



*Town of Osgood Case Study
Fall 2009-Spring 2010
Fecal Coliform Analysis Exceedances
Operator Perspective*

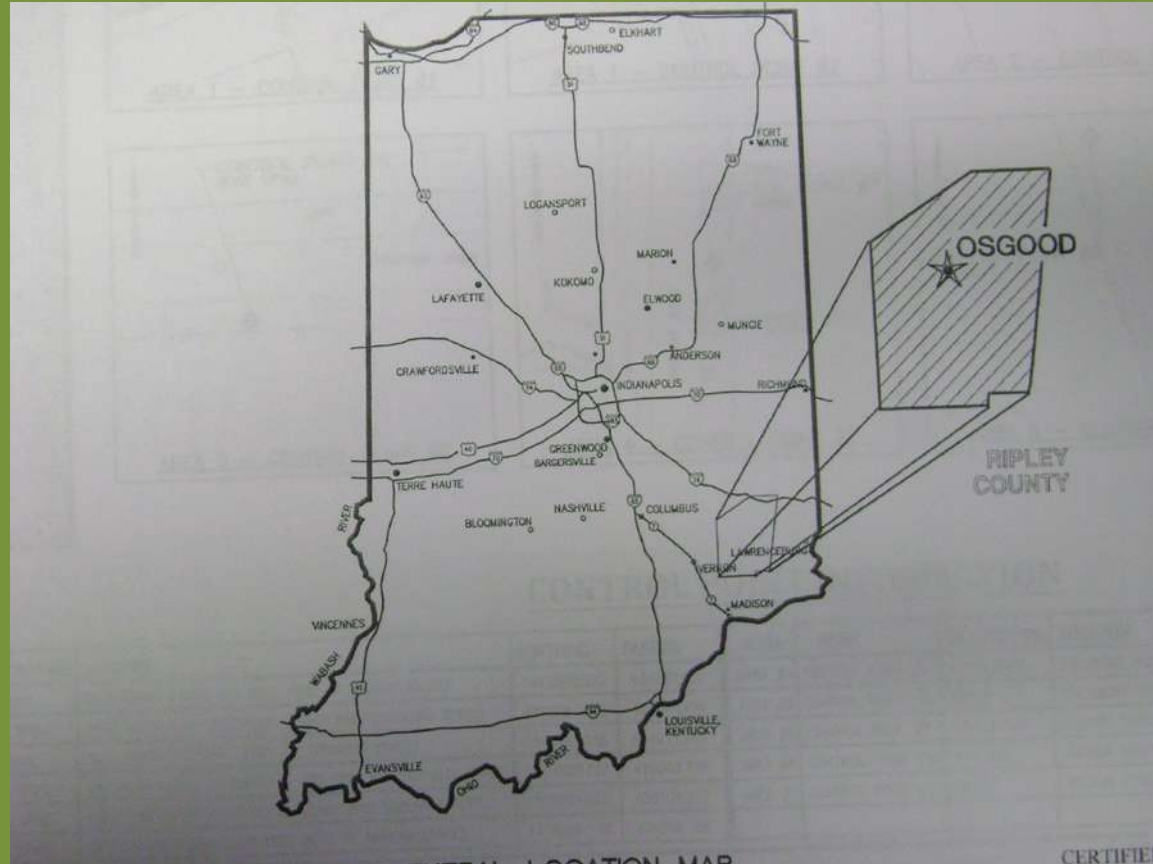
Personal History

Tony Wood: Superintendent of Osgood Wastewater 1992- Present

- ❖ **Class III Municipal & Class B Industrial Operator**
- ❖ **Came to the Wastewater field as a quality control technician for a bottling company where I was responsible for water systems, wastewater lab testing and a backup for microbe plating.**

Osgood Indiana

www.osgoodindiana.org



Home of the Damm Theatre



Facility Summary

- ❖ **The Osgood Wastewater Treatment Plant is located in Ripley County . This Class II plant has a history of plant upgrades in the 1950's, 1970's, and late 1990's. The current treatment plant consists of the following processes:**
 - ❖ **Automatic bar screen**
 - ❖ **Dual Gravity grit channels**
 - ❖ **Influent Pumping Station**
 - ❖ **Oxidation ditch (extended aeration)**
 - ❖ **Secondary Clarifiers**
 - ❖ **UV Disinfection**
- ❖ **A large project to construct an EQ basin, modernize pumping systems and blowers, and to integrate SCADA for monitoring the plant remotely and more efficiently is now in preliminary planning. Funding is almost secured and we look at late 2011 and 2012 for construction of this project.**

Land Application Program History

- ❖ **Original Land Application Permit INLA000299 goes back to 1989 and contains provisions for site specific surface application of 104 acres of hay and row crop.**
- ❖ **Current Land Application Permit allows 251.81 acres of hay and row crop for site specific surface application of biosolids.**
- ❖ **Four 85,000 tanks were converted to aerobic digesters where coarse bubble diffusers aerate the biosolids. After digestion material is tested and pumped to two trucks and taken to the predetermined site. Our yearly program outline is to haul out in the spring, land apply some hay in late summer, and empty out by late November.**

Town of Osgood Biosolids Output

YEAR	DRY TONS
2010	119
2009	69
2008	88
2007	106
2006	92
2005	82
2004	96
2003	72
2002	33
2001	40
2000	41
AVERAGE	76 Dry Ton/Year.

Keady & Knight Trucks



Fecal Coliform Class B November 12 , 2009 Tank 4



Characteristics

Aerobic Digester Detention Time Approximately 190 days

Laboratory Result

Fecal Coliform

Sample 1	2,592,000	cfu/1g
Sample 2	5,581,000	cfu/1g
Sample 3	5,905,000	cfu/1g
Sample 4	5,804,000	cfu/1g
Sample 5	4,066,000	cfu/1g
Sample 6	4,955,000	cfu/1g
Sample 7	4,132,000	cfu/1g

Geometric Mean = 4,564,370

My Course of Action

- ❖ My personal feeling was that I had a bad result and the next testing window would approve the tank for land application.
- ❖ Calls were to made for the laboratory to audit the result and to review technical data and mathematical calculations to confirm the results.
- ❖ I would hold Tank 4 until the next available window of opportunity: pretest, and reevaluate the numbers. Since our window was closing within two days due to bad weather retesting would be a waste of time and money and I would remix and retest later.

Fecal Coliform History:

2009	November	11-9-09	4,564370	cfu/g
2009	August	8-25-09	1520000	cfu/g
2009	April	4-28-09	37619	cfu/g
2009	March	3-23-09	83147	cfu/g
AVG	2009	2009	1551284	cfu/g
2008	October	10-29-08	20333	cfu/g
2008	September	9-24-08	11546	cfu/g
2008	August	8-19-08	21859	cfu/g
2008	June	6-18-08	10233	cfu/g
2008	April	4-30-08	10557	cfu/g
AVG	2008	2008	14905	cfu/g
2007	November	11-19-07	582857	cfu/g
2007	September	9-13-07	24415	cfu/g
2007	September	9-12-07	29629	cfu/g
2007	May	5-23-07	556942	cfu/g

Fecal Coliform History:

2007	May	5-4-07	69729	cfu/g
AVG	2007	2007	252714	cfu/g
2006	November	11-28-06	20050	cfu/g
2006	October	10-3-06	30847	cfu/g
2006	September	9-24-06	43184	cfu/g
2006	June	6-2-06	1200	cfu/g
2006	May	5-25-06	212	cfu/g
AVG	2006	2006	19099	cfu/g
2005	October	10-13-05	12790	cfu/g
2005	May	5-26-05	33581	cfu/g
2005	April	4-26-05	36281	cfu/g
AVG	2005	2005	27551	cfu/g
2004	November	11-15-04	39168	cfu/g
2004	October	10-28-04	38865	cfu/g
2004	September	9-1-04	44077	cfu/g
2004	April	4-14-04	23754	cfu/g
AVG	2004	2004	36466	cfu/g

Fecal Coliform History:

2003	October	10-21-03	40721	cfu/g
2003	October	10-7-03	37158	cfu/g
2003	June	6-9-03	41232	cfu/g
2003	April	4-16-03	39487	cfu/g
AVG	2003	2003	39650	cfu/g
2002	November	11-21-02	26596	cfu/g
2002	August	8-6-02	30526	cfu/g
2002	June	6-25-02	29903	cfu/g
AVG	2002	2002	29008	cfu/g
2001	November	11-6-01	33362	cfu/g
2001	October	10-31-01	35293	cfu/g
2001	October	10-8-01	33953	cfu/g
2001	October	10-8-01	31110	cfu/g
AVG	2001	2001	33430	cfu/g
2000	October	10-17-00	74863	cfu/g
2000	May	5-18-00	80704	cfu/g
AVG	2000	2000	77784	cfu/g
TOT AVG			215,440	cfu/g

OTHER FACTORS

- ❖ A review of all data showed no major changes in the dynamics of my process:
- ❖ Dissolved Oxygen Levels
- ❖ PH
- ❖ Flow
- ❖ Treatment efficiency and outputs
- ❖ Industrial point sources
- ❖ Detention time

Fecal Coliform Retest April 12, 2010 Tank 4

❖ Detention Time Approximately 310 Days

❖ Lab Result

Sample 1	3,750,000 cfu/1g
Sample 2	2,307,692 cfu/1g
Sample 3	4,076,655 cfu/1g
Sample 4	4,057,377 cfu/1g
Sample 6	2,707,581 cfu/1g
Sample 7	4,800,000 cfu/1g

❖ Geometric Mean = 3,402,372 cfu/1g

❖ Percent Solids 2.4-2.9

Operator Response

- ❖ **An internal review by the laboratory stated no mathematical calculations or errors and the result was a certified result.**
- ❖ **Red Flags stood out on three fronts in my opinion on the laboratory result:**
- ❖ **The overall large fecal coliform counts were not supported by the long aerobic digester detention times and the science behind the process**
- ❖ **The % solids on the report were inconsistent with the percent solids that we ran for the material. Our records indicated solids in the 4 percent range through our internal testing.**
- ❖ **The long-term data suggested that results were outside of the upper control data for the previous decade citing reasonable detention times and no other changes with respect to process control.**

IDEM was called for advisement

IDEM would look at all the supporting quality control data in order to determine if all standard methods were met.

A split was prepared and the samples were sent to two other labs for analysis:

SPLIT SAMPLES

	LAB 1		LAB 2	
Sample 1	55,556	cfu/g	463	MPN/g
Sample 2	79,545	cfu/g	26,400	MPN/g
Sample 3	120,000	cfu/g	30,500	MPN/g
Sample 4	148,276	cfu/g	10,200	MPN/g
Sample 5	34,146	cfu/g	497	MPN/g
Sample 6	23,310	cfu/g	9740	MPN/g
Sample 7	50,820	cfu/g	3500	MPN/g
Geometric Mean	61,105	cfu/g	4865	MPN/g

*Both laboratories and our facility had %solid results which matched almost identical for each of the 7 samples.

IDEM Review and Findings

After sending all results and QAQC supporting data to IDEM, they concluded that:

- ❖ The laboratory on the initial April 12th 2010 sample failed to run dilutions in the prescribed ranges of 20-60 colonies per membrane but instead tested in ranges much higher. When sample quantity is unknown Standard Methods states that several dilutions be run to achieve a countable density. Estimate volume and/or dilution expected to yield a countable membrane and select two additional quantities representing one-tenth and ten times this volume, respectively. Based on the dilutions ran and the fact that they ran only one sample instead of a range of samples the laboratory failed to meet Standard Methods for the fecal coliform test and IDEM dismissed their result.**

IDEM REVIEW AND FINDINGS

- ❖ Both laboratories doing the later split samples met all dilution and range requirements according to Standard Methods and the samples were allowed and were found to meet Class B requirements for Land Application.
- ❖ All findings and correspondence was sent to the laboratory in question and corrective action was then implemented to meet Standard Methods Requirements on all new testing.

CONCLUSION Operator Perspective Land Application

- ❖ Know your Biosolids**
- ❖ Keep Good Records**
- ❖ Get to know your Lab and QAQC**
- ❖ Networking**
- ❖ Consider Split Samples to verify ranges**
- ❖ Have a Backup Plan**