	0	* 12/5/1998	0.022	3.71
11	<4	<4	<2	5.26	6.4	0	1	0	0	0	* 12/5/1998		3.54
12	<4	<4	<2	0.99	1	0	0	0	0	0	unknown		<0.1
13	<4	<4	>200	4.95	25.4	0	4	0	0	0	1/2/1999	0.048	4.77
14	<4	<4	<2	0.01	3.1	0	0	0	0	0	12/12/1998	<0.015	0.87
15	<4	<4	>200	0.01	8.7	0	0	0	0	0	no	<0.015	5.94
16	<4	<4	<2	2.84	0	0	0	0	0	0	no	<0.015	<0.1
17	<4	<4	<2	0.21	1	0	0	0	0	0	no		5.84
18	<4	<4	<2	4.5	11.1	0	5	0	0	0	no		3.05
19	<4	<4	4	0.38	17.8	0	0	0	0	0	12/2/1998		0.232
20	100	<4	<2	0.43	12.4	0	0	0	0	0	no	<0.015	1.37
21	<4	<4	<2	2.72	200.5	0	0	0	0	0	no		4.22
22	460	<4	2	0.29	1	0	0	0	0	0	no		0.225
23	32	<4	>200	0.29	165.2	6.4	3	0	0	0	no	<0.015	0.471
24		<4	<2		200.5	0	0	0	0	0	12/23/1998	<0.015	2.84
25		<4	<2		200.5	0	0	0	0	0	12/23/1998	<0.015	0.202

* 01/05/99