

From Air into Water

Carolinas Air Pollution Control Association

Presentation by:

**Kellie Hedrick
Environmental Process Solutions PLLC**



Presentation Outline

- Pollutants moved from air into water
- Pre-treatment
- Direct Discharge (NPDES)
- Engineering Alternatives Analysis
- Non-discharge system
- Permit received, now what?



Manufacturing Operations

- **Generate waste products**
 - Solids
 - Liquids
 - Gases
- **Many require modification prior to disposal/release**

Air Pollution



Wet Scrubber

Contaminants into Water

- What now?
- Discharge where?
- Permit required?



Discharge Water

- **Where?**
 - POTW available
 - POTW willing and able to accept
 - River, lake, creek (NPDES)
 - Spray irrigation

POTW permitting

- **Contact the permitting authority as soon as you suspect you might possibly need a permit**



What is needed?

- Data on the manufacturing processes involved that generate the wastewater stream
- Data on the potential composition of the discharge stream
- Chemical composition and volume

Categorical Standards

- Provide limits for specific industries
- Include pretreatment (discharge to a POTW)
- Also include NPDES (direct discharge to a river, lake, or other water body)



Toxic Pollutants

- List of 65 parameters shown in 40 CFR 401.15
- Include organics, inorganics, and metals
- Permit limited for discharge to a POTW or directly to a water body



Conventional Pollutants

- 1. Biochemical oxygen demand (BOD)
- 2. Total suspended solids (nonfilterable) (TSS)
- 3. pH
- 4. Fecal coliform
- 5. Oil and grease



Categorical Industries

- 58 Industries listed
- Some generate waste to air, others only water
- Categorical status is wastewater centric



Categorical Permitting

- Set limits depending on the industry
- May be concentration or mass based
- Some are production based



Typical Application Process (Charlotte Water)

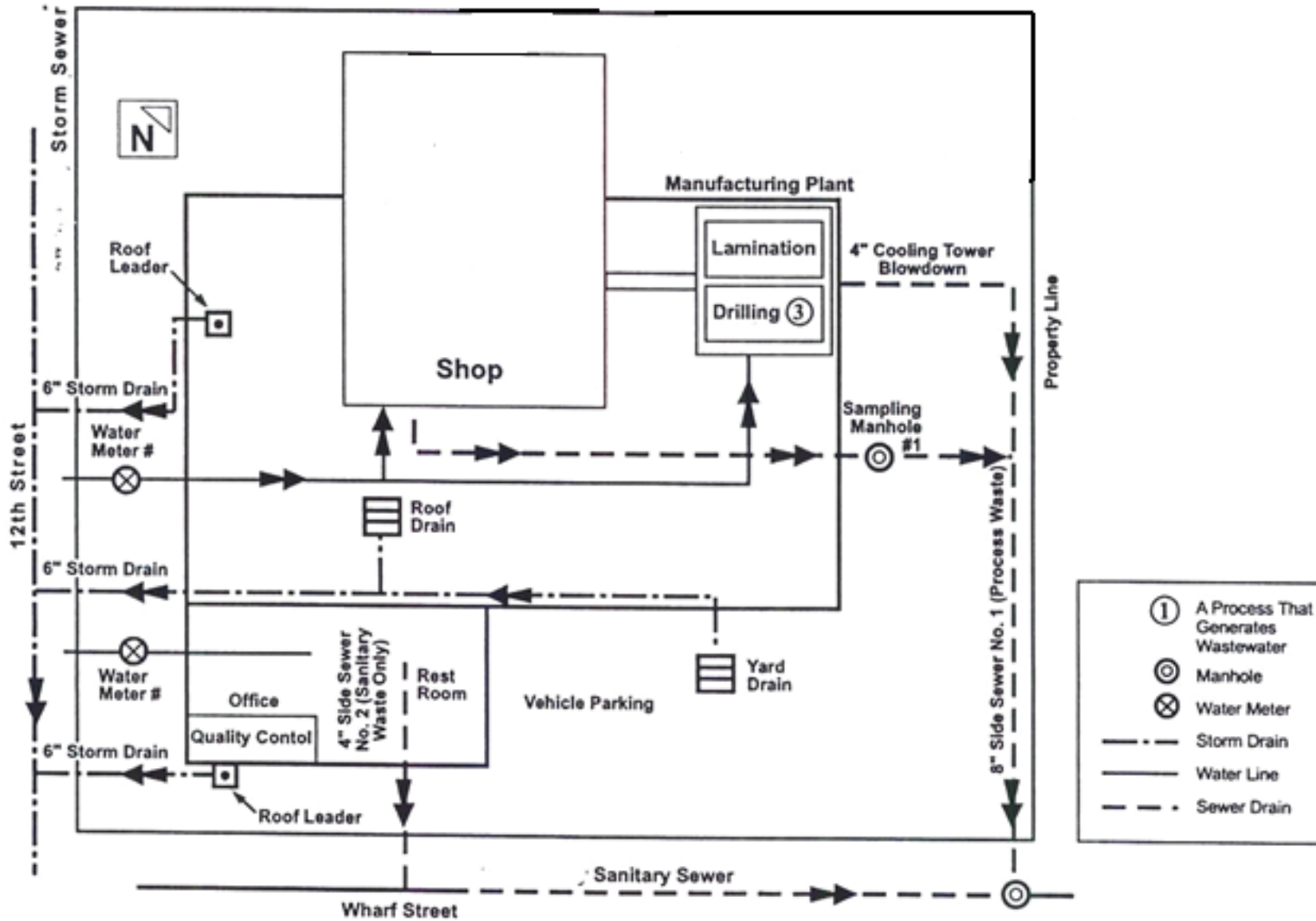
- **Section A – General Information**
- List the Standard Industrial Classification (SIC) or the North American Industry Classification System (NAICS) codes for your facility. These codes may be found on tax documents, some Human Resources documents, or in publications at the POTW's offices.



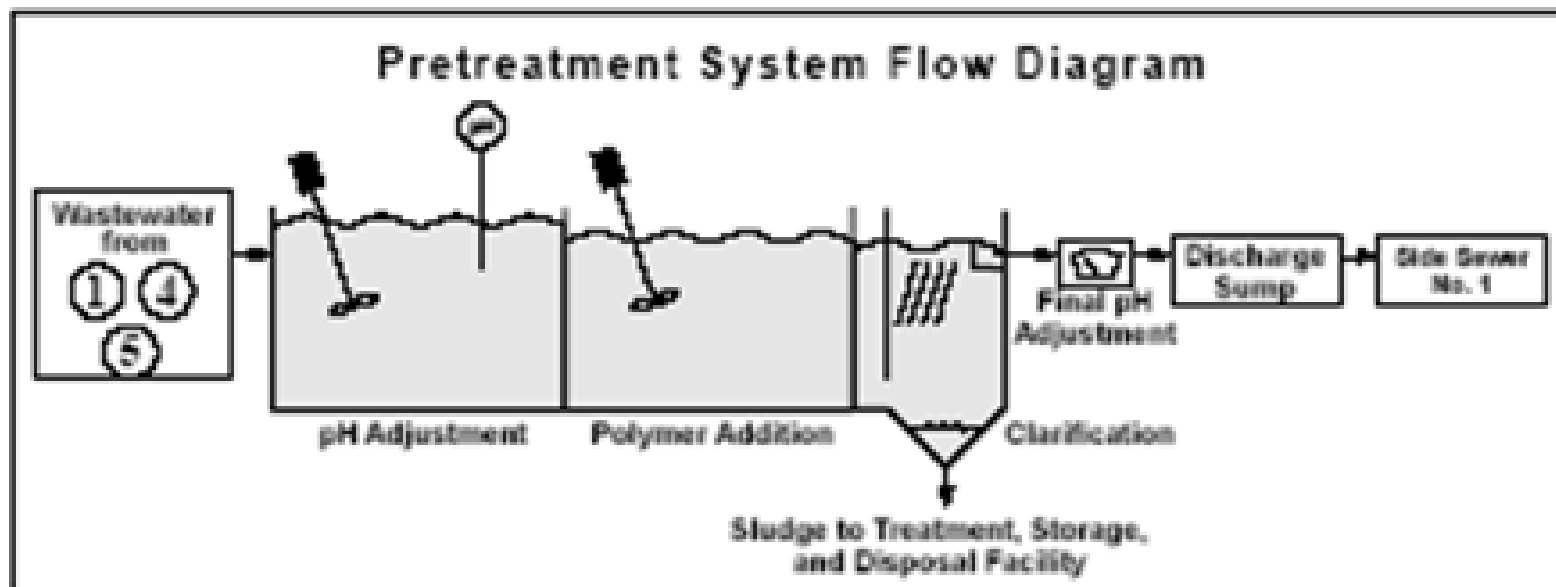
- **Section B – Flow Diagram/
Schematics and Site Layout**



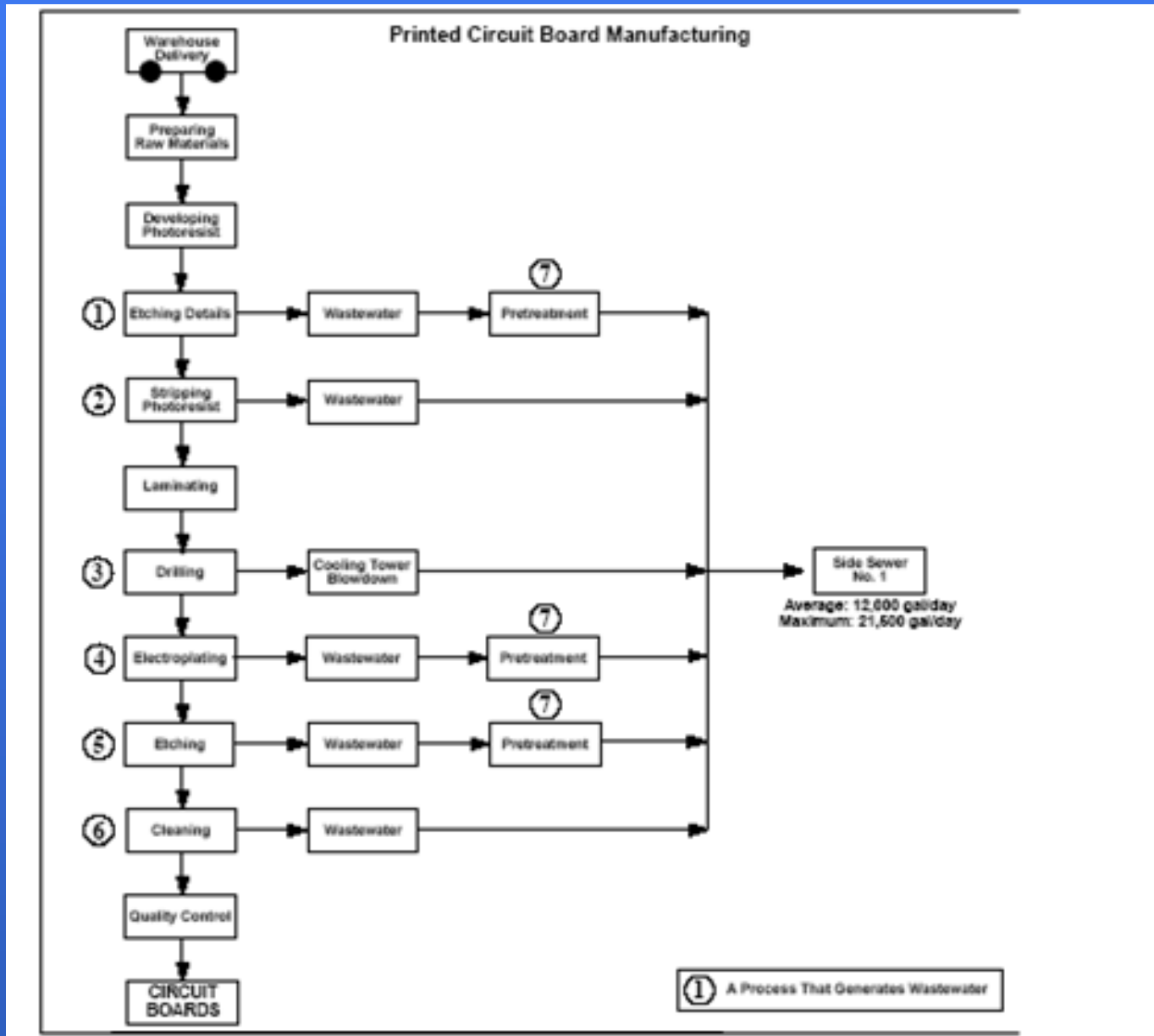
Printed Circuit Board Manufacturing Plant



EXAMPLE WASTEWATER PRETREATMENT SYSTEM FLOW DIAGRAM



EXAMPLE PRODUCTION/PROCESS SCHEMATIC FLOW DIAGRAM



Section C – Facility Operation Characteristics

- For specific shift activities, describe in general terms the type(s) of activities (administrative/office, full manufacturing, limited manufacturing, clean-up of manufacturing areas, equipment maintenance, janitorial, etc.) that are conducted on each shift on each workday



Mass Balance - Influent

Type of Application /Use	Detailed Description of Applicable Operation(s) and/or Equipment	Volume Used (gallons/day)	[E]stimated or [M]easured
Process			[] E [] M
Air-Pollution Control Unit (Please specify if used for general air conditioning or process related pollutants)			[] E [] M
Backwash Water			[] E [] M
Boilers (Please specify if live and/or dry steam is used.)			[] E [] M
Contact Cooling/Warming Water			[] E [] M
Equipment Washdown			[] E [] M
In-Product			[] E [] M
Lab			[] E [] M
Maintenance Shop			[] E [] M
Non-Contact Cooling/Warming Water (e.g. water circulated through jackets or piping; process where the water is kept from contacting the item/object)			[] E [] M
Pump Sealant Water			[] E [] M
Cafeteria/Kitchen/Breakroom			[] E [] M
Domestic (e.g. restroom(s) estimate = 30 GPR/person)			[] E [] M
Other, please describe			[] E [] M
Total			



Mass Balance - Effluent

Source of Wastewater	Wastewater is Discharged To Where	Pretreated?	Volume Used (gallons/day)	Estimated (E) or Measured (M)
Process		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Air-Pollution Control		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Backwash Water		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Boiler Blowdown		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Cafeteria/Breakroom		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Contact Cooling/Warming Water		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Cooling Tower Bleed Off		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Equipment Washdown		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Facility Washdown		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Lab		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Maintenance Shop		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Non-Contact Cooling/Warming Water		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Off Spec/Out of Date/ Customer Returned Product		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Pump Sealant Water		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Groundwater/Remediated Groundwater		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Storm Water Runoff		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Tank Bottoms		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Domestic		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M
Other, please specify		<input type="checkbox"/> yes <input type="checkbox"/> no		<input type="checkbox"/> E <input type="checkbox"/> M



Chemical List

Chemical Name	Chemical Abstract Number [CAS#]	Present at Facility	Quantity Present	Absent at Facility	Present in Discharge to POTW	Absent in Discharge to POTW	Concentration in Discharge, (mg/l)
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Limits Developed

- Will have limits on conventional pollutants
- Will have limits on toxic pollutants
- Will likely have limits on pollutants removed from air



POTW can't/won't accept

- Evaluate additional options
- NPDES – Very similar permitting process to POTW for pre-treatment

NPDES Permitting

- Evaluate the basin water plan at the NCDEQ website to determine the status of the based for the intended discharge



Engineering Alternatives Analysis

- This is required for any potential permit to discharge
- First step is to determine if the flow would be allowed

Is it a zero flow stream?

- Zero flow stream restrictions [15A NCAC 2B.0206(d)(2)] apply to oxygen-consuming waste in zero-flow streams. In order to determine streamflow at the proposed discharge location, contact the U.S. Geological Survey at 919-571-4000.



Does the stream have a prohibitive classification?

- Receiving stream classification restrictions [e.g., ORW, WS, SA, NSW, and HQ class waters have various discharge restrictions or require stricter treatment standards].

Basinwide water quality plan

- **Basinwide Water Quality Plans.**
These basin-specific plans list NPDES permitting strategies that may limit wastewater discharges to particular streams within the basin due to lack of stream assimilative capacity, etc.



Impaired Waters?

- Impaired waters and TMDLs (Total Maximum Daily Load). Certain waterbodies listed as impaired on the 303(d) list and/or subject to impending TMDLs may have wastewater discharge restrictions.



Endangered Species?

- **Presence of Endangered Species.**
If endangered species are present in the proposed discharge location, there may be wastewater discharge restrictions.

Will the flow be allowed?

- If, yes, then Engineering Alternatives Analysis should proceed
- Complete Guidance is on the NCDEQ website



Possible Alternatives

- Discharge to an existing facility
- Land Application/Spray Irrigation
- Wastewater Reuse
- Direct Discharge to Surface Waters
- Combination of Alternatives



Evaluate the economic feasibility

- Must complete the present value of costs analysis
- Procedures for the required analysis are included in the EAA Guidance document



Spray Irrigation/Non-discharge system

- Not as easy as it seems
- Cannot just discharge untreated wastewater
- Generally must meet the standard conventional parameter limits for direct discharge



Standard Direct Discharge limits

- BOD – 30 mg/L
- TSS – 30 mg/L
- Ammonia – 3 mg/L
- Fecal Coliform – 200/100mL

Permit received

- Time for the Authorization to Construct (ATC)
- Detailed design of treatment facility
- ATC will be required by the State for NPDES or by the POTW for pre-treatment



Conclusion and Summary

- Pollutants move from one phase to another and still must be treated to minimize the impact on the environment



Questions?

Kellie.Hedrick@EPSCCharlotte.com

980-202-2377

