Introduction to Combined Wastestream Formula

ACWA Pretreatment Conference

Silver Spring, Maryland

Presenter:

Jan Pickrel, USEPA

Talking Points

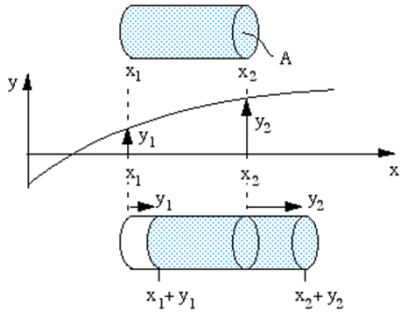
* What is the CWF?

* How to use the CWF:
  * Step 1 – Identify Wastestreams
  * Step 2 – Determine comingled wastestreams
  * Step 3 – Determine flow volumes for each wastestream
  * Step 4 – Determine applicable pollutants

* Example Calculations

Combined Wastestream Formula

* What the CWF?!!



$4x^2 - 1 = 0$

$4x^2 - 1 = 0$

$a=4,\ b=0,\ c=-1$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$= \frac{-0 \pm \sqrt{0^2-4(4)(-1)}}{2(4)}$

$= \frac{\pm\sqrt{16}}{8} = \frac{\pm 4}{8} = \pm\frac{1}{2}$

Solution set $\{-\frac{1}{2}, \frac{1}{2}\}$

What is CWF?

* 40 CFR 403.6(e)
* Alternative categorical pollutant limits for comingled wastestreams
* Prior to treatment
* Applicable categorical pollutants
* CIUs only

Combined Wastestream Formula (CWF) - Definitions

* **Regulated Wastestream** - process wastestream that is regulated by a categorical standard for pollutant 'x'

* **Unregulated Wastestream** – one that is not a regulated wastestream or a dilute wastestream

Combined Wastestream Formula (CWF) - Definitions

* **Dilute Wastestream** - includes the following:
  * Sanitary wastewater – unless stated otherwise in the categorical standard
  * Noncontact cooling water, boiler blowdown – except in certain cases
  * Wastestreams listed in Appendix D to Part 403

What are “Alternative Limits”

* **Derived using CWF**
* **For each regulated pollutant**

Benefits of Using CWF Method

* Combine and monitor different categorical streams
* No need to treat and sample separately
* Encourage treatment of unregulated flow
* Compare categorical standards and local limits
* Treat a combined flow

Waste streams and Calculations

Combined Wastestream Formula (CWF) is used where regulated, unregulated, and/or dilution wastestreams are combined prior to pretreatment.

~~**Flow Weighted Average (FWA)** formula is used when regulated, unregulated, and/or dilution wastestreams combine after pretreatment, but prior to the specified monitoring location.~~

CWF Considerations

* Enforceable as categorical standards
* Established for each regulated pollutant
* May require converting concentration-based standards to mass-based, or vice versa
* Calculated for daily maximum and long-term averages
* Must be greater than analytical detection limit
* Special considerations

Who has to calculate CWF?

* Control Authority/Permit Writer
* IU provides information
* Control Authority may allow IU to perform CWF

What do IUs have to do?

* Provide information – schematics, flows, etc.
* Report changes
  * Production
  * Wastestream(s) flows
  * Wastestream(s) configuration
  * Manufacturing process
  * Pollutant concentrations

What about categorical standards that require zero flow?

* "Zero discharge of process wastewater pollutants"
  * state as condition in permit
* "No discharge allowance for process wastewater pollutants"
  * discharge allowed but considered dilution

STEPS FOR APPLYING CWF TO DEVELOP ALTERNATIVE LIMITS

Step 1: Wastestream(s) Identification

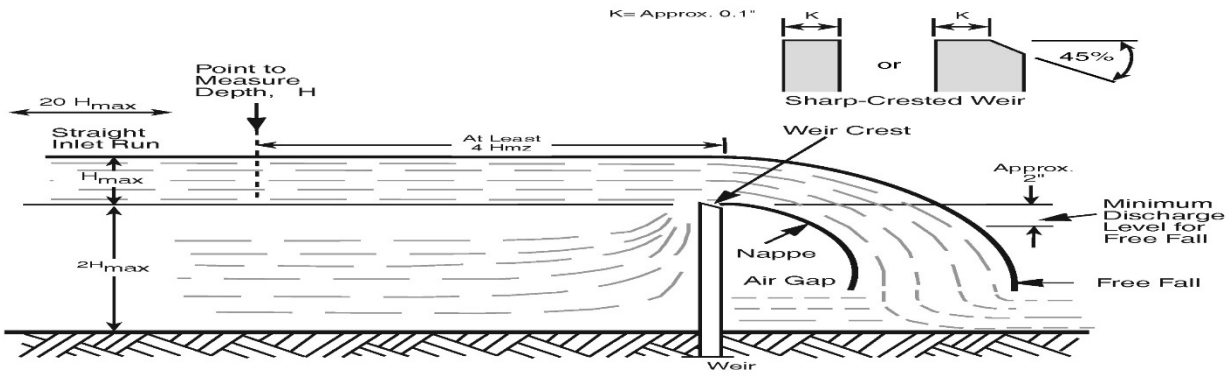
* Regulated, Unregulated, or Dilute
* Types(s) or regulated streams
* Information sources: permit, permit application, visual inspections, etc.

Step 2: Comingling of Wastestreams

* Which wastestreams?
* Where?
* Before treatment?

Step 3: Flow Volumes

* Determine flows for each wastestream
* See EPA's Industrial User Inspection and Sampling manual for POTWs



Step 4: Applicable Pollutants

* The CWF must be applied to every applicable categorical standard
* Local limits must be considered after alternative limits are developed

CWF: Alternative Concentration Limit Formula

$$C_T = \frac{\sum_{i=1}^{N} C_i F_i}{\sum_{i=1}^{N} F_i} \times \left(\frac{F_T - F_D}{F_T} \right)$$

Where:

C_T = Alternative CWF concentration limit

C_i = Categorical pretreatment standard concentration limit for regulated stream "i"

F_i = Average daily flow for regulated stream "i"

F_T = Average daily flow through combined treatment facility (TOTAL)

F_D = Average daily flow of "dilute" streams

Combined Wastestream Formula

$$(\text{Alt concentration limit})_T = \frac{\sum_{i=1}^{N} (\text{CB'd std})_i \times (\text{ave daily flow})_i}{\sum_{i=1}^{N} (\text{ave daily flow})_i} \times \frac{(\text{Ave daily flow})_T - (\text{Ave daily flow})_D}{(\text{Ave daily flow})_T}$$

Where CB'd std = concentration based standard

T = the combined wastestream

i = regulated stream i

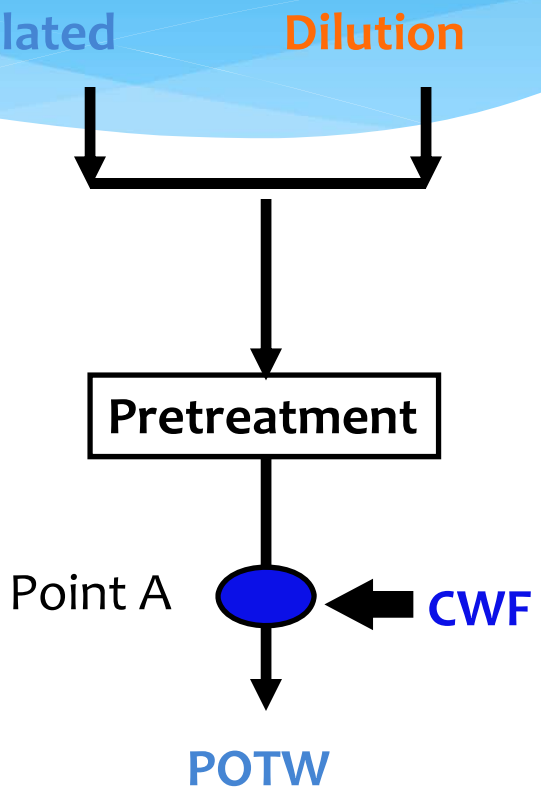
D = dilute wastestream(s)

N = total number of regulated streams

Example of CWF Calculation

Given

* Electroplating:
  * Wastestream Type ….. Regulated
  * Flow …….. 0.02 mgd
  * Daily Max Zn Limit …… 2.61 mg/l
  * Max Monthly Zn Limit .. 1.48 mg/l
* Sanitary Waste:
  * Wastestream Type ….. Dilution
  * Flow …….. 0.003 mgd
  * Daily Max Zn Limit …… N/A
  * Max Monthly Zn Limit .. N/A



Example of CWF Calculation

* **Daily Max Zn_{cwf} =**

$$\frac{2.61\frac{mg}{l} x\ 0.02\ mgd}{(0.02\ mgd)} \text{ x } \frac{(0.02\ mgd + 0.003\ mgd) - 0.003\ mgd}{0.02\ mgd + 0.003\ mgd} = 2.27\ mg/l$$

* **Max Monthly Average Zn_{cwf} =**

$$\frac{1.48\frac{mg}{l} x\ 0.02\ mgd}{(0.02\ mg)} \text{ x } \frac{(0.02\ mgd + 0.003\ mgd) - 0.003\ mgd}{0.02\ mgd + 0.003\ mgd} = 1.29\ mg/l$$

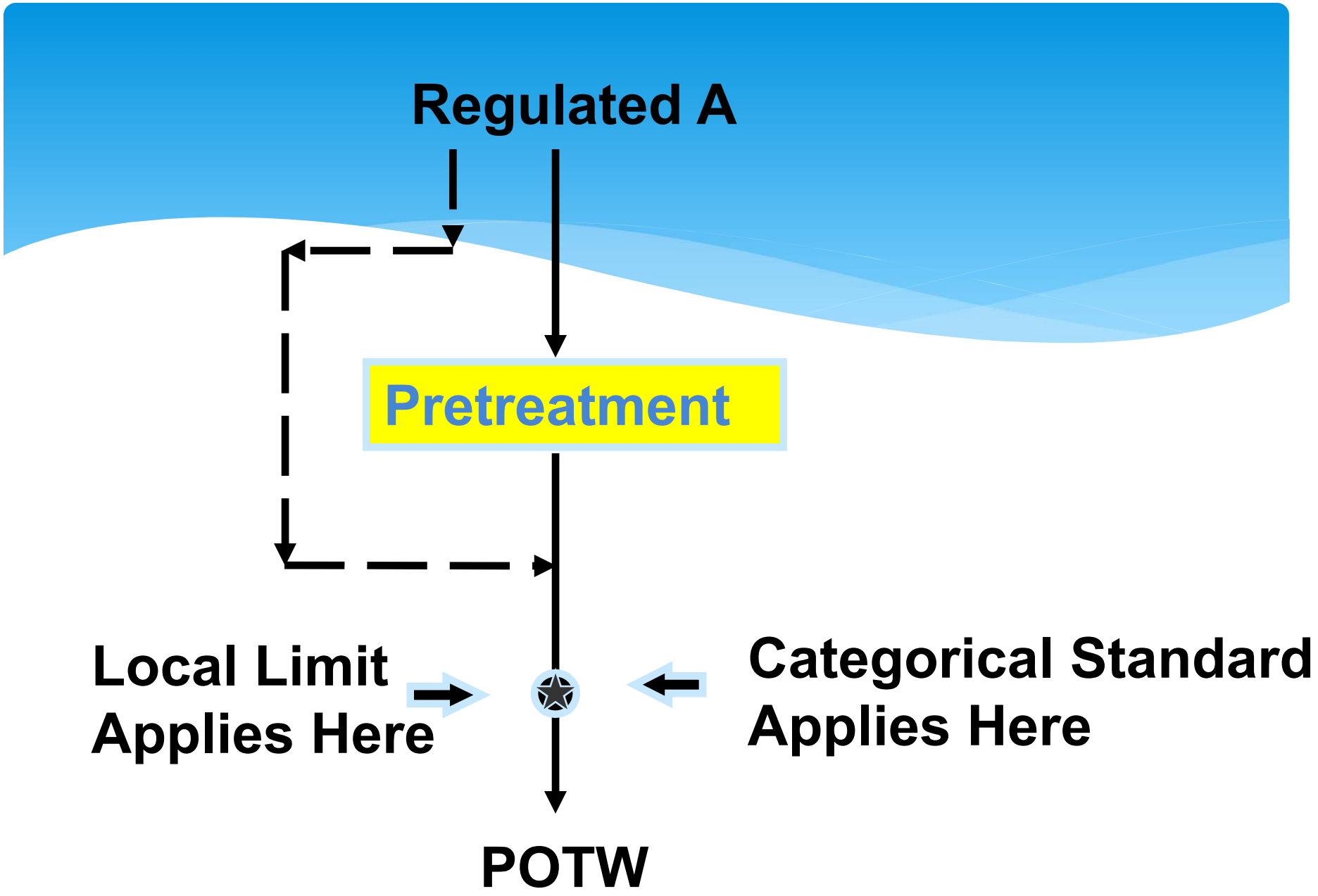
Example of CWF Calculation

- **Daily Max Zn_{cwf} =**

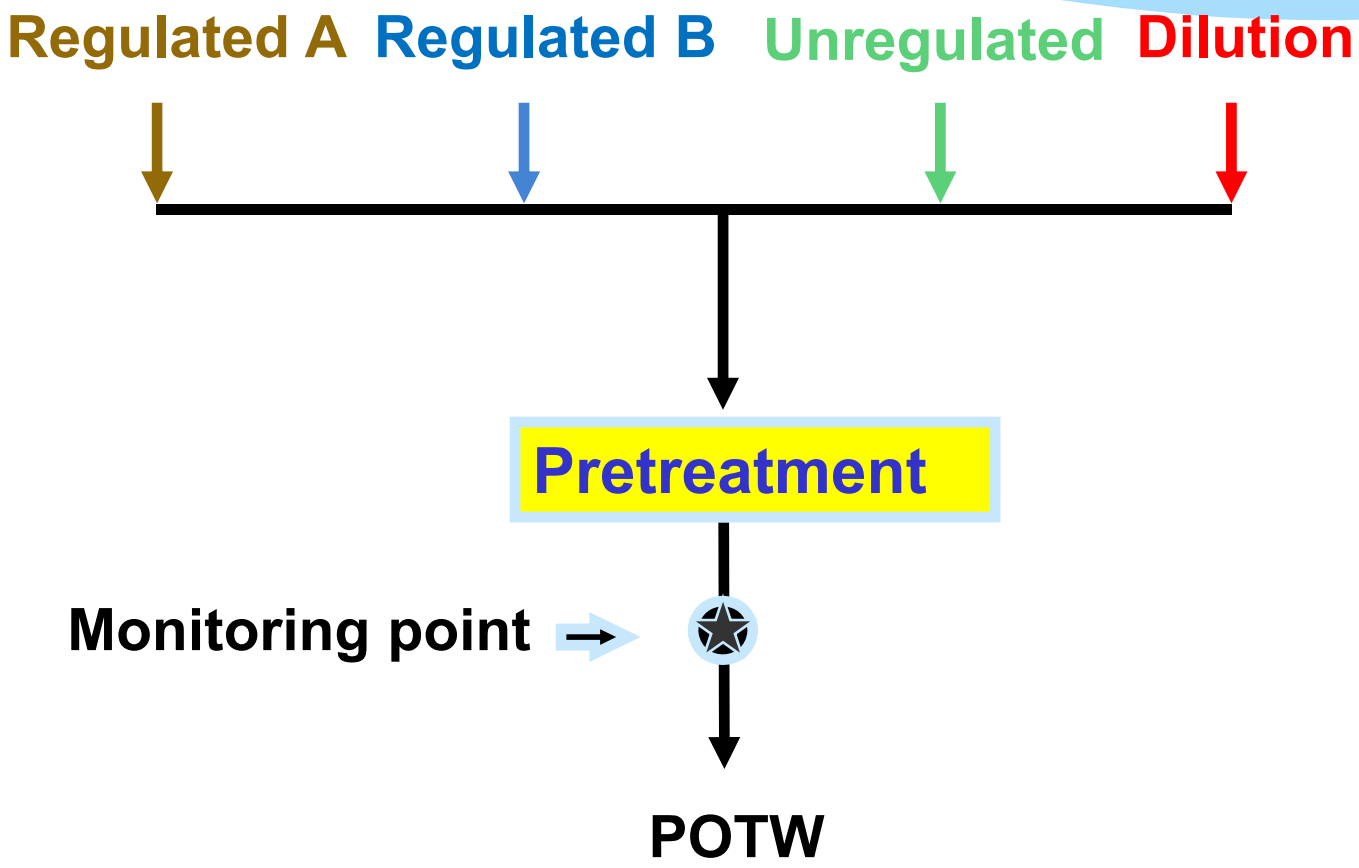
$$\frac{2.61\ \text{mg/l} \times 0.02\ \text{mgd}}{(0.02 + 0.003)\ \text{mgd}} = 2.27\ \text{mg/l}$$

- **Max Monthly Ave Zn_{cwf} =**

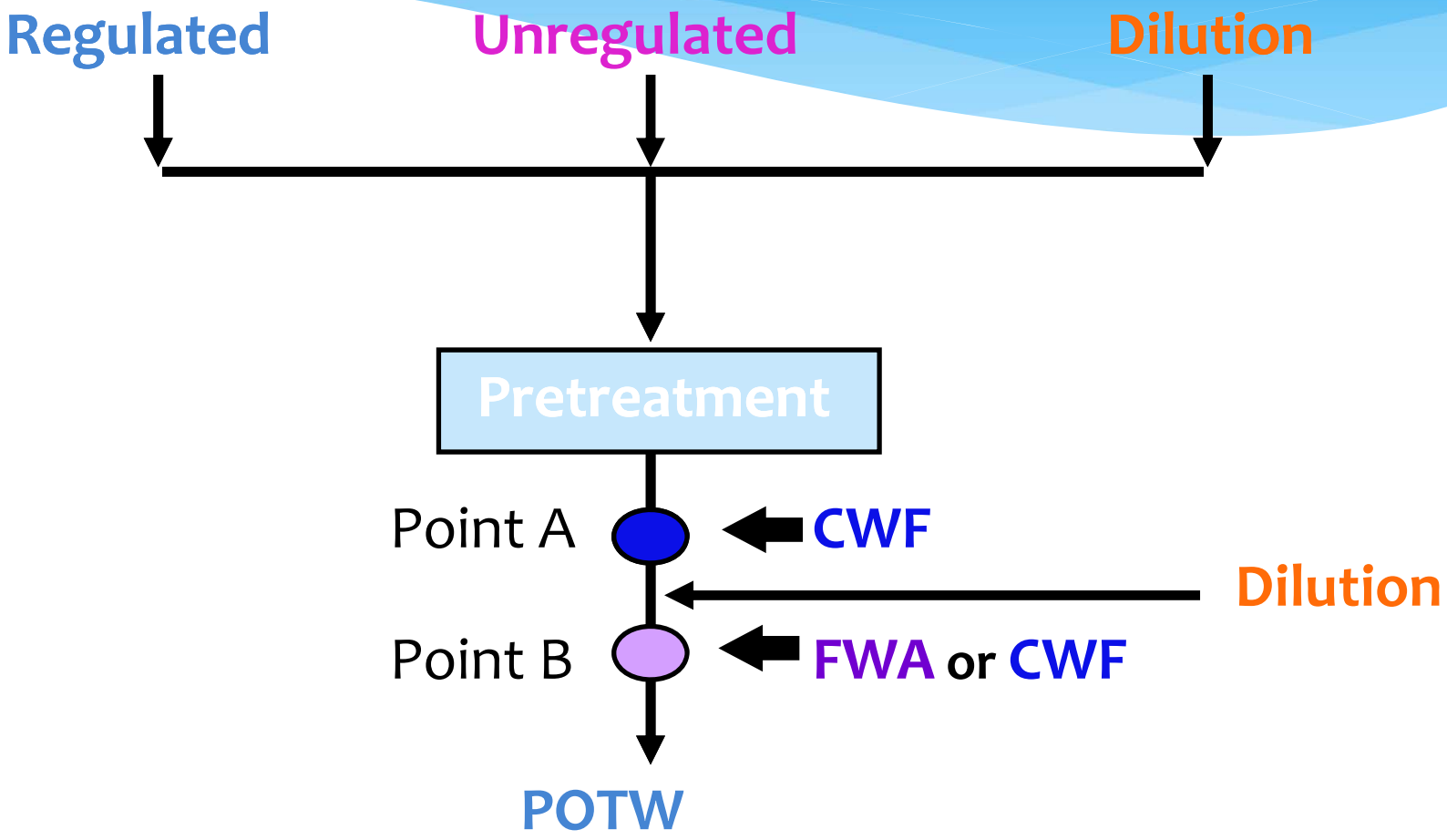
$$\frac{1.48\ \text{mg/l} \times 0.02\ \text{mgd}}{(0.02 + 0.003)\ \text{mgd}} = 1.29\ \text{mg/l}$$


Regulated A
Pretreatment
Local Limit
Applies Here
Categorical Standard
Applies Here
POTW

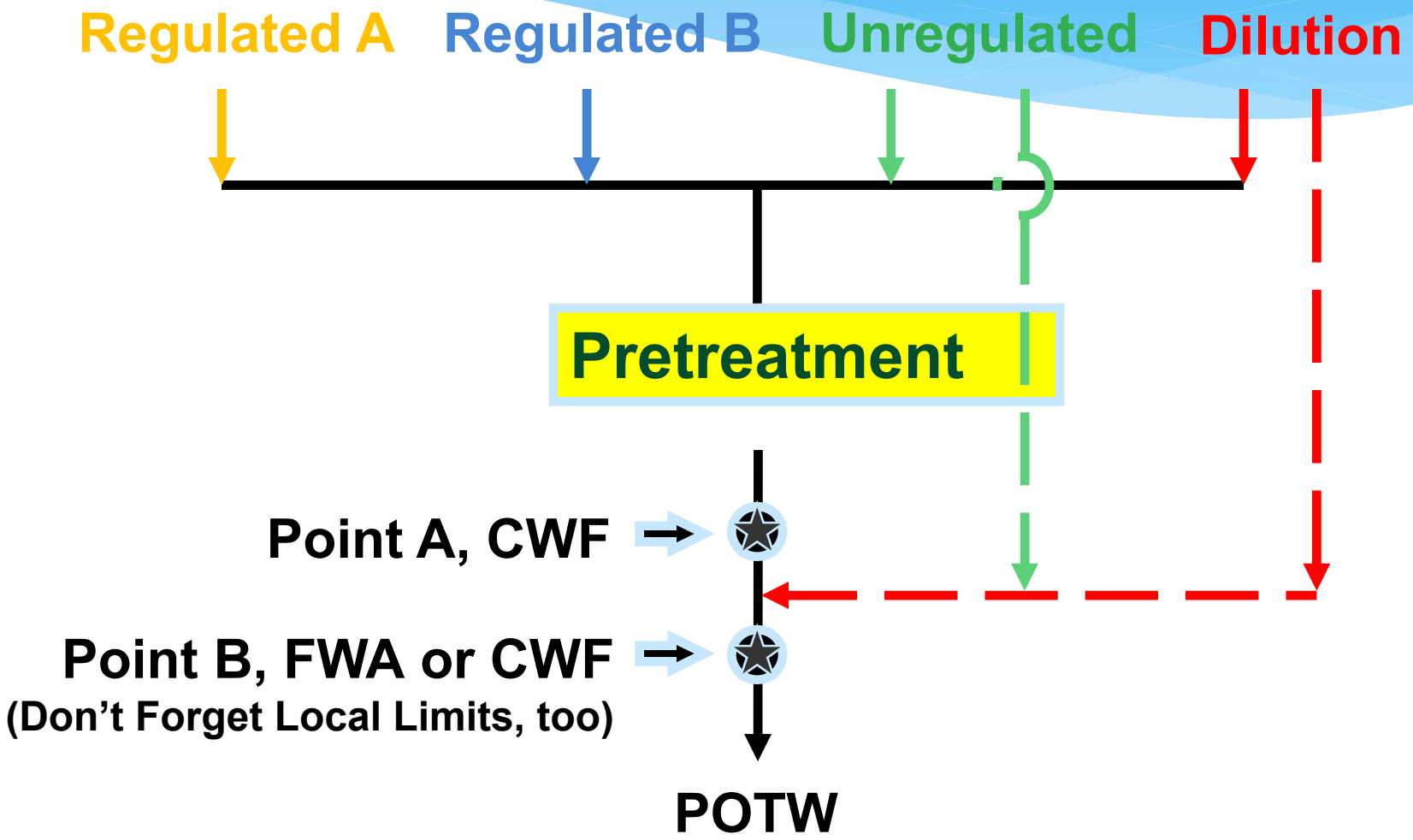
Combined Wastestream Formula (CWF)



CWF vs. FWA


Regulated
Unregulated
Dilution
Pretreatment
Point A
CWF
Dilution
Point B
FWA or CWF
POTW

CWF vs. FWA


Regulated A
Regulated B
Unregulated
Dilution
Pretreatment
Point A, CWF
Point B, FWA or CWF
(Don't Forget Local Limits, too)
POTW

Category	Wastestream Type	Average Flow(MGD)	Daily Max. Zn limit(mg/l)	Max. Monthly Avg. Zn limit(mg/
Metal Finishing	Regulated	0.025	2.61	1.48
Porcelain Enameling (Subpart A)	Regulated	0.020	1.33	0.56
Facility washdown	Unregulated	0.0005	full credit	full credit
Cooling tower bleedoff	Dilution	0.0003	N/A	N/A

CWF limit calculations

$$\text{Daily Maximum Zn}_{CWF} = \frac{(2.61\ \text{mg/l} * 0.025\ \text{MGD}) + (1.33\ \text{mg/l} * 0.02\ \text{MGD})}{(0.025\ \text{MGD} + 0.02\ \text{MGD})} \times \frac{(0.025 + 0.02 + 0.0005)\ \text{MGD}}{(0.025 + 0.02 + 0.0005 + 0.0003)\ \text{MGD}} = 2.03\ \text{mg/l}$$

$$\text{Maximum Monthly Average Zn}_{CWF} = \frac{(1.48\ \text{mg/l} * 0.025\ \text{MGD}) + (0.56\ \text{mg/l} * 0.02\ \text{MGD})}{(0.025\ \text{MGD} + 0.02\ \text{MGD})} \times \frac{(0.025 + 0.02 + 0.0005)\ \text{MGD}}{(0.025 + 0.02 + 0.0005 + 0.0003)\ \text{MGD}} = 1.06\ \text{mg/l}$$

CWF: Alternative Mass Limit Formula

$$M_T = \sum_{i=1}^{N} M_i \times \left(\frac{(F_T - F_D)}{\sum_{i=1}^{N} F_i} \right)$$

Where:

- M_T = Alternative CWF mass limit
- M_i = Categorical mass limit for regulated stream "i" multiplied by appropriate measure of production
- F_i = Average daily flow for regulated stream "i"
- F_T = Average daily flow through combined treatment facility (TOTAL)
- F_D = Average daily flow of "dilute" streams

Category	Wastestream Type	Average Flow(MGD)	Daily Max. Cu Equivalent Mass Limit (lbs/day)	Maximum Monthly Avg. Cu Equivalent Mass Limit (lbs/day)
Copper Forming	Regulated	0.10	2.0	1.0
Facility washdown	Unregulated	0.01	full credit	full credit
Boiler blowdown	Dilution	0.0003	N/A	N/A

CWF limit calculations

$$\text{Daily Maximum Cu}_{CWF} = 2.0 \text{ lbs/day} * \frac{(0.10 + 0.01 + .0003) \text{ MGD} - (0.0003)}{0.10 \text{ MGD}} = \underline{2.2 \text{ lbs/day}}$$

$$\text{Maximum Monthly Average Cu}_{CWF} = 1.0 \text{ lbs/day} * \frac{(0.10 + 0.01) \text{ MGD}}{0.10 \text{ MGD}} = \underline{1.1 \text{ lbs/day}}$$

FWA, Adjusted Mass Limit:

Pretreatment effluent mass limit (CWF adjusted where necessary) + Actual mass of pollutant in nonregulated wastestream(s) added after pretreatment

FWA, Adjusted Concentration Limits:

$$\frac{\left(\text{Pretreatment effluent concentration limit (CWF adjusted where necessary)} \times \text{Flow at pretreatment effluent}\right) + \text{Actual mass of pollutant in nonregulated wastestream(s) added after pretreatment}}{\text{Flow at monitoring location}}$$

Apply when "unregulated" wastestreams are combined after pretreatment

YM4

Additional Examples
("hands on")

Slide 32

YM4 Will there be a hands on exercise? If not, add the problem description to this presentation. If hands-on, the problem description is included as part of a seperate hand-out.
Yatasha Moore, 04/10/2018

Problem CWF - 1 SOLUTION

- **Job Shop (Electroplater) - Discharging < 10,000 gpd <u>process</u> wastewater.**
- **Use "concentration" CWF - (limits in mg/l)**

$$C_T = \frac{\sum_{i=1}^{N} C_i F_i}{\sum_{i=1}^{N} F_i} \times \frac{F_T - F_D}{F_T}$$

- **Since there's only one "regulated" wastestream, simplify CWF to:**

$$C_T = C_i \times \frac{F_T - F_D}{F_T}$$

Problem CWF - 1 -- SOLUTION (continued)

- **Apply the "CWF Factor" to all of the regulated pollutants**

$$C_T = C_i \times 0.67$$

- **Table E6-4 ADJUSTED**

Pollutant	Daily Max (mg/l)	-Day Average (mg/l)
Cadmium	0.80	0.47
Lead	0.40	0.27
Cyanide, A	3.35	1.81
TTO	3.06	---

Problem CWF - 1 -- SOLUTION (continued)

- **Applicable "Limit" is the most stringent:**

Pollutant	Alternate PSES (mg/l)		Local Lim. (mg/l)	Permit Limit (mg/l)	
	Daily Max	4-Day Ave	Daily Max	Daily Max	4-Day Ave
Cadmium	0.80	0.47	0.45	0.45	0.47
Chromium	No Limit	No Limit	2.50	2.50	No Limit
Copper	No Limit	No Limit	2.05	2.05	No Limit
Lead	0.40	0.27	0.50	0.40	0.27
Nickel	No Limit	No Limit	4.00	4.00	No Limit
Silver	No Limit	No Limit	1.65	1.65	No Limit
Zinc	No Limit	No Limit	2.50	2.50	No Limit
Cyan. T	No Limit	No Limit	1.00	1.00	No Limit
Cyan. A	3.3	1.8	No Limit	3.3	1.8
TTO	3.05	No Limit	No Limit	3.05	No Limit

Problem CWF – 2-- SOLUTION

- **Determine "regulated", "un-regulated" and "dilute" wastestreams**
- **Regulated: 10,000 gpd electronic components, 7,000 gpd metal finishing**
- **Dilute: 2,000 non-contact cooling (prior to pretreatment), 1,000 gpd domestic (after pretreatment)**
- **Un-regulated: 5,000 gpd boiler blowdown (after pretreatment)**
- **For all pollutants, the CWF is used to determine limits at Point B**

$$Zn_{cwfB} = \frac{(Zn_{ec\ X}\ F_{ec}) + (Zn_{mf\ X}\ F_{mf})}{F_{ec} + F_{mf}} \times \frac{F_B - F_{dB}}{F_B}$$

Problem CWF – 2-- SOLUTION

- **Determine "regulated", "un-regulated" and "dilute" wastestreams**
- **Regulated: 10,000 gpd electronic components, 7,000 gpd metal finishing**
- **Dilute: 2,000 non-contact cooling (prior to pretreatment), 1,000 gpd domestic (after pretreatment)**
- **Un-regulated: 5,000 gpd boiler blowdown (after pretreatment)**
- **For all pollutants EXCEPT Zinc, the CWF is used to determine limits at Point B (since boiler blowdown is un-regulated for Zn)**
- **For Zn, CWF-adjusted limits at Point B and CWF-adjusted limits at Point A and further adjusted by FWA at Point B are calculated.**
- **MOST STRINGENT APPLIES FOR Zinc**

$$Zn_{cwfB} = \frac{(Zn_{ec\ X}\ F_{ec}) + (Zn_{mf\ X}\ F_{mf})}{F_{ec} + F_{mf}} \times \frac{F_B - F_{dB}}{F_B}$$

Problem CWF – 2 -- SOLUTION (continued)

- **For Zn - Daily Maximum at Point B:**

$$Zn_{cwfB} = \frac{(1.38\ mg/l \times 10{,}000) + (2.61 \times 7{,}000)}{10{,}000 + 7{,}000} \times \frac{(7{,}000 + 10{,}000 + 2{,}000 + 1{,}000 + 5{,}000) - (2{,}000 + 1{,}000)}{(7{,}000 + 10{,}000 + 2{,}000 + 1{,}000 + 5{,}000}$$

NOTE - Boiler Blowdown <u>not</u> in "dilute" quantity

$$Zn_{cwfB} = 1.66\ mg/l$$

Problem CWF – 2 -- SOLUTION (continued)

- **Next, Zn - Daily Maximum at Point A:**

$$Zn_{cwfA} = \frac{(Zn_{ec\ X}\ F_{ec}) + (Zn_{mf\ X}\ F_{mf})}{F_{ec} + F_{mf}} \times \frac{F_A - F_{dA}}{F_A}$$

$$Zn_{cwfA} = \frac{(1.38\ \text{mg/l}\ \text{X}\ 10{,}000) + (2.61\ \text{X}\ 7{,}000)}{10{,}000 + 7{,}000} \times \frac{(7{,}000 + 10{,}000 + 2{,}000) - (2{,}000)}{(7{,}000 + 10{,}000 + 2{,}000)}$$

$$Zn_{cwfA} = \textit{1.69 mg/l}$$

Problem CWF – 2 -- SOLUTION (continued)

- **Next, Zn - Daily Maximum at Point B Using FWA:**

$$Zn_{fwaB} = \frac{(Zn_A \times F_A) + (Zn_{ur} \times F_{ur}) + (Zn_d \times F_d)}{F_B}$$

$$Zn_{fwaB} = \frac{(1.69 \text{ mg/l} \times 19{,}000) + (4.0 \times 5{,}000) + (0 \times 1{,}000)}{19{,}000 + 5{,}000 + 1{,}000}$$

$$Zn_{fwaB} = 2.08 \text{ mg/l}$$

Problem CWF – 2 -- SOLUTION (continued)

Pollutant	Point A		Local Limit	Permit Limit (mg/l)	
	Daily Max	4-Day Average	Daily Max	Daily Max	4-Day Average
Cadmium	0.29	0.11	0.45	0.29	0.11
Chromium	1.36	0.79	2.50	1.36	0.79
Copper	0.02	1.85	2.05	2.05	1.85
Lead	0.84	0.37	0.50	0.50	0.37
Nickel	3.56	2.13	4.00	3.56	2.13
Silver	0.38	0.21	1.65	0.38	0.16
Zinc	1.69	0.84	2.50	1.66	0.84
Cyanide, T	1.07	0.58	1.00	1.07	0.58
Cyanide, A	0.77	0.29	No Lim.	0.77	0.29
TTO	1.62	No Lim.	No Lim.	1.62	No Lim.
Fluoride	31.3	16.1	No Lim.	31.3	16.1

YM3

Problem CWF – 2 -- SOLUTION (continued)

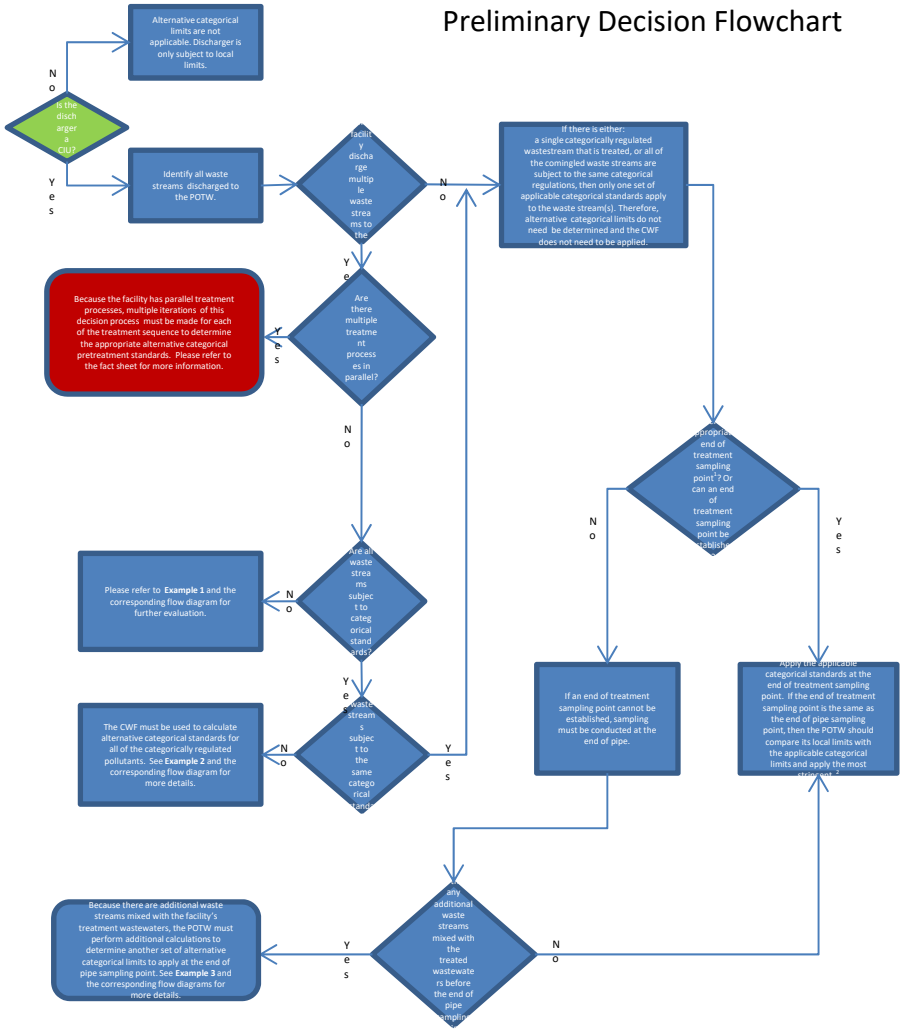
Pollutant	Point A		Point B		Loc. Lim.	Permit Limit (mg/l)	
	D. Max	4-D Ave	D. Max	4-D Ave.	Daily Max	Daily Max.	4-Day Ave
Cadmium	0.29	0.11	0.21	0.08	0.45	0.21	0.08
Chromium	1.36	0.79	1.04	0.60	2.50	1.04	0.60
Copper	.02	1.85	2.30	1.41	2.05	2.05	1.41
Lead	0.84	0.37	0.64	0.28	0.50	0.50	0.28
Nickel	3.56	2.13	2.71	1.62	4.00	2.71	1.62
Silver	0.38	0.21	0.29	0.16	1.65	0.29	0.16
Zinc	1.69	0.84	1.66	0.83	2.50	1.66	0.83
Cyan. T	1.07	0.58	0.82	0.44	1.00	0.82	0.44
Cyan. A	0.77	0.29	0.58	0.22	No Lim.	0.58	0.22
TTO	1.62	No Lim.	1.23	No Lim.	No Lim.	1.23	No Lim.
Fluoride	31.3	16.1	23.8	12.2	No Lim.	23.8	12.2

Slide 42

YM3 Hiding this slide because it includes a reference to cacluations using FWA. Added a version of this slide that does not include FWA (Point B).

Yatasha Moore, 04/09/2018

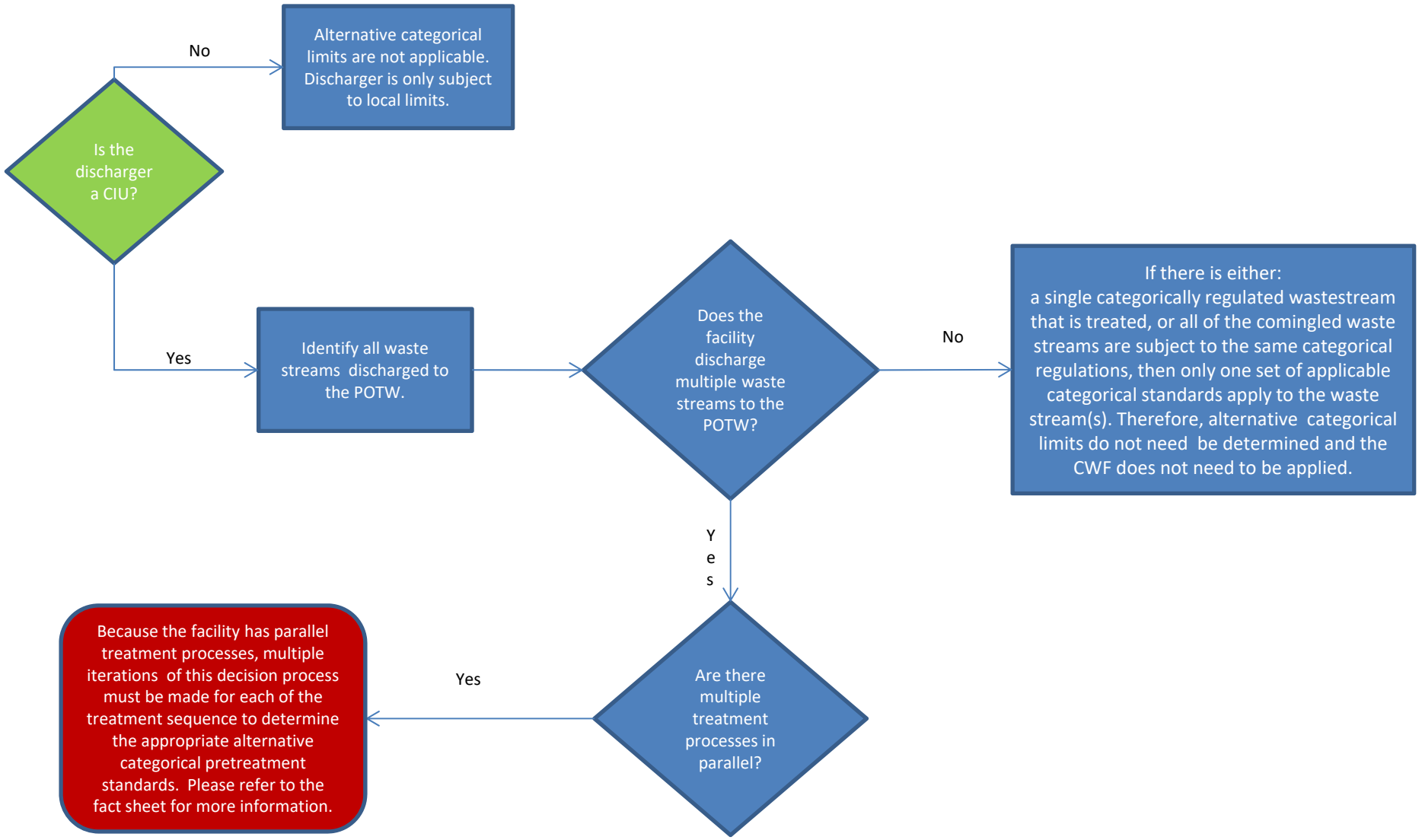
Preliminary Decision Flowchart



1. For this scenario, end of treatment sampling point is the same as the end of process sampling point because the facility is subject to only one categorical standards, and all of the categorical process wastewater is treated through one treatment process.
2. If there are no other wastestreams comingled with the treated wastewater between the end of treatment sampling point and the facility's connect to the POTW's sewers, the end of treatment sampling point is the same as an end of pipe sampling point. Because this sampling point is also considered the end of pipe sampling point, the POTW must compare its local limits with the applicable categorical standards and apply the most stringent limit.

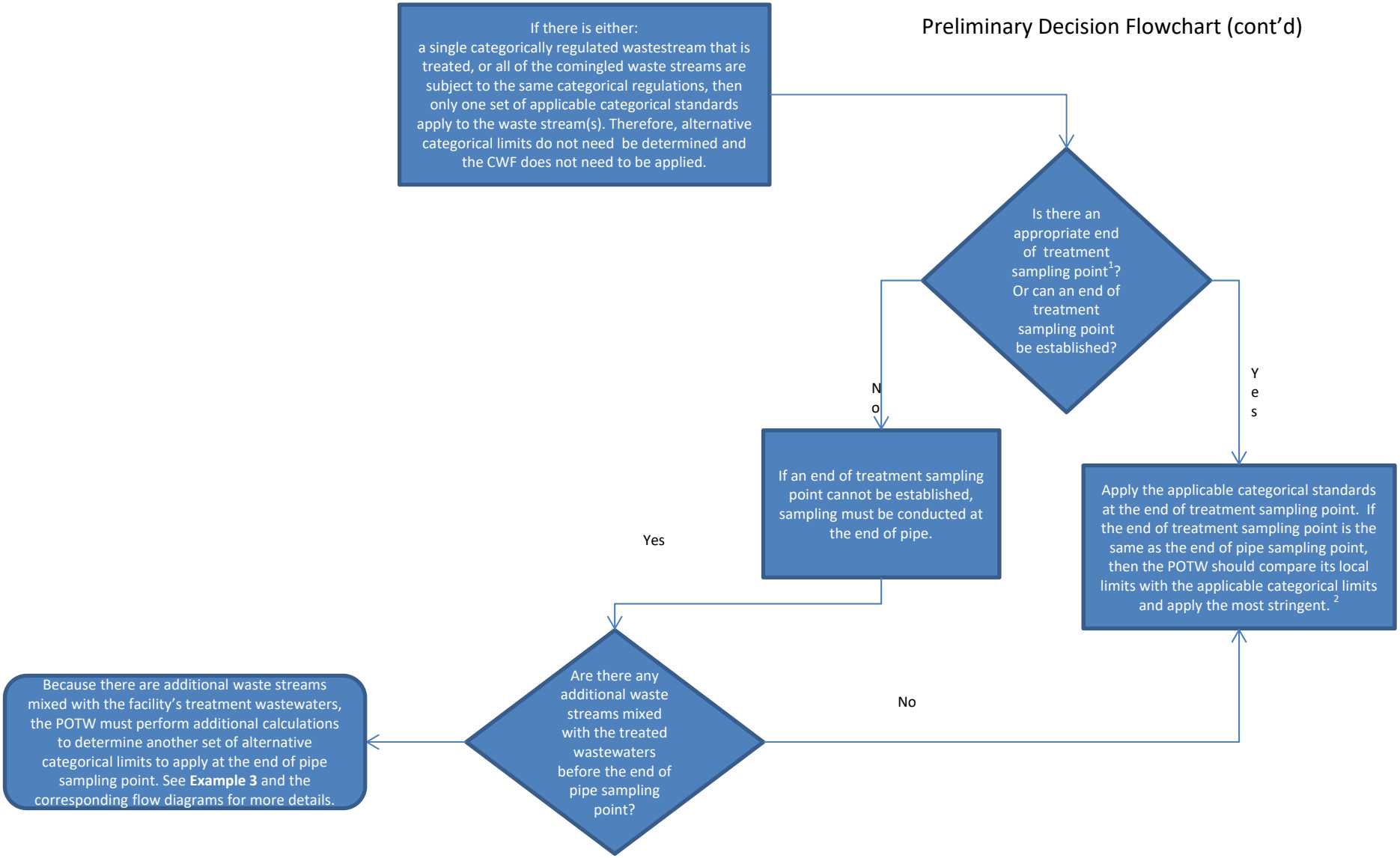
Use this flowchart in the preliminary decision making process. **Assumption that the IU has treatment in place. Flowcharts cannot be used if no treatment is provided.

Preliminary Decision Flowchart



Use this flowchart in the preliminary decision making process.
**Assumption that the IU has treatment in place. Flowcharts cannot be used if no treatment is provided.

Preliminary Decision Flowchart (cont'd)



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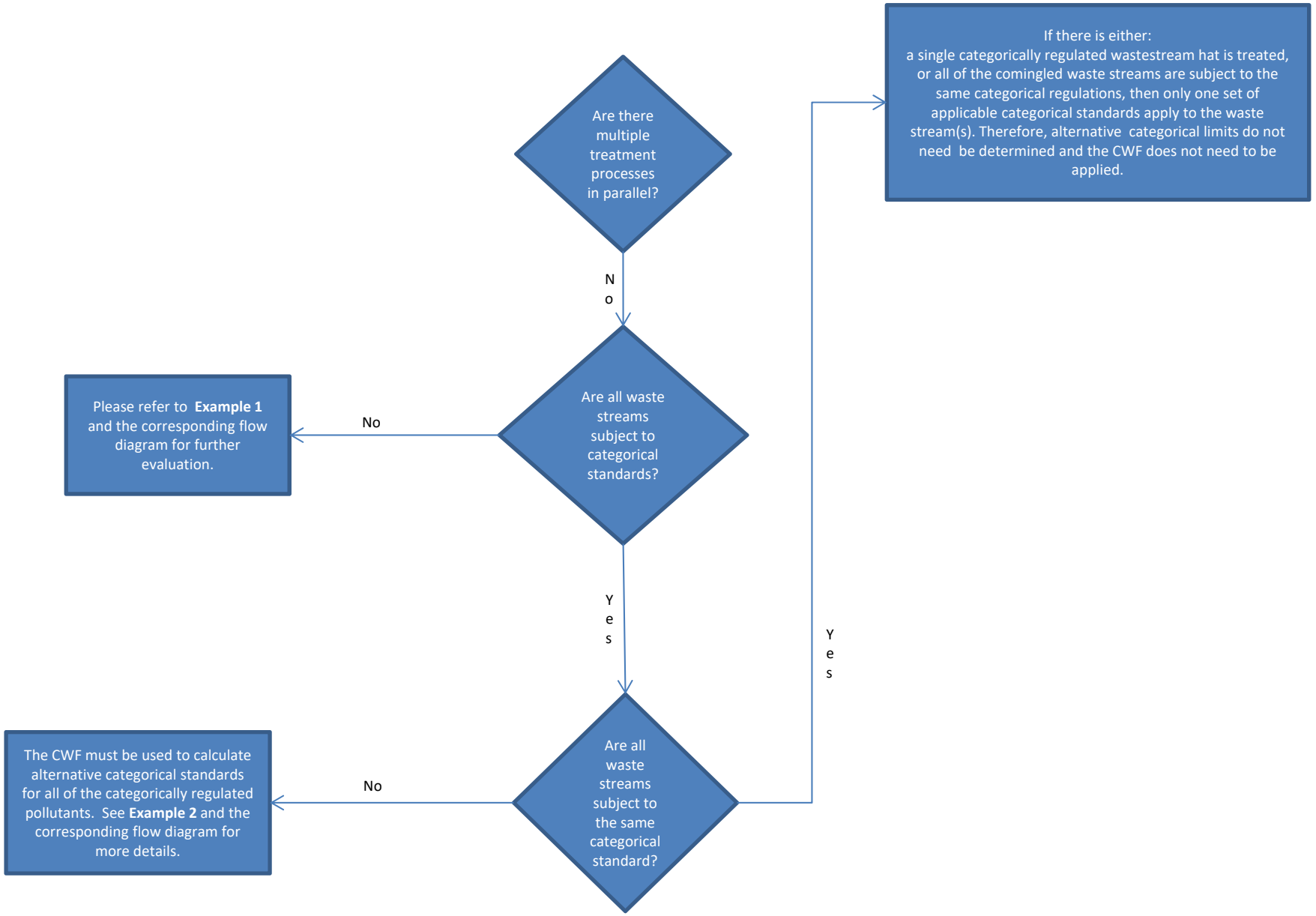
Preliminary Decision Flowchart (cont'd)



Preliminary Decision Process

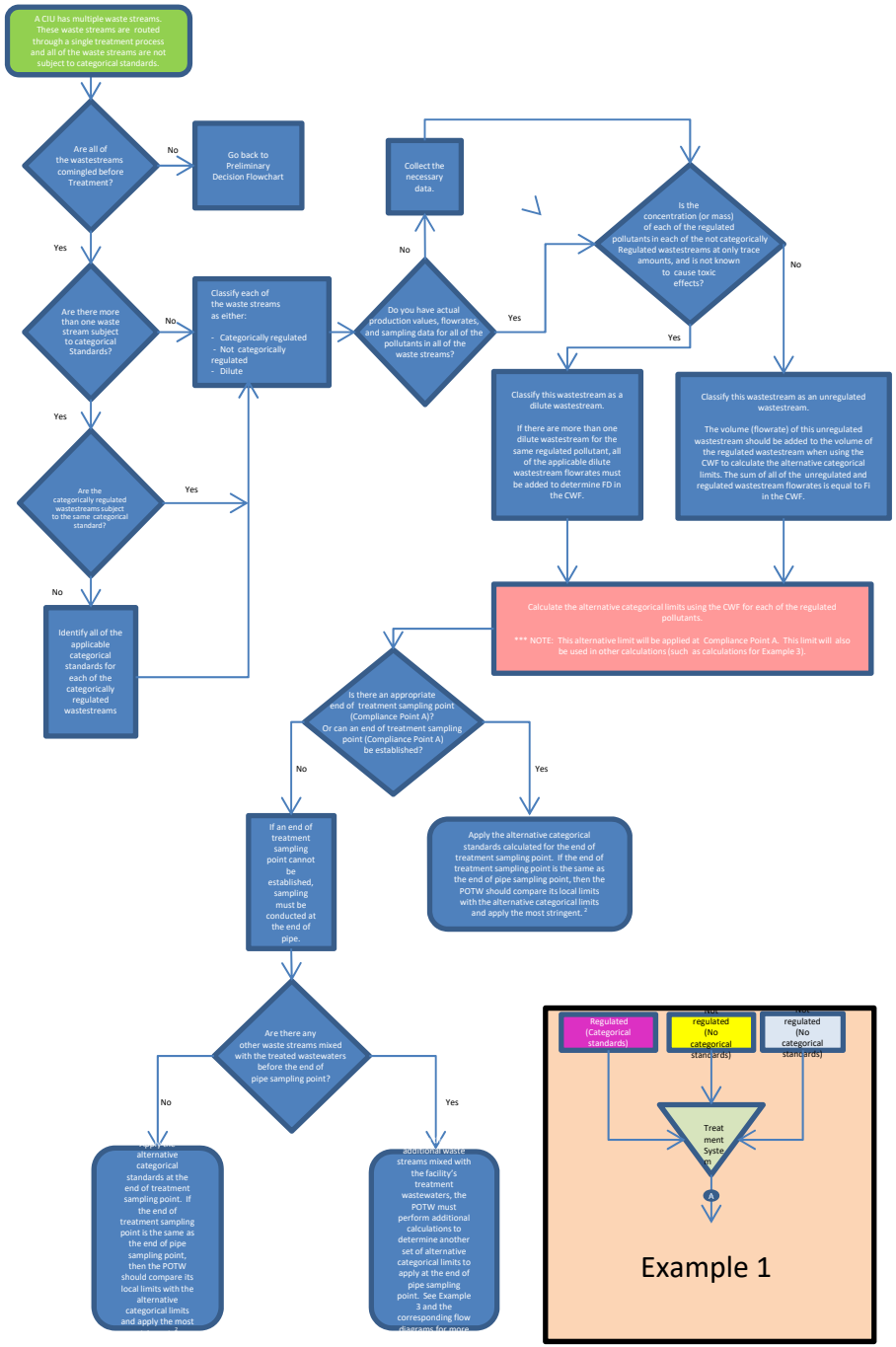
1. Is the discharger a CIU? (If not, alternative categorical limits are not applicable and discharger is only subject to local limits.)
2. If the discharger is a CIU, identify all waste streams discharged to the POTW.
3. Does the facility discharge multiple waste streams to the POTW? (If no, go to step 4. If yes, go to step 10.)

4. If there is either: a single categorically regulated wastestream that is treated, or all of the comingled waste streams are subject to the same categorical regulations, then only one set of applicable categorical standards apply to the waste stream(s). Therefore, alternative categorical limits do not need to be determined and the CWF does not need to be applied.
5. Is there an appropriate end of treatment sampling point or can one be established? (If yes, go to step 6. If no, go to step 7.)
6. Apply the applicable categorical standards at the end of treatment sampling point. If the end of treatment sampling point is the same the end of pipe sampling point, then the POTW should apply the more stringent of the categorical standards and the local limits.

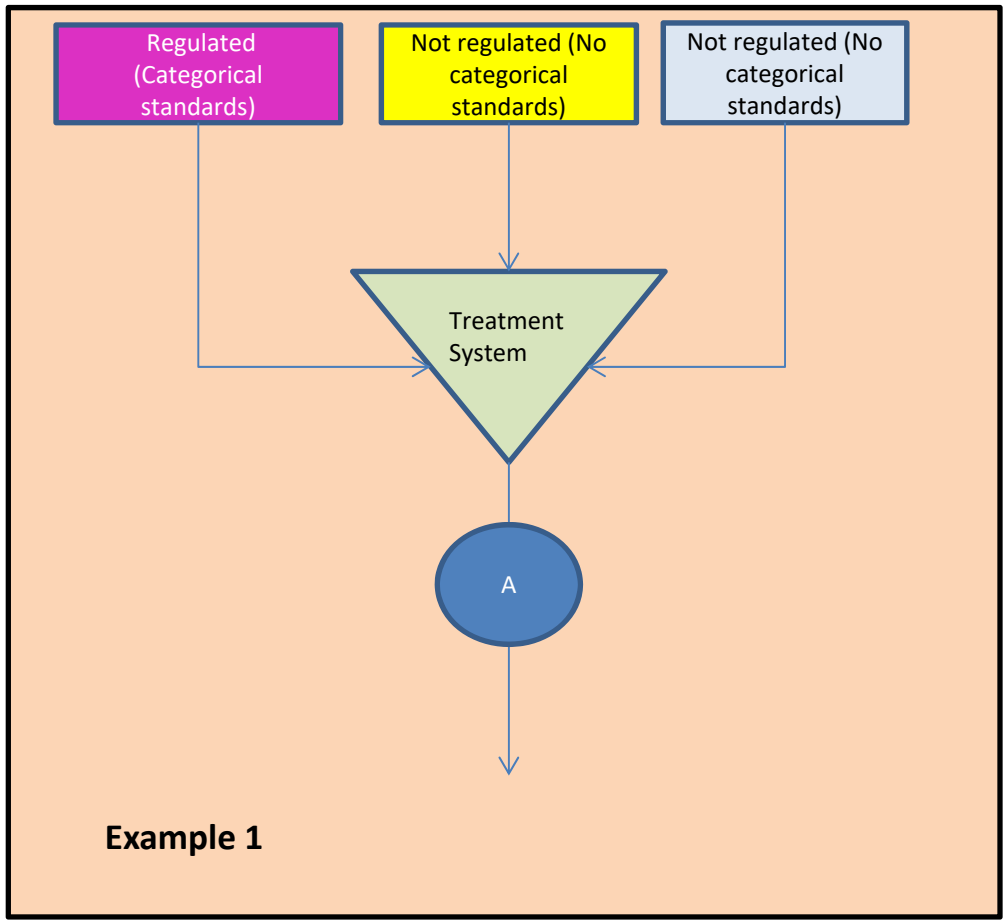
7. If an end of treatment sampling point cannot be established, sampling must be conducted at the end of pipe.
8. Are there any additional waste streams mixed with the treated wastewaters before the end of pipe sampling point? (If no, return to step 6. If yes, proceed to step 9.)
9. Because there are additional waste streams mixed with the facility's treatment wastewaters, the POTW must perform additional calculations to determine another set of alternative categorical limits to apply at the end of pipe sampling point. See Example 3 and the corresponding flow diagrams for more details.

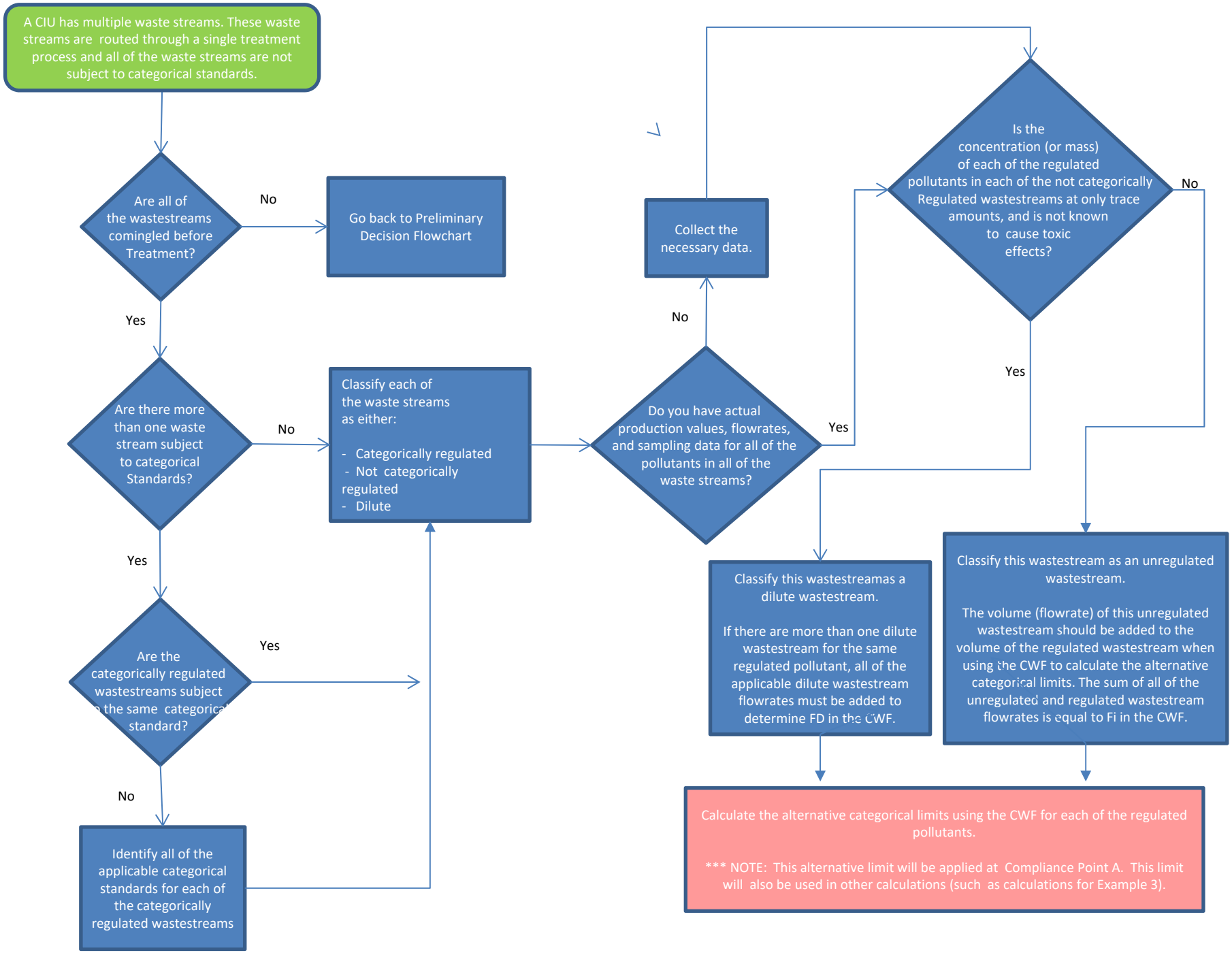
10. Are there multiple treatment processes in parallel? (If yes, proceed to step 11. If no, proceed to step 12.)
11. Because the facility has parallel treatment processes, multiple iterations of this decision process must be made for each of the treatment sequences to determine the appropriate alternative categorical pretreatment standards. Please refer to the fact sheet for more information.
12. Are all waste streams subject to categorical standards? (If no, proceed to step 13. If yes, proceed to step 14.)
13. Please refer to Example 1 and the corresponding flow diagram for further evaluation.

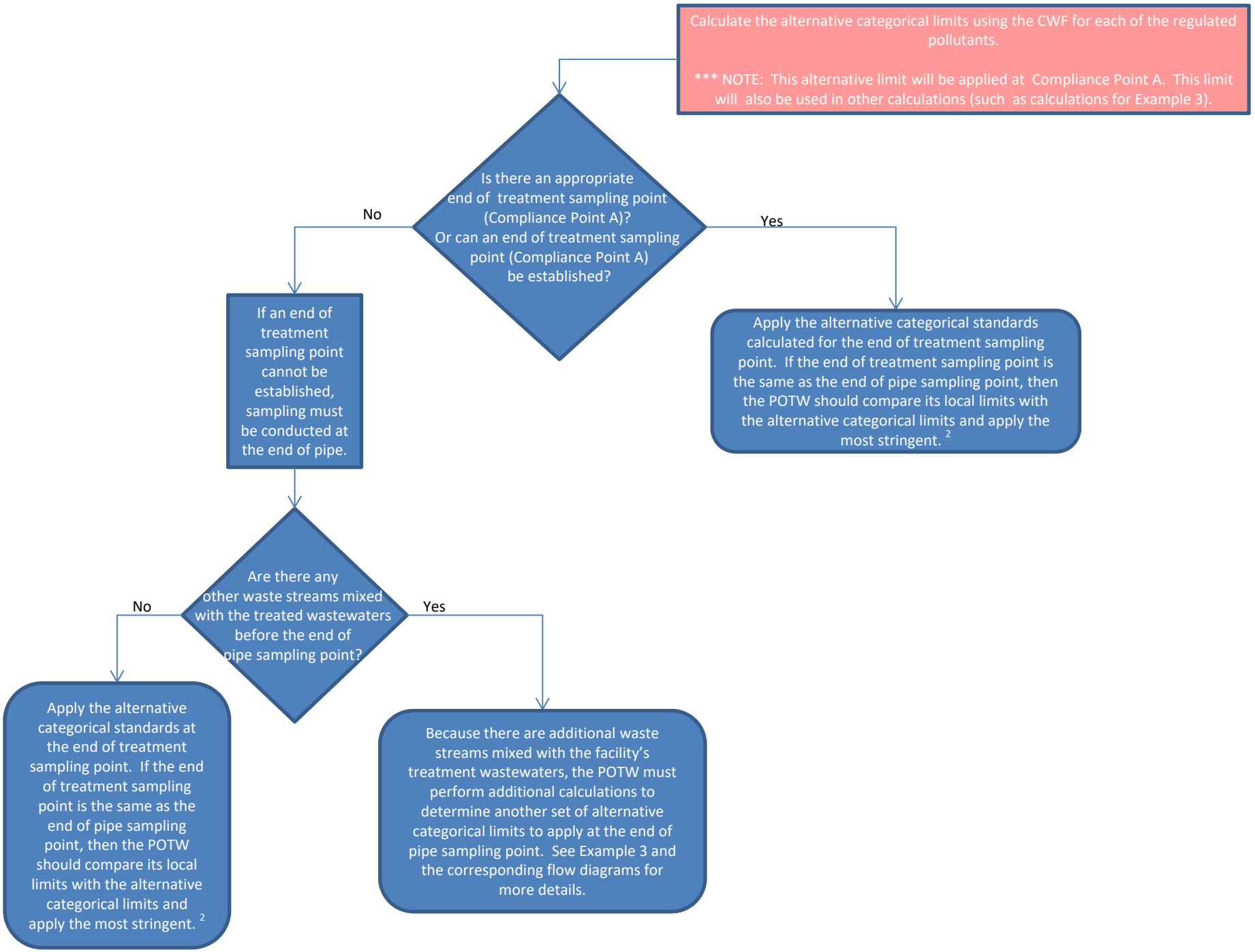
14. Are all waste streams subject to the same categorical standard? (If yes, return to step 4. If no, proceed to step 15.)
15. The CWF must be used to calculate alternative categorical standards for all of the categorically regulated pollutants. See Example 2 and the corresponding flow diagram for more details.

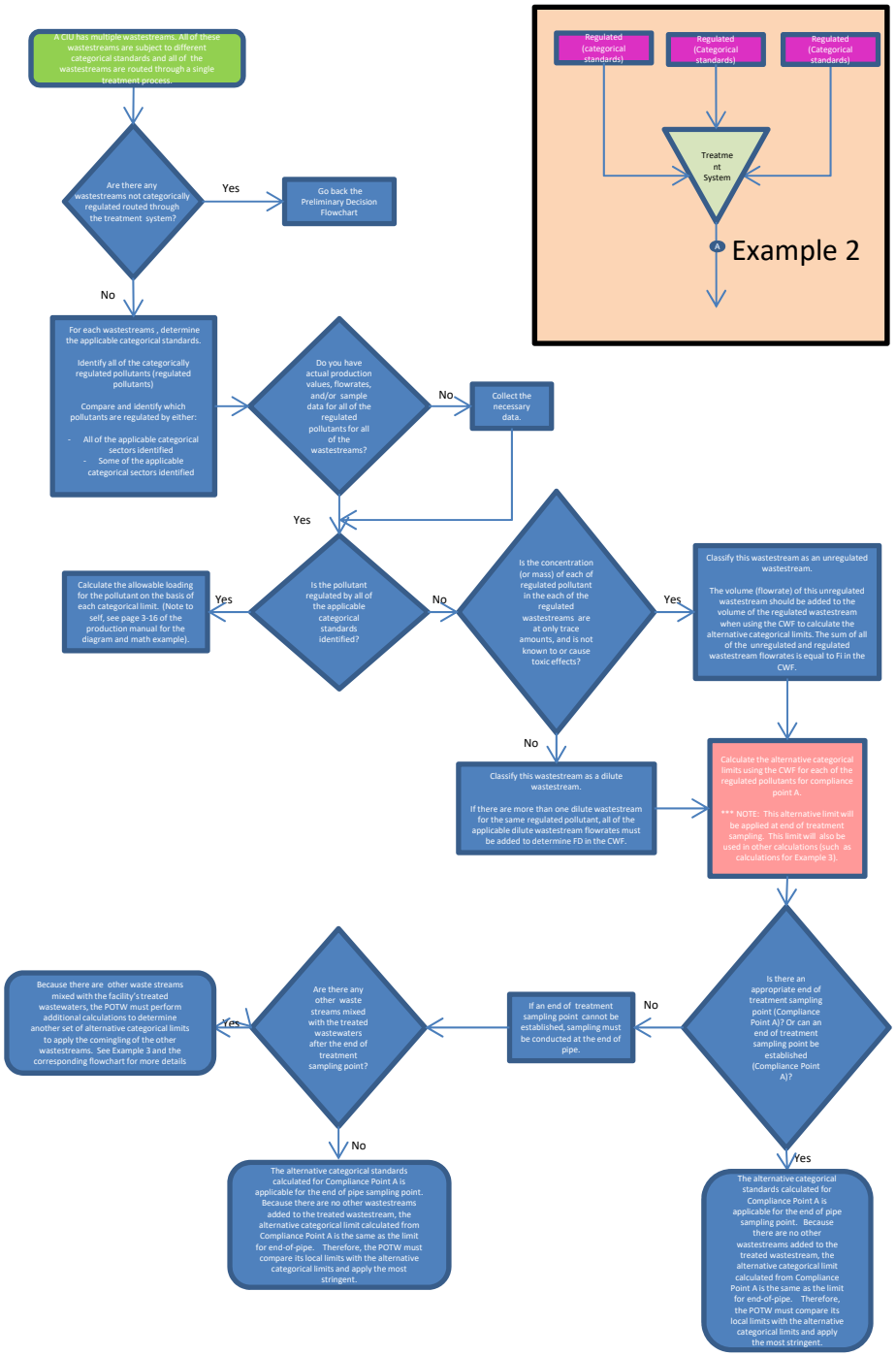


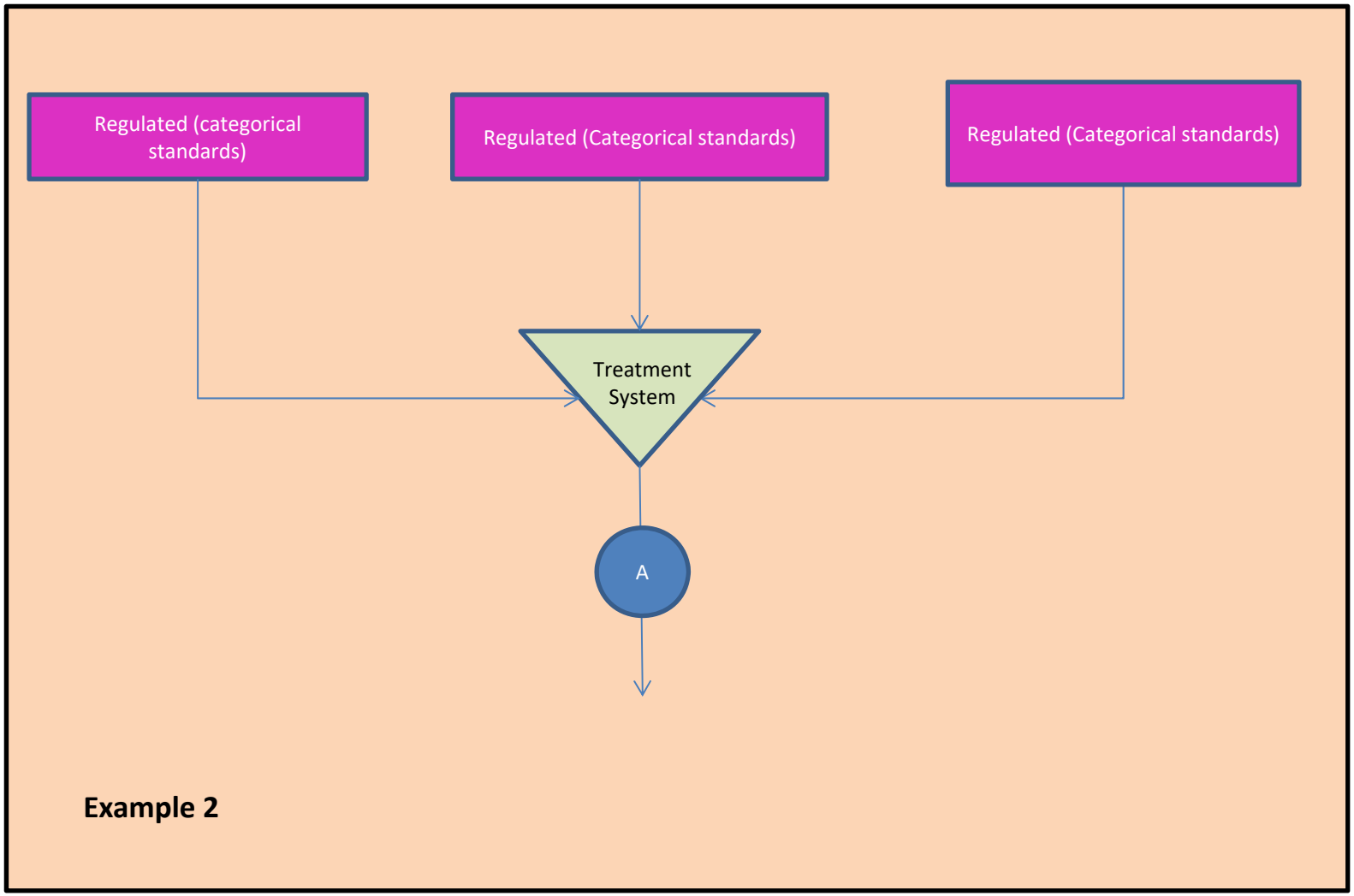
Footnote 2 would be discussions of more stringent limit. 40 CFR 403.8(f)(1)(ii). When there are more than one set of limits applicable at one sampling point, the application of the most stringent limit would ensure compliance with all applicable limits.


Regulated (Categorical standards)
Not regulated (No categorical standards)
Not regulated (No categorical standards)
Treatment System
A
Example 1

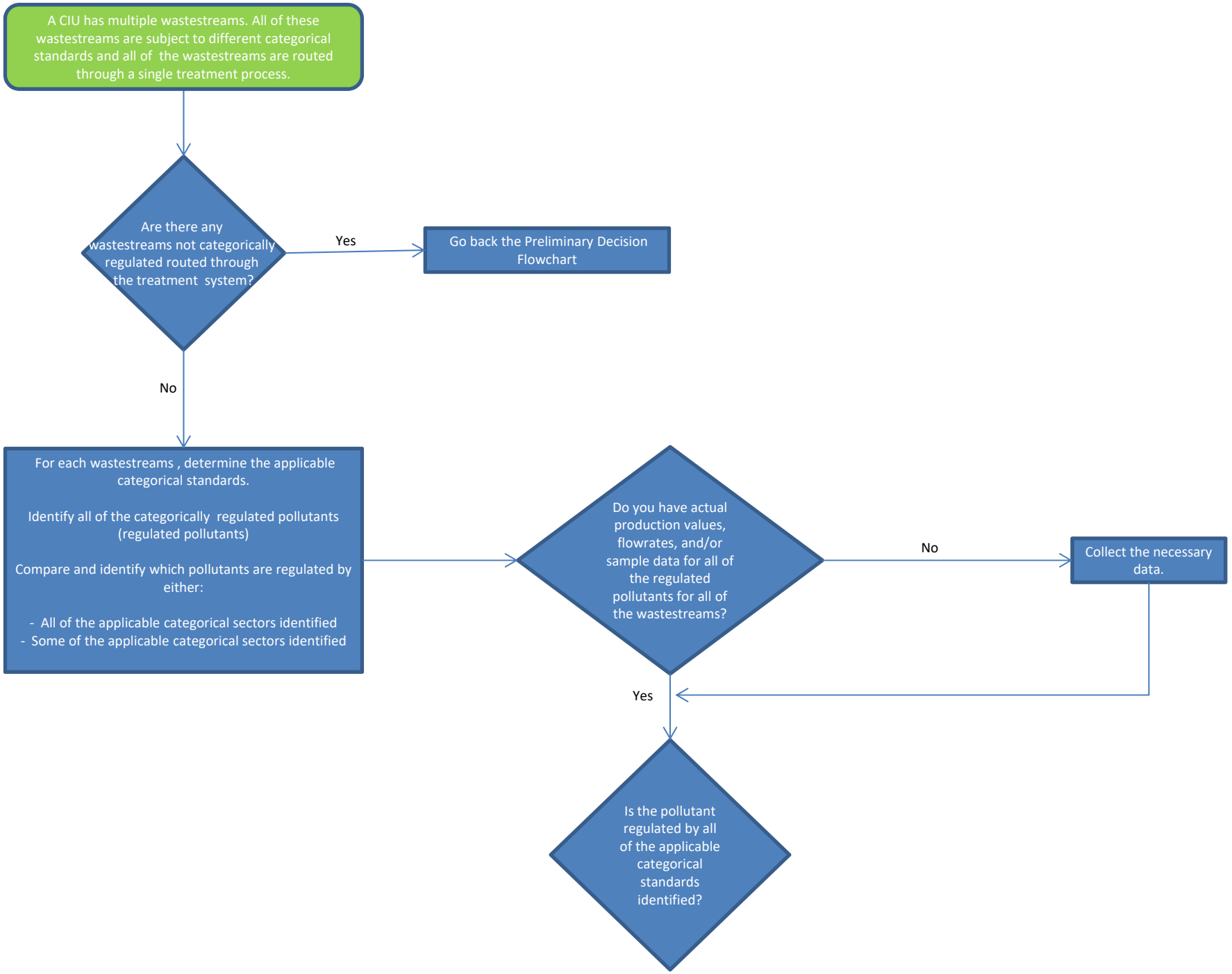

A CIU has multiple waste streams. These waste streams are routed through a single treatment process and all of the waste streams are not subject to categorical standards.
Are all of the wastestreams comingled before Treatment?
No
Go back to Preliminary Decision Flowchart
Yes
Are there more than one waste stream subject to categorical Standards?
No
Classify each of the waste streams as either:
- Categorically regulated
- Not categorically regulated
- Dilute
Do you have actual production values, flowrates, and sampling data for all of the pollutants in all of the waste streams?
No
Collect the necessary data.
Yes
Is the concentration (or mass) of each of the regulated pollutants in each of the not categorically Regulated wastestreams at only trace amounts, and is not known to cause toxic effects?
No
Yes
Yes
Are the categorically regulated wastestreams subject to the same categorical standard?
Yes
No
Identify all of the applicable categorical standards for each of the categorically regulated wastestreams
Classify this wastestreamas a dilute wastestream.
If there are more than one dilute wastestream for the same regulated pollutant, all of the applicable dilute wastestream flowrates must be added to determine FD in the CWF.
Classify this wastestream as an unregulated wastestream.
The volume (flowrate) of this unregulated wastestream should be added to the volume of the regulated wastestream when using the CWF to calculate the alternative categorical limits. The sum of all of the unregulated and regulated wastestream flowrates is equal to Fi in the CWF.
Calculate the alternative categorical limits using the CWF for each of the regulated pollutants.
*** NOTE: This alternative limit will be applied at Compliance Point A. This limit will also be used in other calculations (such as calculations for Example 3).

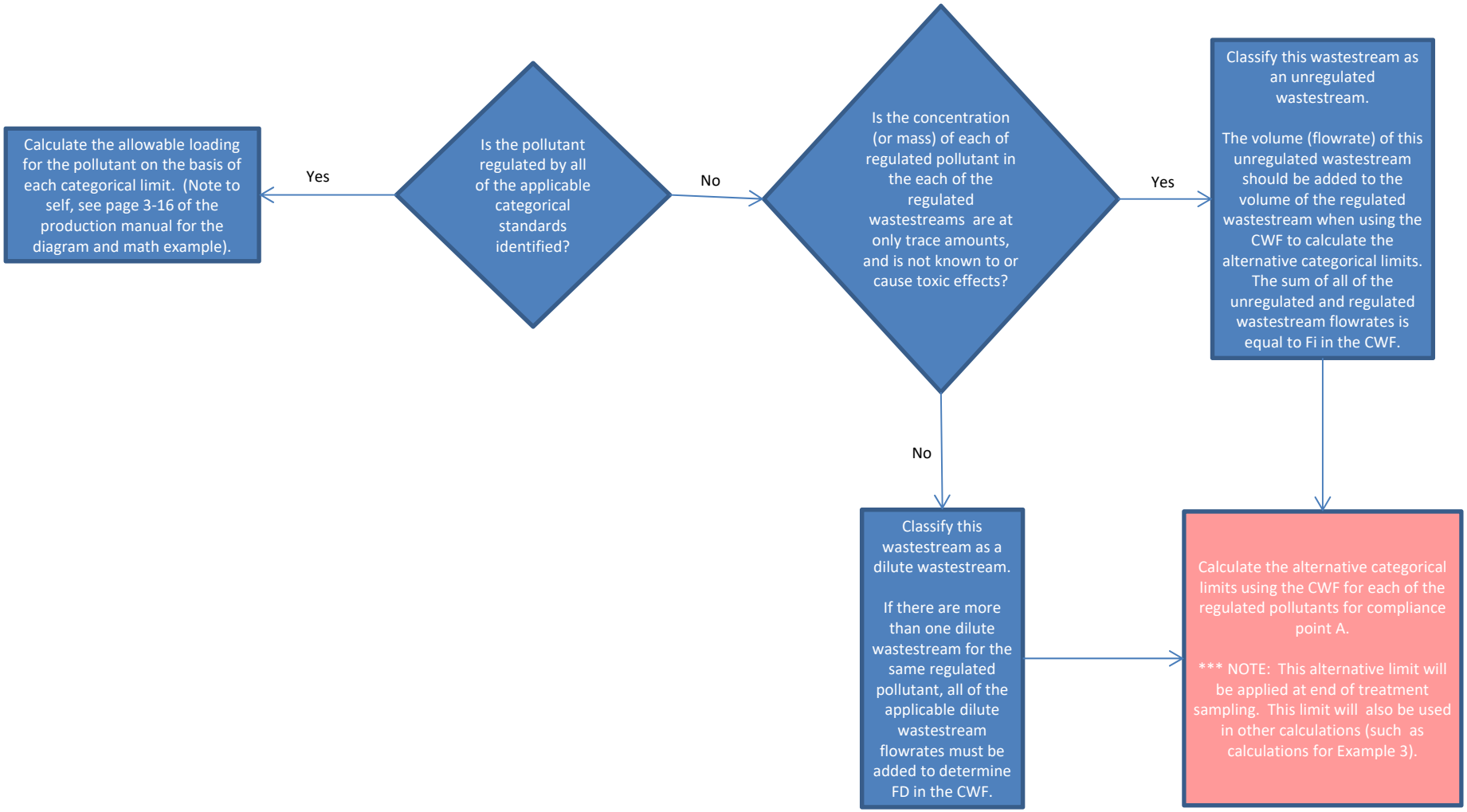

Calculate the alternative categorical limits using the CWF for each of the regulated pollutants.
*** NOTE: This alternative limit will be applied at Compliance Point A. This limit will also be used in other calculations (such as calculations for Example 3).
Is there an appropriate end of treatment sampling point (Compliance Point A)? Or can an end of treatment sampling point (Compliance Point A) be established?
No
Yes
If an end of treatment sampling point cannot be established, sampling must be conducted at the end of pipe.
Apply the alternative categorical standards calculated for the end of treatment sampling point. If the end of treatment sampling point is the same as the end of pipe sampling point, then the POTW should compare its local limits with the alternative categorical limits and apply the most stringent. [2]
Are there any other waste streams mixed with the treated wastewaters before the end of pipe sampling point?
No
Yes
Apply the alternative categorical standards at the end of treatment sampling point. If the end of treatment sampling point is the same as the end of pipe sampling point, then the POTW should compare its local limits with the alternative categorical limits and apply the most stringent. [2]
Because there are additional waste streams mixed with the facility's treatment wastewaters, the POTW must perform additional calculations to determine another set of alternative categorical limits to apply at the end of pipe sampling point. See Example 3 and the corresponding flow diagrams for more details.

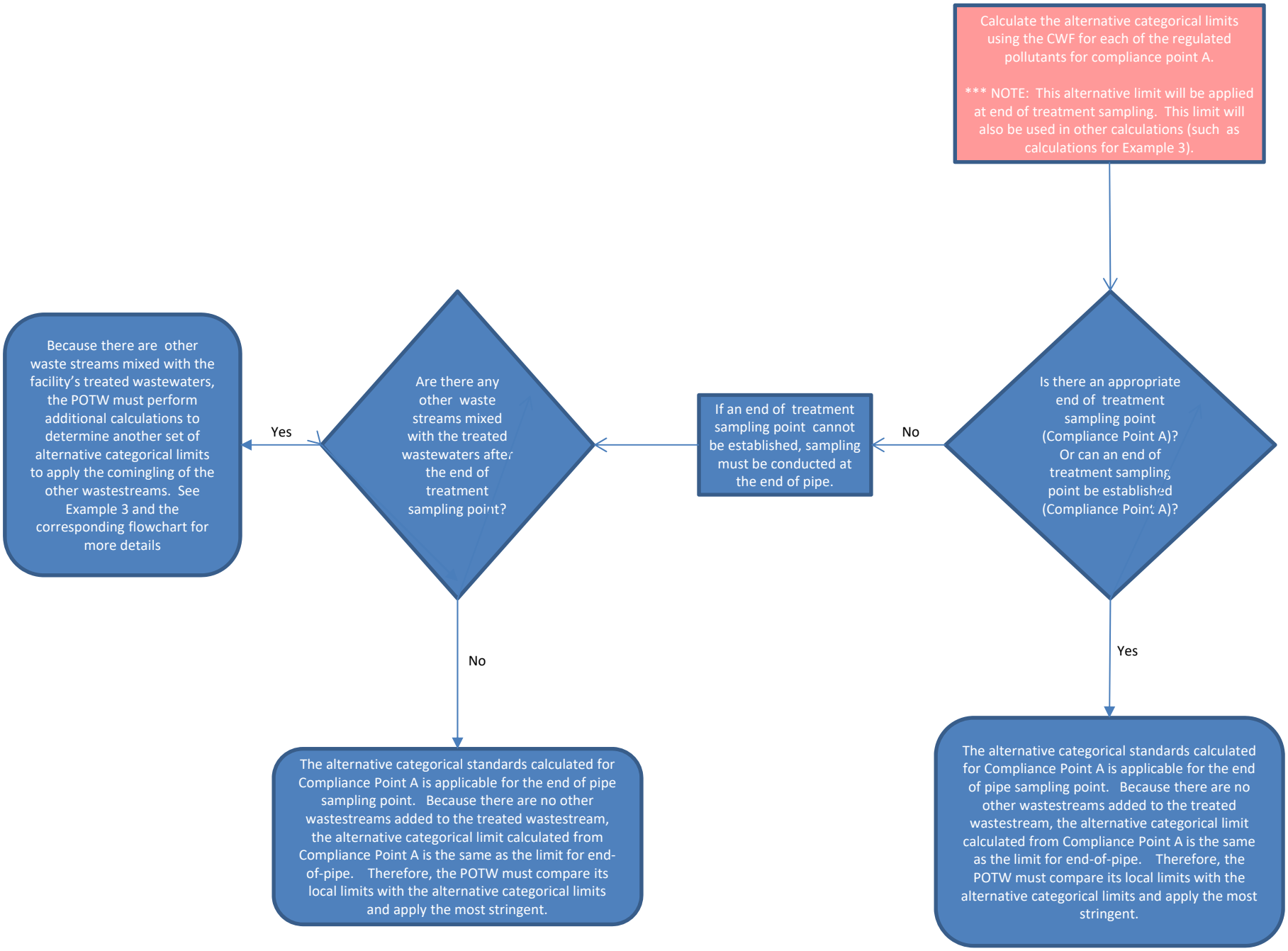

A CIU has multiple wastestreams. All of these wastestreams are subject to different categorical standards and all of the wastestreams are routed through a single treatment process.
Are there any wastestreams not categorically regulated routed through the treatment system?
Yes
Go back the Preliminary Decision Flowchart
No
For each wastestreams , determine the applicable categorical standards.
Identify all of the categorically regulated pollutants (regulated pollutants)
Compare and identify which pollutants are regulated by either:
- All of the applicable categorical sectors identified
- Some of the applicable categorical sectors identified
Do you have actual production values, flowrates, and/or sample data for all of the regulated pollutants for all of the wastestreams?
No
Collect the necessary data.
Yes
Is the pollutant regulated by all of the applicable categorical standards identified?
Yes
Calculate the allowable loading for the pollutant on the basis of each categorical limit. (Note to self, see page 3-16 of the production manual for the diagram and math example).
No
Is the concentration (or mass) of each of regulated pollutant in the each of the regulated wastestreams are at only trace amounts, and is not known to or cause toxic effects?
Yes
Classify this wastestream as an unregulated wastestream.
The volume (flowrate) of this unregulated wastestream should be added to the volume of the regulated wastestream when using the CWF to calculate the alternative categorical limits. The sum of all of the unregulated and regulated wastestream flowrates is equal to Fi in the CWF.
No
Classify this wastestream as a dilute wastestream.
If there are more than one dilute wastestream for the same regulated pollutant, all of the applicable dilute wastestream flowrates must be added to determine FD in the CWF.
Calculate the alternative categorical limits using the CWF for each of the regulated pollutants for compliance point A.
*** NOTE: This alternative limit will be applied at end of treatment sampling. This limit will also be used in other calculations (such as calculations for Example 3).
Is there an appropriate end of treatment sampling point (Compliance Point A)? Or can an end of treatment sampling point be established (Compliance Point A)?
No
If an end of treatment sampling point cannot be established, sampling must be conducted at the end of pipe.
Are there any other waste streams mixed with the treated wastewaters after the end of treatment sampling point?
Yes
Because there are other waste streams mixed with the facility's treated wastewaters, the POTW must perform additional calculations to determine another set of alternative categorical limits to apply the comingling of the other wastestreams. See Example 3 and the corresponding flowchart for more details
No
The alternative categorical standards calculated for Compliance Point A is applicable for the end of pipe sampling point. Because there are no other wastestreams added to the treated wastestream, the alternative categorical limit calculated from Compliance Point A is the same as the limit for end-of-pipe. Therefore, the POTW must compare its local limits with the alternative categorical limits and apply the most stringent.
Yes
The alternative categorical standards calculated for Compliance Point A is applicable for the end of pipe sampling point. Because there are no other wastestreams added to the treated wastestream, the alternative categorical limit calculated from Compliance Point A is the same as the limit for end-of-pipe. Therefore, the POTW must compare its local limits with the alternative categorical limits and apply the most stringent.
Regulated (categorical standards)
Regulated (Categorical standards)
Regulated (Categorical standards)
Treatment System
A
Example 2

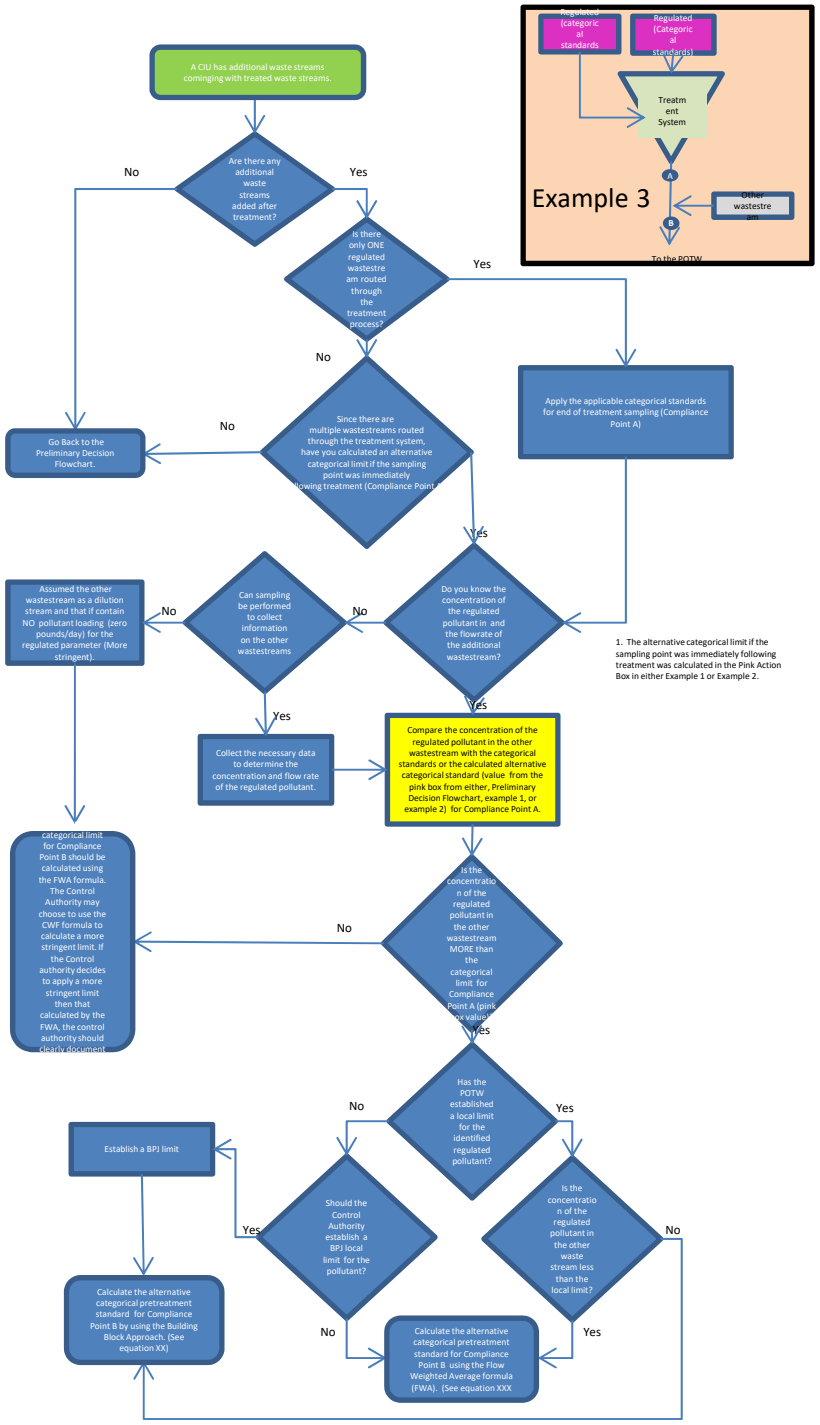

Regulated (categorical standards)
Regulated (Categorical standards)
Regulated (Categorical standards)
Treatment System
A

Example 2

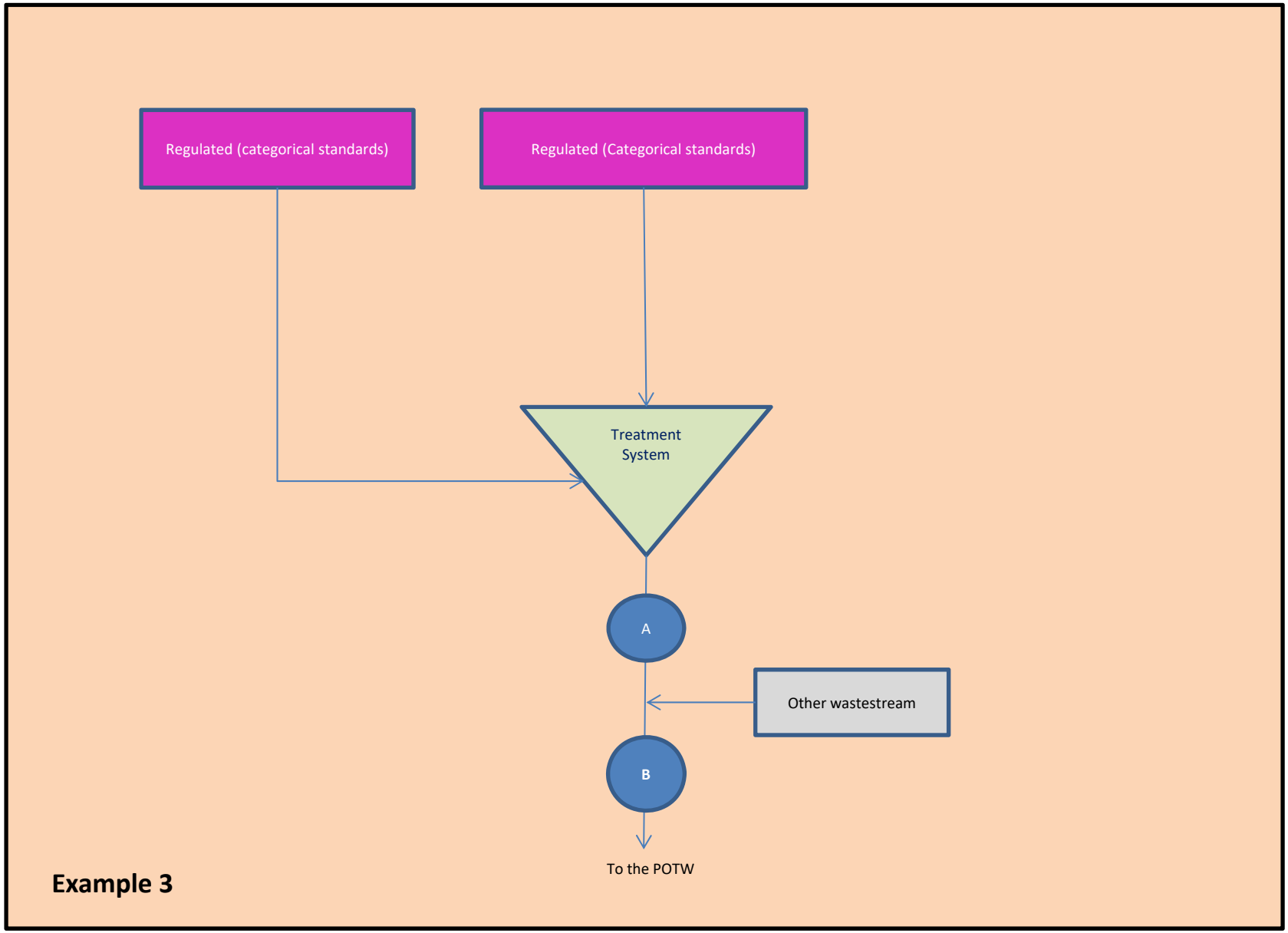

A CIU has multiple wastestreams. All of these wastestreams are subject to different categorical standards and all of the wastestreams are routed through a single treatment process.
Are there any wastestreams not categorically regulated routed through the treatment system?
Yes
Go back the Preliminary Decision Flowchart
No
For each wastestreams , determine the applicable categorical standards.
Identify all of the categorically regulated pollutants (regulated pollutants)
Compare and identify which pollutants are regulated by either:
- All of the applicable categorical sectors identified
- Some of the applicable categorical sectors identified
Do you have actual production values, flowrates, and/or sample data for all of the regulated pollutants for all of the wastestreams?
No
Collect the necessary data.
Yes
Is the pollutant regulated by all of the applicable categorical standards identified?


Is the pollutant regulated by all of the applicable categorical standards identified?
Yes
Calculate the allowable loading for the pollutant on the basis of each categorical limit. (Note to self, see page 3-16 of the production manual for the diagram and math example).
No
Is the concentration (or mass) of each of regulated pollutant in the each of the regulated wastestreams are at only trace amounts, and is not known to or cause toxic effects?
Yes
Classify this wastestream as an unregulated wastestream.
The volume (flowrate) of this unregulated wastestream should be added to the volume of the regulated wastestream when using the CWF to calculate the alternative categorical limits. The sum of all of the unregulated and regulated wastestream flowrates is equal to Fi in the CWF.
No
Classify this wastestream as a dilute wastestream.
If there are more than one dilute wastestream for the same regulated pollutant, all of the applicable dilute wastestream flowrates must be added to determine FD in the CWF.
Calculate the alternative categorical limits using the CWF for each of the regulated pollutants for compliance point A.
*** NOTE: This alternative limit will be applied at end of treatment sampling. This limit will also be used in other calculations (such as calculations for Example 3).

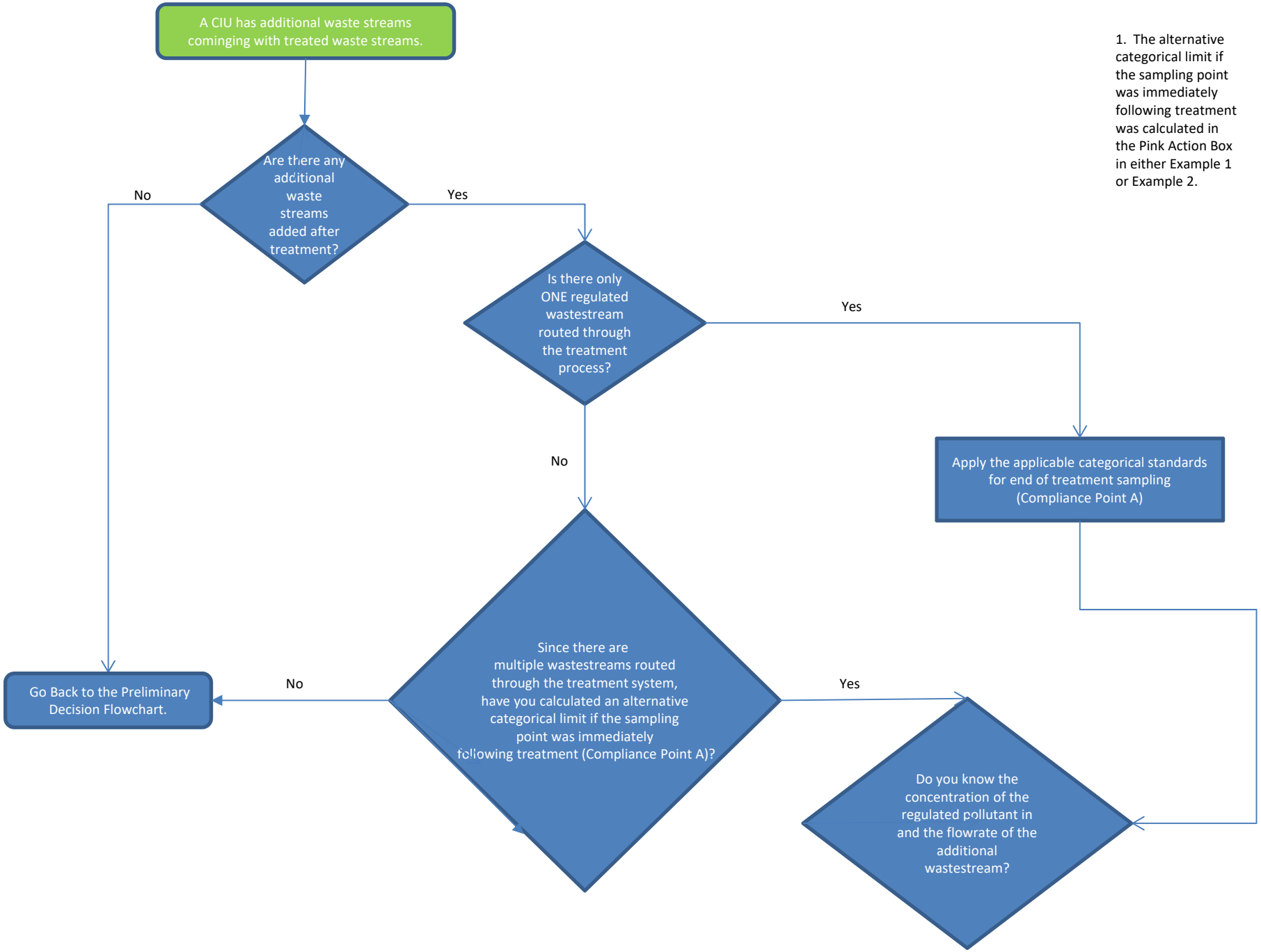

Calculate the alternative categorical limits using the CWF for each of the regulated pollutants for compliance point A.
*** NOTE: This alternative limit will be applied at end of treatment sampling. This limit will also be used in other calculations (such as calculations for Example 3).
Is there an appropriate end of treatment sampling point (Compliance Point A)? Or can an end of treatment sampling point be established (Compliance Point A)?
No
If an end of treatment sampling point cannot be established, sampling must be conducted at the end of pipe.
Are there any other waste streams mixed with the treated wastewaters after the end of treatment sampling point?
Yes
Because there are other waste streams mixed with the facility's treated wastewaters, the POTW must perform additional calculations to determine another set of alternative categorical limits to apply the comingling of the other wastestreams. See Example 3 and the corresponding flowchart for more details
No
The alternative categorical standards calculated for Compliance Point A is applicable for the end of pipe sampling point. Because there are no other wastestreams added to the treated wastestream, the alternative categorical limit calculated from Compliance Point A is the same as the limit for end-of-pipe. Therefore, the POTW must compare its local limits with the alternative categorical limits and apply the most stringent.
Yes
The alternative categorical standards calculated for Compliance Point A is applicable for the end of pipe sampling point. Because there are no other wastestreams added to the treated wastestream, the alternative categorical limit calculated from Compliance Point A is the same as the limit for end-of-pipe. Therefore, the POTW must compare its local limits with the alternative categorical limits and apply the most stringent.



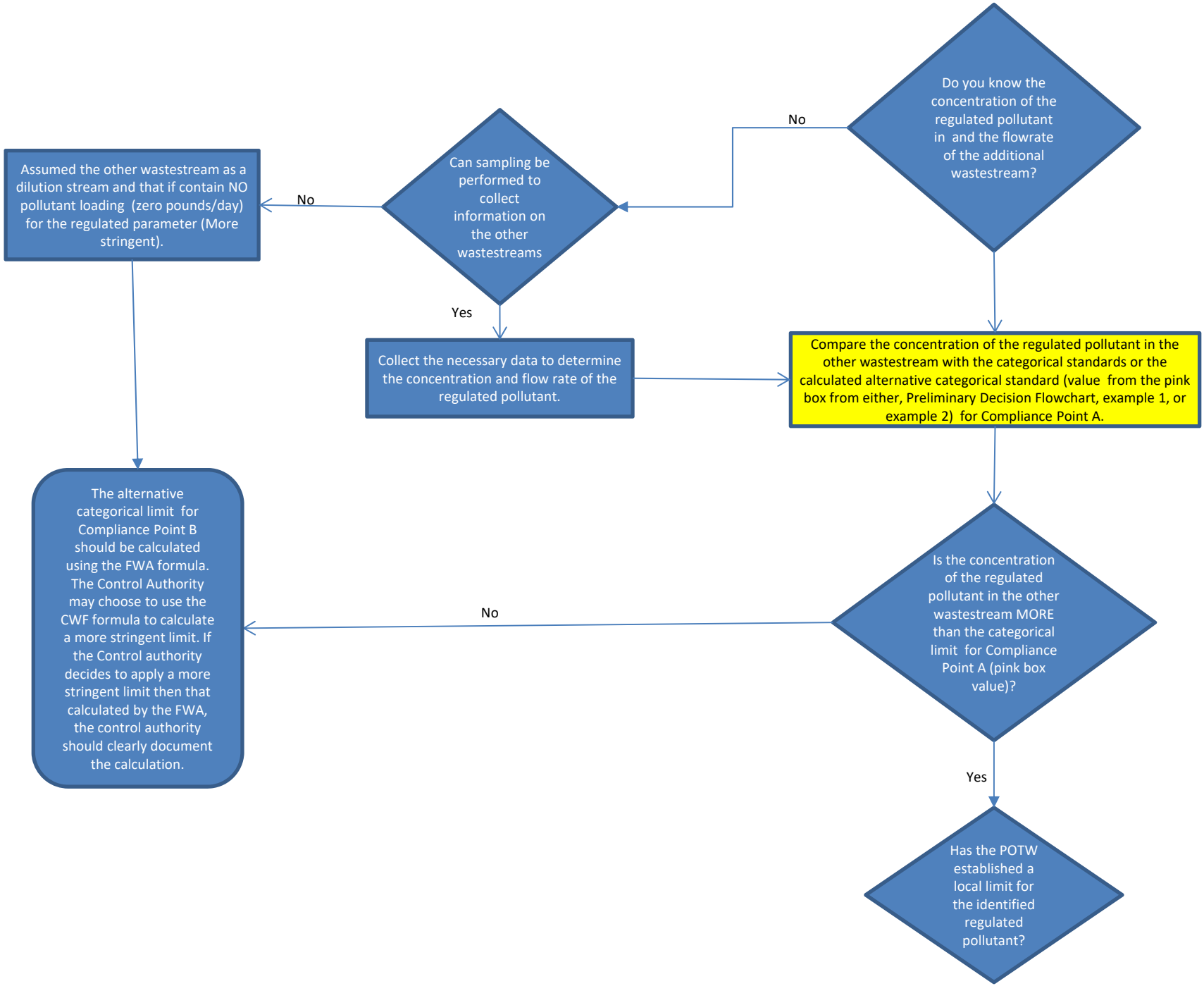
1. The alternative categorical limit if the sampling point was immediately following treatment was calculated in the Pink Action Box in either Example 1 or Example 2.

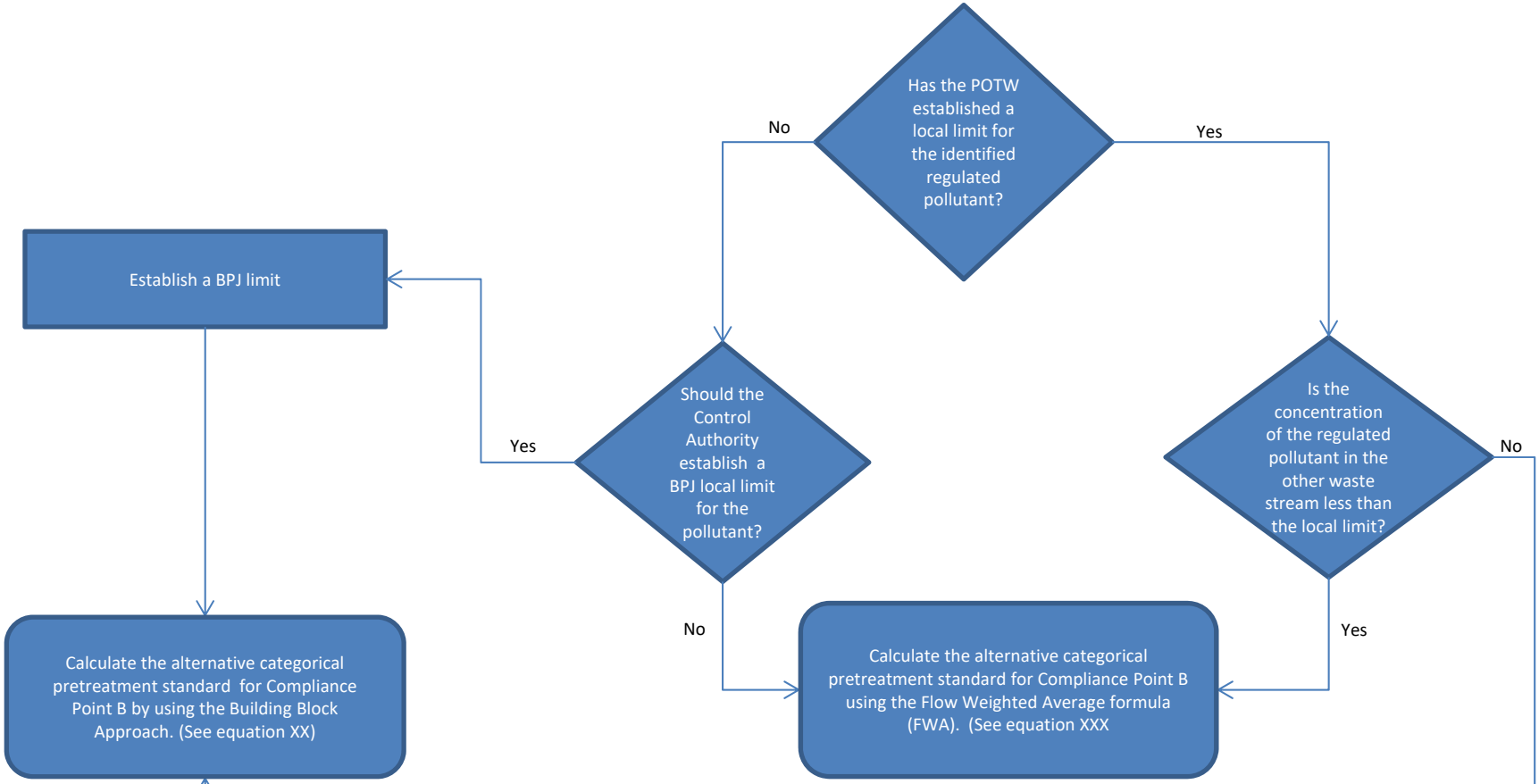

Regulated (categorical standards)
Regulated (Categorical standards)
Treatment System
A
Other wastestream
B
To the POTW

Example 3



1. The alternative categorical limit if the sampling point was immediately following treatment was calculated in the Pink Action Box in either Example 1 or Example 2.


Do you know the concentration of the regulated pollutant in and the flowrate of the additional wastestream?
No
Can sampling be performed to collect information on the other wastestreams
No
Assumed the other wastestream as a dilution stream and that if contain NO pollutant loading (zero pounds/day) for the regulated parameter (More stringent).
Yes
Collect the necessary data to determine the concentration and flow rate of the regulated pollutant.
Compare the concentration of the regulated pollutant in the other wastestream with the categorical standards or the calculated alternative categorical standard (value from the pink box from either, Preliminary Decision Flowchart, example 1, or example 2) for Compliance Point A.
Is the concentration of the regulated pollutant in the other wastestream MORE than the categorical limit for Compliance Point A (pink box value)?
No
The alternative categorical limit for Compliance Point B should be calculated using the FWA formula. The Control Authority may choose to use the CWF formula to calculate a more stringent limit. If the Control authority decides to apply a more stringent limit then that calculated by the FWA, the control authority should clearly document the calculation.
Yes
Has the POTW established a local limit for the identified regulated pollutant?


Has the POTW established a local limit for the identified regulated pollutant?
No
Yes
Establish a BPJ limit
Should the Control Authority establish a BPJ local limit for the pollutant?
Yes
Is the concentration of the regulated pollutant in the other waste stream less than the local limit?
No
No
Yes
Calculate the alternative categorical pretreatment standard for Compliance Point B by using the Building Block Approach. (See equation XX)
Calculate the alternative categorical pretreatment standard for Compliance Point B using the Flow Weighted Average formula (FWA). (See equation XXX

Questions?

Contact Information:

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