



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
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The February 20, 2004 inspection report for the pretreatment performance evaluation of Sunsweet Growers was issued as an attachment to the April 20, 2004 EPA request for information under Section 308 of the Clean Water Act.

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Section 1

Introduction and Background

1.0 Scope and Purpose

On August 20, 2003, EPA conducted a compliance evaluation inspection of Sunsweet Growers in Yuba City. The purpose was to ensure compliance with the Federal regulations covering the discharge of non-domestic wastewaters into the sewers, in particular:

- Classification in the proper Federal categories;
- Application of the correct standards at the correct points;
- Consistent compliance with the standards; and
- Fulfillment of Federal self-monitoring requirements.

Sunsweet is one of three significant industrial users (“SIUs”) in Yuba City whose compliance was assessed as part of EPA’s 2004 evaluation of the Yuba City pretreatment program. Yuba City and Sunsweet received individual reports. The inspection participants are listed on the title page. Arthur conducted the inspection on August 20.

1.1 Process Description

Sunsweet processes and packages dried fruit, and performs hot bottling of juices and other drinks at 901 North Walton in Yuba City. Sunsweet consists of two plants. In its dried fruit plant, Sunsweet fumigates, warehouses, re-hydrates, preserves, and packages dried plums, apricots, peaches, apples, tomatoes, cranberries, pears, dates, and other fruit delivered from dried fruit suppliers. In its bottling plant, Sunsweet brews and formulates drinks for on-site bottling. Bottles, both glass and plastic, arrive formed but not washed. Labels, plastic packaging, and can printing are manufactured off-site, although ink-jet printing of bottling code information is performed on-site.

1.2 Waste Streams

Dried Fruit Plant - All incoming dried fruit is fumigated with methyl bromide in a sealed concrete vault prior to on-site warehousing. Warehousing and fumigation do not generate wastewaters. Sorting by size and color generates single-pass cooling water from the sorting cameras and equipment, as well as conveyor belt lube water, and lamp cleaning water. The mechanized pitting generates fruit washing blowdown and overflow, spray wash down of the pitting machines, and conveyor wash down. Preservation by immersion in potassium sorbate solution generates spent preservative solutions that are changed-out nightly, and conveyor lube water. Plant and equipment cleaning throughout the dried fruit plant generates graveyard shift wash down.

Section 1 – Introduction and Background

Bottling Plant - The prune juice line runs 24-hours per day and involves fruit cooking in tanks and the centrifuged separation of solids from the juice. It generates conveyor lube water, and area wash down waters. Drink pasteurizing generates heat exchanger single-pass cooling water, conveyor lube water, and product loss as the lines are changed-out and cleaned between product runs. Drink bottling generates area wash down, clean-in-place tail water, conveyor lube water, and single-pass bottle cooling water. The clean-in-place equipment involves the automatic multiple-stepped circulation from solution tanks through the processing equipment and back of caustic cleaner, phosphoric-acid descalant and a final rinse. The ingredient staging area outside of the building generates secondary containment drainage. Plant and equipment cleaning throughout the bottling plant generates graveyard shift wash down.

Water Purification - The bottling plant uses a media filter, reverse osmosis, activated carbon, and UV-disinfection to provide purified low-TDS (1.8 μ mohs/cm) waters from incoming city water. The system has a production capacity of 150 gallons per minute (“gpm”) of high-quality water and a reject rate of 50 gpm. The RO-reject would be expected to be high-TDS (and EC) because it would contain the minerals concentrated out of the incoming city water.

Steam Condensate - Both the bottling and dried fruit plants use steam produced by the Calpine cogeneration plant located next door. As a result, the wash down from both plants would be expected to include the steam condensate from Greenleaf Unit 2. The condensate would be expected to contain the anti-fouling additives of cyclohexylamine, morpholine, sodium nitrate, and diethylethanolamine, added by Calpine at Greenleaf Unit 2.

Wastewater Strength - Many of the wastewaters carry fruit sugars from the fruit processing operations and drink bottling. These wastewaters, which include conveyor lube waters and graveyard shift wash down, would be expected to be high strength in organics (BOD). On the other hand, the single-pass cooling waters, steam condensate, and RO-reject would be expected to be low strength in organics. All would be expected to be low in nutrients.

1.3 Wastewater and Waste Handling

Process wastewaters discharge into the sewers through one connection at an average and peak discharge flow rate of 0.8 and 1.2 million gallons per day. The process-related waste streams collect in three sumps for delivery and treatment through microscreening and pH adjustment. Fruit pits from mechanized pitting are off-hauled to Calpine as fuel. Centrifuged solids from the prune juice line are off-hauled as cattle feed. Treatment unit microscreenings are off-hauled to a non-hazardous landfill.

1.4 Wastewater Discharge Permitting

Yuba City has issued permit No. 03-2 to Sunsweet authorizing the discharge of process wastewaters to the sewers from the final pH adjustment holding tank through the designated sample box. The overall discharge is continuous monitored for flow and pH. The discharge point also incorporates a permanent automatic composite sampler. This sample point is described in the permit itself. It is referred to in this report as IWD-LOC1.

Section 2

Sewer Discharge Standards and Limits

Federal categorical pretreatment standards (where they exist), national prohibitions, and the local limits (where they exist) must be applied to the sewer discharges from industrial users. 40 CFR 403.5 and 403.6.

2.0 Summary

No Federal categorical pretreatment standards apply to the process wastewater discharges from Sunsweet. The Yuba City permit applies local limits and self-monitoring for pH, flow, BOD and TSS, and does not apply local limits for any toxics. Yuba City imposes additional surcharges related to the peak discharge flow rate, organics loads, and solids loads, but does not impose them in the permit. The Yuba City permit does require 48-hour prior notice before any extended shutdowns to allow Yuba City to protect its wastewater treatment plant from operational upsets. The application of Federal categorical standards, national prohibitions and local limits was determined through visual inspection. See Table 2 for the discharge requirements.

Requirements

- The permit must apply the narrative national prohibitions against causing adverse impacts to the Yuba City treatment works.

Recommendations

- The permit should specifically prohibit changes in discharge strength or flow rate that result in an operational upset of the wastewater treatment plant.
- Any disinfectants used to wash down plant and equipment should be identified.
- The permit should establish a sliding scale pH limit based on the alkalinity demand.

2.1 Classification by Federal Point Source Category

Sunsweet is a significant industrial user discharging over 25,000 gpd to the sewers. It does not qualify as a categorical industrial user subject to any of the Federal categorical pretreatment standards in 40 CFR 407-471.

Section 2 – Sewer Discharge Standards and Limits

2.2 Local Limits and National Prohibitions

Local limits and the national prohibitions are meant to express the limitations on non-domestic discharges necessary to protect the sewers, treatment plants and their receiving waters from adverse impacts. In particular, they prohibit discharges that can cause the pass-through of pollutants into the receiving waters or into reuse, the operational interference of the sewerage works, the contamination of the sewage sludge, sewer worker health and safety risks, fire or explosive risks, and corrosive damage to the sewers.

The national prohibitions in 40 CFR 403.5(a)(b) apply nationwide to all non-domestic sewer discharges. Local limits, required in 40 CFR 403.5(c), like those for Yuba City, are meant to translate the predominantly narrative national prohibitions into numeric limits that apply to non-domestic discharges within its sewer service area. This means the local limits as they apply to Sunsweet are meant to address the unique risks to the operations of the Yuba City sewerage works posed by Sunsweet. In particular this comes from the potential variabilities of discharge strength and flow, and the potential formation of anoxic conditions in the downstream sewers. Toward these risks, the Yuba City permit for Sunsweet sets discharge limits for pH, flow and conventional pollutants, and requires 48-hour prior notice prior to extended shutdowns or weekend and holiday processing.

The Yuba City local limits for toxics are not based on the protection of its treatment works as they are currently configured and operated. The version of the local limits, adopted by the city council in the 1970's, and the later 1990's unadopted version, are both no longer protective. The 2003 version of the NPDES permit for the Yuba City wastewater treatment plant now has a more involved list of pollutant limits, including new limits for toxics derived from the California Toxics Rule. Although Yuba City has challenged this permit, no matter the outcome, it will likely have to develop new local limits to reflect the specific discharge requirements upon its wastewater treatment facility now. Sunsweet would not be expected to discharge toxics because the operations do not use or generate them, with the exception of fruit fumigant used on-site, the anti-fouling additives in the steam, and any disinfectants used in the plant and equipment clean-up. The Yuba City permit to Sunsweet does not set local limits nor require self-monitoring for toxics.

2.3 Point(s) of Compliance

The sample box after the final pH adjustment tank serves as the compliance sampling point and is designated in this report as IWD-LOC1.

2.4 Compliance Sampling

Local limits and the national prohibitions are instantaneous-maximums that are comparable to samples of any length including single grab samples.

Section 3

Compliance with Federal Standards

Industrial users must comply with the Federal categorical pretreatment standards that apply to their process wastewater discharges. 40 CFR 403.6(b).

Categorical industrial users must comply with the prohibition against dilution of the Federally-regulated waste streams as a substitute for treatment. 40 CFR 403.6(d).

Industrial users must comply with the provision restricting the bypass of treatment necessary to comply with any pretreatment standard or requirement. 40 CFR 403.17(d).

3.0 Summary

No Federal categorical pretreatment standards apply to Sunsweet because none of the Federally-regulated processes are performed on-site. It follows that there can be no dilution as a substitute for treatment nor any bypass of treatment necessary to comply with Federal standards.

Requirements

- None.

Recommendations

- None.

Section 4

Compliance with Local Limits and National Prohibitions

All non-domestic wastewater discharges to the sewers must comply with local limits and the national prohibitions. 40 CFR 403.5(a,b,d).

Industrial users must comply with the provision restricting the bypass of treatment necessary to comply with any pretreatment standard or requirement. 40 CFR 403.17(d).

4.0 Summary

Sunsweet poses two operational risks to the Yuba City treatment works. First, sharp drops in loadings have in the past resulted in operational interferences at the wastewater treatment plant related to the treatability of the nutrient-deficient discharges from Sunsweet and the responsive dosing of nutrients by Yuba City. Second, the high-strength organic discharges can cause sulfide degradation of concrete sewers if they become anoxic. Yuba City has instituted permit requirements to keep the pH above 8.5 and to provide 48-hour prior notification for impending shutdowns. It cannot be determined whether toxics pose any risk, although toxics would not be expected from food processing in general.

Requirements

- The sources of iron in the wastewater discharges must be determined.

Recommendations

- Equalization should be considered in order to minimize the operational risks posed by Sunsweet to the wastewater treatment plant.
- Alkalinity demand should be determined for different temperatures and organic loads. Lime could be used if fully satisfying the alkalinity demand with caustic would result in hazardous pHs. Spent CIP acids could be off-hauled to reduce alkalinity demand.
- The wastewater discharges should be preconditioned through the addition of nutrients to result in rule-of-thumb loading ratios of 100:5:1 lbs-BOD:N:P.
- Peroxide addition in the summertime should be considered to prevent the reduction of sulfurous compounds to hydrogen sulfide in the sewers.

Section 4 – Compliance with Local Limits and National Prohibitions

4.1 National Objectives

The general pretreatment regulations were promulgated in order to fulfill the national objectives to prevent the introduction of pollutants that:

- (1) cause operational interference with sewage treatment or sludge disposal,
- (2) pass-through sewage treatment into the receiving waters or sludge,
- (3) are in any way incompatible with the sewerage works, or
- (4) do not improve the opportunities to recycle municipal wastewaters and sludge.

This evaluation did not include an evaluation of whether achievement of the national objectives in 40 CFR 403.2 have been demonstrated by consistent compliance with the sludge and discharge limits at the Yuba City wastewater treatment plant. That analysis will be available later as part of the EPA evaluation report for Yuba City. If the objectives are not found to have been achieved in Yuba City, then Sunsweet and the other industrial users of the Yuba City wastewater treatment plant would have to comply with new Yuba City local limits recalculated to be protective of the treatment works.

4.2 Local Limits for Conventional Pollutants

There are no numeric local limits for conventional pollutants in the Yuba City ordinance. However, the permit sets local limits specific to Sunsweet for suspended solids and BOD. Nevertheless, within the limitations of the permit, the variabilities in the organics, suspended solids, and hydraulic loadings from Sunsweet still have the potential to be large enough to adversely effect the operation of the Yuba City wastewater treatment plant. Sunsweet contributes on average over 50% of the organics and 20% of the flow handled by the wastewater treatment plant. This means that Sunsweet could cause loading differences on consecutive days as high as 12,000 lbs/day-BOD by abruptly shutting down or restarting its operations. A change in strength equal to this difference could result in a maximum change at the wastewater treatment plant of over ± 220 mg/l-BOD. A worst-case change of this magnitude in the influent BOD has the potential to cause an operational interference in particular in the summertime when both nitrogen and phosphorus must be added to foster the aerobic treatment of Sunsweet's wastewaters.

As a result, Yuba City requires 48-hour notice prior to any extended shut down of longer than 24 hours. Yuba City also has real-time probes with automatic alarms for dissolved oxygen, solids, and redox potential at various locations in the wastewater treatment plant. These measures make it possible for Yuba City to adjust the operations of the wastewater treatment plant. Nevertheless, the potential remains that changes at Sunsweet can adversely effect the operation of the Yuba City wastewater treatment plant. A typical prohibition against slug loadings in other city ordinances restricts peak organic loads of 15 minutes or more to less than 500% of the 24-hour averages for normal operations. Here, the reverse would apply to drops over 500% of the 24-hour averages for normal operations.

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Sunsweet provides no significant operational or built-in designed control of the variability in effluent strength during normal operations nor during scheduled maintenance and emergency operations. Wastewaters as they are generated are discharged to the sewers through the sumps and pH adjustment without appreciable attenuation or metering. Equalization with a hydraulic retention capacity of as little as 8-12 hours should be enough to attenuate even abrupt shutdowns or start-ups to less than a 500% change over the course of a day, as long as they are gradually drained down and discharges gradually resumed over extended shut-down periods. Equalization at Sunsweet (<500,000 gallons) or at the Yuba City wastewater treatment plant (<2 million gallons) would eliminate or nearly eliminate the risk of an operational interference at the wastewater treatment plant caused by Sunsweet.

Sunsweet could also ensure the treatability of its wastewater at the wastewater treatment plant by preconditioning its discharge through the addition of nutrients. This would require Sunsweet to determine its BOD to nitrogen to phosphorus ratios on a near continuous basis in order to properly dose ammonia and phosphate. This would alleviate the need to determine nutrient dosing levels at the Yuba City wastewater treatment plant. The rule-of-thumb ratio for treatability at activated sludge wastewater treatment plants like Yuba City's is 100:5:1 lbs of BOD:nitrogen:phosphorus. This would be easier to do with equalization.

4.3 Local Limits for Toxics

The last toxics sample of Sunsweet was collected in 1994. There would be little expectation of toxics in the discharges from Sunsweet beyond the anti-fouling agents added to the steam, the use of a fumigant and disinfectants, and a trace of metals dissolved in the clean-in-place processes. As a result, Yuba City has appropriately not applied its local limits for metals. However, Yuba City has the potential to not comply with its NPDES discharge limits for iron of 300 µg/l. The lone sample from Sunsweet indicated an iron level of 15 mg/l, which at average flow rates conceivable could result in a 3,000 µg/l increase in the iron concentration entering the wastewater treatment plant.

4.4 Local Limits for Solvents and The National Prohibition Against Flammability

Flammability is not a risk because of an expected lack of organic solvents in the waste streams. See Table 1.

4.5 Local Limits for pH and The National Prohibitions Against Safety Hazards and Corrosive Structural Damage

Sewer collection system interferences related to the formation of hydrogen sulfide include worker safety hazards and unpermitted sewage releases caused by acidic disintegration of the sewers. Wastewater strength, sulfides, pH, temperature, and residence time all influence the formation and release of hydrogen sulfide within the sewers. Although the permit only

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establishes numeric limits for pH, the national prohibitions do not allow non-domestic interference with treatment works operations.

The discharge from Sunsweet involves the introduction of high-strength organic wastewaters which because of their sustained high-strength would be expected to biodegrade in the sewers, thereby creating favorable conditions for oxygen depletion and anaerobic degradation of sewage. Septic wastewater under anaerobic conditions become acidic and release hydrogen sulfide as a gas, which upon contact with mist and surface moisture, forms the sulfuric acid responsible for disintegration of the concrete within the sewers.

The permit requires Sunsweet to maintain a pH over 8.5 for all but 1% of the time (7 hours and 26 minutes in any calendar month), and to never allow the pH to drop below the national prohibition of 5.0. Sunsweet accomplishes this through the addition of caustic and continuous pH monitoring. Increased alkalinity suppresses the release of hydrogen sulfide as a gas by neutralizing the organic acids produced within the sewers through anaerobic degradation. The increased alkalinity does not inhibit biodegradation in the sewers nor the formation of sulfides from sulfurous compounds in the sewage. A more exact measure of the potential risk might be the total alkalinity demand of the wastewater under anaerobic conditions. The permit could better reflect alkalinity demand with a sliding scale pH limit that incrementally rises with increased temperature and organics loading. A switch from caustic to lime adds alkalinity without allowing the pH to increase to hazardous levels (over 12.5). Peroxide addition would inhibit the reduction of sulfurous compounds to sulfides.

Section 5

Compliance with Federal Monitoring Requirements

Significant industrial users must self-monitor for all regulated parameters at least twice per year unless the sewerage agency monitors in place of self-monitoring. 40 CFR 403.12(e) & 403.12(g).

Each sample must be representative of the sampling day's operations. Sampling must be representative of the conditions occurring during the reporting period. 40 CFR 403.12(g) & 403.12(h).

5.0 Summary

Sunsweet and Yuba City monitor the discharge to the sewers for conventional pollutants, pH, and calculated discharge flow rate, each working day. These samples are representative and appropriate given the risk to the treatment plant and sewer system posed by the sustained high-strength of the wastewater discharges. Some determination of the alkalinity demand given the temperature and organics concentration would be a better measure of the potential impact upon the sewer systems. There is just one sample of the discharges to the sewers for the potential toxics of concern, nutrients, or salts.

Requirements

- Sunsweet must continue the continuous self-monitoring for pH, and the daily self-monitoring for BOD, and discharge flow rate.

Recommendations

- The permit should require monitoring at least once over the life of the permit for methyl bromide, cyclohexylamine, morpholine, sodium nitrate, diethylethanolamine, and any of the identified disinfectants.
- The permit should require the daily determination of alkalinity demand, BOD to nutrient ratios, and discharge temperature.
- The permit should require the monthly determination of total ammonia, nitrates, total phosphorus, total dissolved solids, and iron.

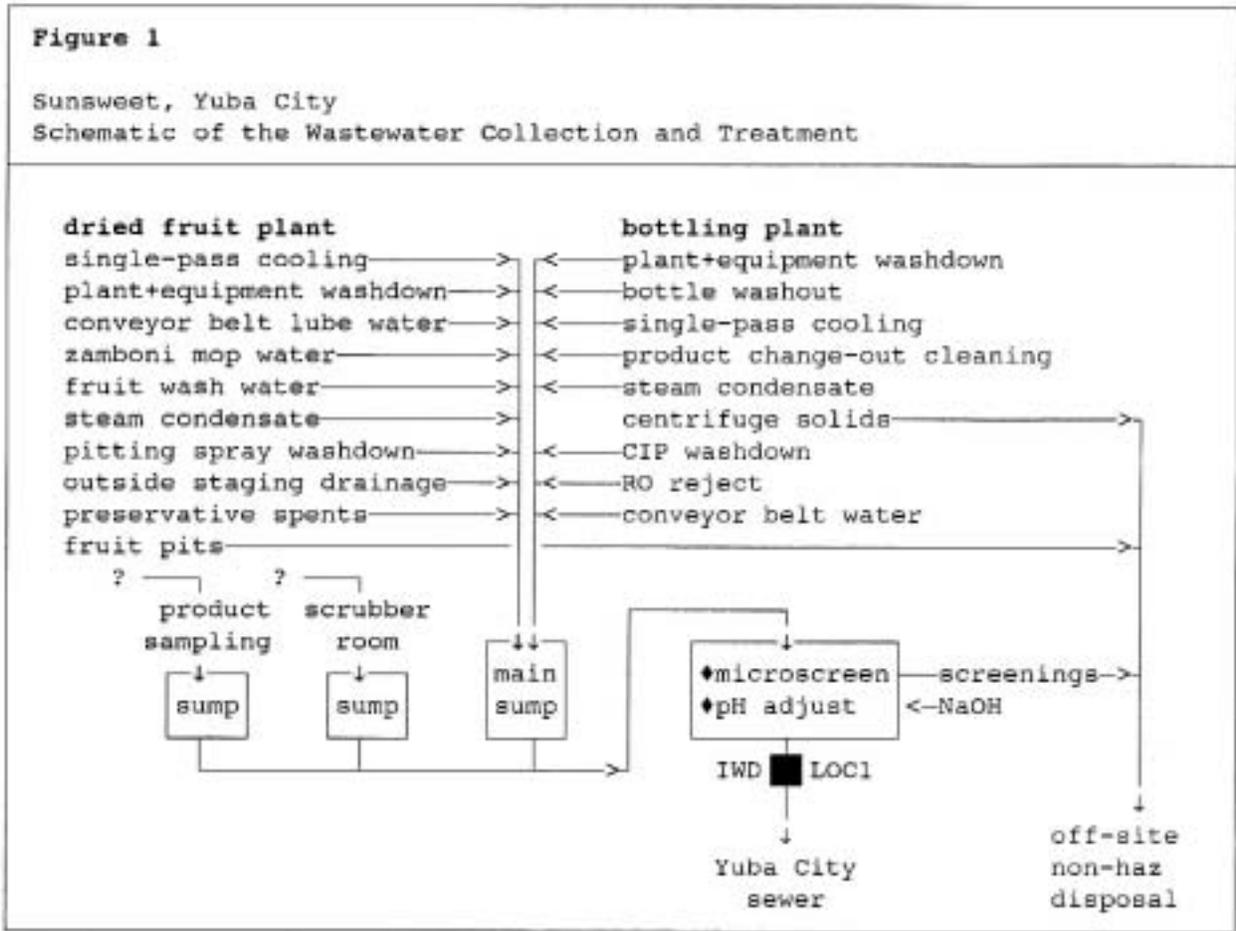


Table 1
 Discharge Quality at IWD-LOC1
 Sunsweet, Yuba City

Pollutants (mg/l) Jan-2000 to Sep-2003	Effluent		Fed Violations		Local inst
	Mean	Max	d-max	avg	
aluminum		0.210	ns	ns	0/2
chromium		0.020	ns	ns	0/1
copper		0.065	ns	ns	0/4
iron		15.0	ns	ns	→1/1
nickel		0.012	ns	ns	0/4
total nitrogen		-	ns	ns	-
total phosphorus		-	ns	ns	-
zinc		0.110	ns	ns	0/4
BOD	1800		ns	ns	unk
discharge flow (gpd)	764485	1561800	ns	ns	unk
pH (s.u.)	not reviewed in depth				
ns no standard unk not determined in this review					

Table 2			
Clean Water Act Requirements - Sunsweet, Yuba City Sampling Point (IWD-LOC1)			
Specific Numerical Limits (mg/l)	Nat'l Prohib Prohib inst	Local Limits Limits inst	
aluminum	-	5.0	
ammonia	-	20.0	
antimony	-	5.0	
arsenic	-	1.0	
benzene phenols derivatives	-	1.0	
bromine chlorine iodine	-	10.0	
cadmium	-	0.1	
chromium	-	0.5	
copper	-	0.5	
formaldehyde	-	5.0	
iron	-	5.0	
lead	-	0.5	
manganese	-	1.0	
molybdenum	-	-	
nickel	-	1.0	
oil+grease	-	100.	
selenium	-	5.0	
silver	-	0.05	
zinc	-	1.0	
total solvents	-	1.0	
discharge flow (mgd)	-	1500000	
temperature (°F)	-	<150°F	
pH-minimum (s.u.)	<5.0	<8.5	
maximum (s.u.)	-	-	
BOD load (lbs/d)	-	25000	
mo-avg load (lbs/d)	-	20000	
TSS loading (lbs/d)	-	6000	
mo-avg load (lbs/d)	-	4000	
Regulation	♦Yuba City Municipal Code Title 6, 5.4 ♦Sunsweet permit		
Instantaneous limits are comparable to any sample (24-comp, grabs, etc.) Narrative Limits <u>National Prohibitions</u> · Pass-through, interference, sludge contamination, obstruction, toxic gases/fumes, fire/explosion hazard · Causing heat >104°F at WWTP			