

Package Plants (e.g., Schools, Mobile Home Parks, Churches, etc.)

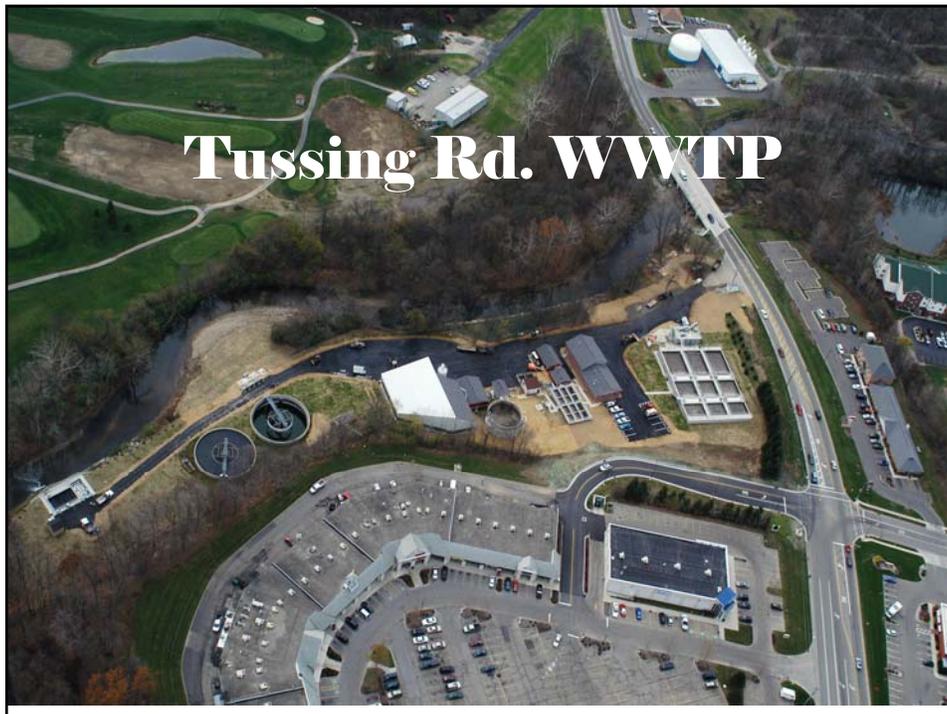
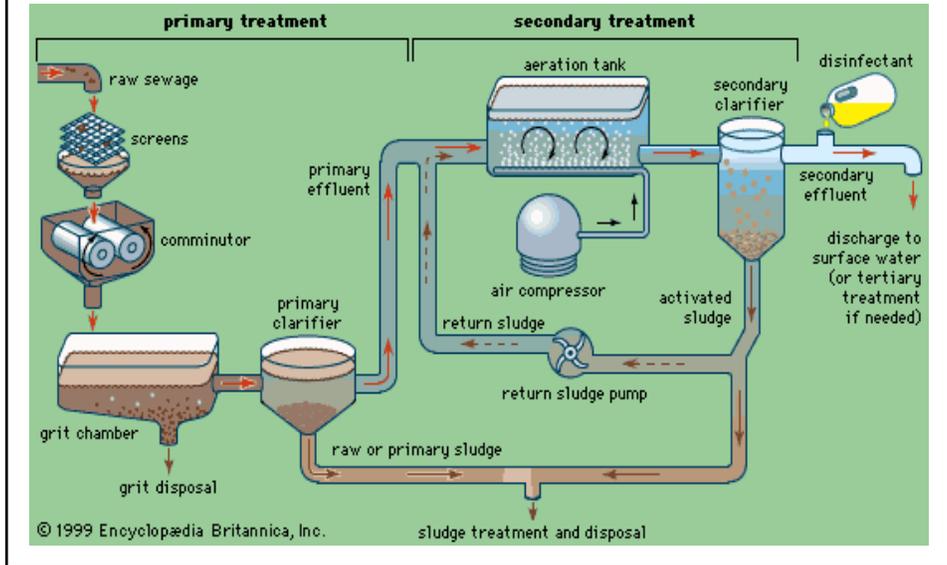
A brief overview of operation, permitting and
relative contribution of Phosphorus to Lake Erie.

Rick Wilson
Ohio EPA-Division of Surface Water
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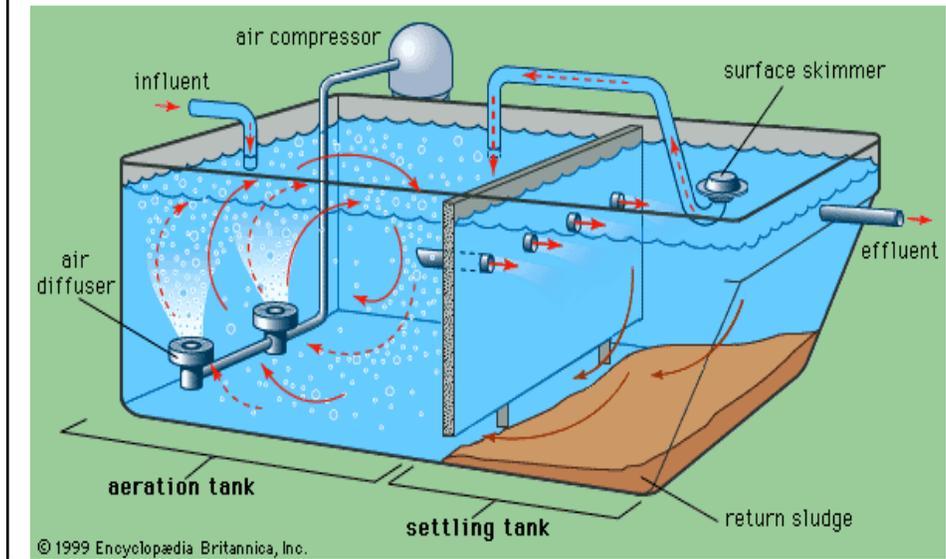
What is a “Package Plant”?

- Package Plants are smaller versions of the extended aeration principle for waste water treatment.
- All discharging sewage treatment systems are required to have NPDES permit.
- Package plants range in size from ~1000 gal/day to >50,000 gal/day. The larger sized facilities generally have more than one plant in parallel.
- This analysis looks at facilities at or below 50,000 gal/day capacity.

Activated Sludge Process



Extended Aeration Package Plant



Package Plant with “Secondary Treatment”





Data Dump from SWIMS

- Requested design capacity and location of all NPDES facilities in Ohio that were:
 - Municipality <0.05 MGD (<50,000)
 - County <0.1 MGD (<100,000 gpd)
 - State and regional facilities
 - Semi-Public facilities (<50,000 gpd)
 - Schools hospitals
 - Mobile Home Parks, Subdivision
- ***NOTE*** facilities may have since expanded to larger sizes. May include non-package plants, such as lagoon systems)

of NPDES Permits in Lake Erie watershed
with 50,000 gpd design capacity or less

	Permits	P- Permits	Daily Flow (MGD)	
0-5000 gpd	165	3	0.45	7.8%
5001 to 10000 gpd	108	3	0.90	15.6%
10001 to 25000 gpd	127	11	2.27	39.1%
25001 to 50000 gpd	60	9	2.18	37.5%
All	460	26	5.80	

of NPDES Permits in Lake Erie watershed
with 100,000 gpd design capacity or less

	NPDES Permits	P* _(monitor) Permits	Daily Flow (MGD)	
0-5000 gpd	165	3	0.45	2.07%
5001 to 10,000 gpd	108	3	0.90	4.12%
10,001 to 25,000 gpd	127	11	2.27	10.36%
25,001 to 50,000 gpd	60	9	2.18	9.96%
50,001 to 100,000 gpd	41	16	3.13	14.33%
>100,000 gpd	34	32	12.9	59.16%
All	535	74	21.87	

P Monitoring Policy

- Facility size: Monitoring Frequency
 - <100,000 gpd None*
 - >100,000 gpd 1/month (composite)
 - >1.0 MGD 1/week (composite)
 - >10 MGD 2/week (composite)
- *Guidance footnote:
 - Phosphorus monitoring generally is recommended only in the Lake Erie basin or as necessary under Reasonable Potential, or where discharge is to a publicly owned lake or reservoir or within 3 miles upstream of a lake or reservoir, or where the treatment facility has phosphorus removal.

Example: Latty WWTP
Permit No.2PA00073

Maximum	6.5 mg/L
Average	1.84 mg/L
Minimum	0.18 mg/L
50 th %tile	0.94 mg/L

- Design Capacity= 30,000 gal/day
- Monitoring Total P since Dec. '05
- Average flow on P-monitoring days:
 - 11,400 gallons

Example: Village of Winesburg
(capacity 15,000 gpd):

*Nutrient trading with Alpine Cheese

Recently started P-monitoring

6 data points for total P

Range = 0.2-1.59 mg/L;

Average = 0.93 mg/L)

**Example: Kirtland Local School District
Permit No.3PT00023**

- Design Capacity =30,000 gal/day
- Monitors 1/month since January 1993 for Total phosphorus.
- (169 data points)
- Average flow on P-monitoring days:
 - 14,500 gallons/day

Percentile concentrations in (mg/L)

10th	1.04
20th	1.55
30th	1.854
40th	2.2
50th	2.7
60th	3.178
70th	3.984
80th	4.38
90th	6.25
95th	7.018

Example: Seneca County (Garage, Jail, Mental Health, Dog pound, child and human services)

Permit No.2PG00088

- Design Capacity =31,125 gal/day
- Monitored 1/month since January 1993 to dec. '01 for Total phosphorus.
- (98 data points)
- Average flow on P-monitoring days:
 - 9990 gallons/day

Percentile concentrations in (mg/L)

10th	1.6
20th	2.246
30th	2.55
40th	2.92
50th	3.29
60th	3.568
70th	4.398
80th	5.14
90th	6.218
95th	7.026

Wrap Up

- 460 permitted dischargers in Lake Erie basin at or below design capacity of 50,000 gal/day.
- Sum of Design Capacities = 5.8 MGD (million gallons per day)
- 5.8 MGD is approximately equal to the design daily capacity from the city of Solon, OH.
 - (Mean flow=2.24 MGD, Mean effluent P concentration 0.5 mg/L) compared to sampling of package plants w/ means ranging from the 0.94 to 3.29 mg/L.