GUIDANCE MANUAL FOR WRITING SOLVENT AND TOXIC ORGANICS MANAGEMENT PLANS

BACKGROUND

This guidance document was developed to help industrial users with wastewater discharge permits including limitations for total toxic organics (TTO) and/or local organic compounds (LOC) understand the requirements they are subject to and to assist them in the preparation of a solvent and toxic organics management plan (STOMP).

WHAT IS ARE TTO AND LOC?

TTO and LOC are discharge limitations defined as the sum of the masses or concentrations of specific toxic organic compounds found in an industry's process wastewater at concentrations greater than 0.01 mg/L. Each permittee with one of these limitations will have a specific list of organic compounds for which it must monitor in Exhibit B of their wastewater discharge permit.

WHAT IS REQUIRED OF INDUSTRIES SUBJECT TO TTO AND LOC LIMITS?

Industries subject to TTO and/or LOC monitoring are required to submit the results of a TTO and/or LOC analysis with their Baseline Monitoring Report and 90-day or Initial Compliance Report. In addition, unless an industry complies with a solvent and toxic organics management plan (STOMP) and certification requirements discussed below, results of TTO and/or LOC analysis must be submitted with periodic compliance reports.

Recognizing the expense of routine TTO and LOC analysis, the Philadelphia Water Department (Department) may allow industries to reduce their TTO and/or LOC monitoring frequency to once every 6 months with the submission of a certification statement that no concentrated toxic organics are dumped into the wastewater and the submission of a STOMP. The STOMP details how organic chemicals are managed so as to keep them out of the industry's wastewater discharge. Please consult Part III ("Monitoring Requirements") of your permit to determine if your facility can submit the certification statement and STOMP for a reduction in your TTO and/or LOC monitoring frequency.

If, at any time, results from samples collected from an industry that has submitted a STOMP and certification statement indicate TTO or LOC levels over the allowable limits, the industry will have their TTO and/or LOC monitoring frequency reduction removed. The industry will not be allowed to submit a certification statement for reduction of TTO and/or LOC monitoring until monitoring data clearly indicate that the industry's STOMP is successful in controlling TTO or LOC discharges.

WHAT IS A STOMP?

A STOMP is a written document that specifies:

- the toxic organic compounds used, and;
- the method of disposal (other than discharge to the sewer), and;
- the procedures for assuring that toxic organics do not routinely spill or leak into the wastewater.

HOW IS A STOMP PREPARED?

Preparing a STOMP involves four steps:

1. Process engineering analysis
2. Pollutant control evaluation
3. Writing the STOMP
4. Submission and implementation of STOMP

<u>Step 1 - Process Engineering Analysis</u>

The purpose of this analysis is to determine the sources and types of toxic organic compounds that may be found in a facility's wastewater discharge. It should include not only those obvious compounds which would enter the wastestream in the event of a catastrophic spill, but other less dramatic sources as well. For example, a facility may use methylene chloride to degrease parts before they are plated. The operators may be very conscientious and never dump concentrated solvent down the sewer. However, if the parts are spray rinsed after solvent degreasing, significant amounts of solvent may be found in the facility's final effluent. Even if a facility uses rags or wiping towels to apply degreasing solvent, if the parts are not allowed to dry properly before further treatment, high concentrations of toxic organics may reach the sewer system.

Facilities that do not use any solvents, but strip paint or clean coated surfaces using caustic compounds, may find high concentrations of toxic organics in their process wastewater. Controlling toxic organics in this situation is difficult and may require conversion to a "dry" process such as sand blasting.

In order to prepare an effective STOMP, EPA recommends that the following steps be followed during the process engineering analysis:

1. Examination of published reports on the specific industry.

   Articles in trade journals, pollution control journals, etc., may help in the identification of the types of toxic organics commonly used in a particular industry. Chemical suppliers may also have information about commonly used toxic organics and alternatives to their use.

2. Construction of a water flow diagram to identify all possible wastewater sources.

   Many industries have already submitted such a flow diagram as part of their Baseline Monitoring Report. If so, the diagram should be reevaluated to see if any new wastestreams have been added or old ones deleted. In addition, seemingly unlikely

sources of toxic organics must also be evaluated. As mentioned previously, these include degreased parts that are rinsed with water, or the self-contained parts washer that, if a leak should occur, would spill into the nearby floor drain.

3. Listing raw materials used in the industrial processes, including chemical additives, water treatment chemicals and cleaning agents, and the wastewater stream that each regulated toxic organic could potentially enter.

4. Comparison of the toxics found by TTO analysis of the effluent with the list of raw materials and selection of the most probable wastewater source.

5. Evaluation of the toxics found in the effluent, but not on the raw materials list and determination of those formed as reaction products or by-products.

6. Examination of sources such as equipment corrosion or raw material impurities that could result in the release of toxic organics pollutants to the wastewater.

Step 2 - Pollutant Control Evaluation

An evaluation should be made of the control options that could be implemented to eliminate each source of or potential source of toxic organic compound(s) introduction to the treatment system. These may include in-plant modifications, solvent or chemical substitution, partial or complete recycle, reuse, neutralization, and operational changes. The analysis should be conducted on a case-by-case basis and will often result in one or more feasible options to control each source or potential source of toxic pollutant discharge. Finally, evaluation of the available control options, including the advantages and disadvantages of each.

Step 3 - Writing the STOMP

A STOMP should, at a minimum, contain the following items:

1. A complete inventory of all toxic organic chemicals in use or identified through sampling and analysis of the wastewater from regulated process operations (organic constituents of trade-name products should be obtained from the appropriate suppliers as necessary).

2. Descriptions of the method of disposal other than the sewer for the inventoried compounds, such as reclamation, contract hauling, or incineration.

3. The procedures for ensuring that the regulated toxic organic pollutants do not spill or routinely leak into process wastewater, floor drains, non-contact cooling water, groundwater, surface waters or any other location which allows discharge of the compounds.

4. Determinations or best estimates of the identifies and approximate quantities of toxic organic pollutants used as well as discharged from the regulated manufacturing processes. Compounds present in wastestreams that are discharged to sanitary sewers may be a result of regulated processes or disposal, spills, leaks, rinse water carryover, air pollution control, and other sources.

Step 4 - Submission and Implementation of STOMP

Once the STOMP has been submitted to the Department and is approved, the plan must be implemented. A prerequisite for the use of the certification statement is a fully approved, implemented, and ongoing STOMP. In addition, the certification statement must be included with each Periodic Compliance Report and be signed by an authorized represenatative of the facility.. A statement such as the following is required:

> Based on my inquiry of the person or persons directly responsible for managing compliance with the TTO (or LOC) limitations. I certify that, to the best of my knowledge and belief, no dumping of concentrated solvents and/or toxic organics into the wastewaters has occurred since the filing of the last report. I further certify that this facility is implementing the toxic organic pollutant management plan submitted to the Department on
>
> _____ _____
>
> (Date) (Officer)

A sample STOMP is attached.

SAMPLE **SOLVENT AND TOXIC ORGANIC MANAGEMENT PLAN**

ABC REFRIGERATION CORPORATION
HIGH POINT PLANT

I. Description of Facilities and Solvent Use

A. Process Description

The ABC Refrigeration Corporation, High Point Plant, manufactures automotive radiators, condensers, and compressors from metal coils and metal castings manufactured by other suppliers. The forming and assembly processes include metal forming, degreasing, chromating, and brazing in preparation for painting and final assembly. The metal castings are machined, washed, assembled, and degreased prior to final assembly.

Wastewater types and volumes and the current wastewater treatment system are depicted in Figure 1. The primary sources of process wastewater are the degreasing, chromating, fluxing, and parts washing operations. Other sources of wastewater are cooling tower blowdown and boiler blowdown. Wastewater from the degreasing operations is treated by dispersed air flotation. The combined wastestream from all sources is then treated by coagulation/flocculation with chemical and polymer addition for solids and metals reduction. The treated effluent is discharged to the city sewer system.

WASTEWATER GENERATION AND TREATMENT
ABC REFRIGERATION CORPORATION HIGH POINT PLANT

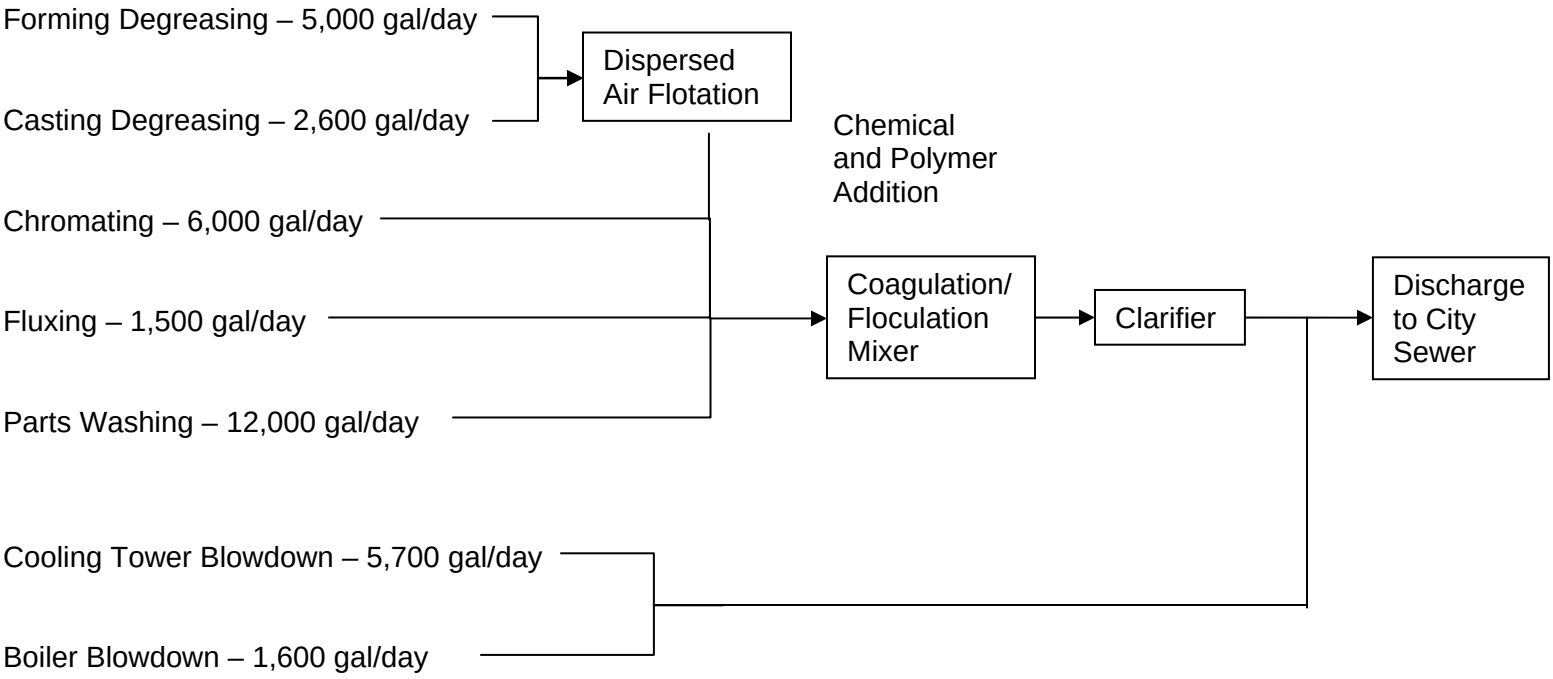

FIGURE 1

B. Identification of Solvent and Toxic Organic Chemicals Entering the Plant Wastewaters

1. Chemical Analysis of Treated Wastewaters

Samples were taken of the plant's treated wastewaters for analysis for the 111 toxic organics regulated under the metal finishing categorical pretreatment standards. Samples collected were 24-hour flow-proportioned composite samples for acid extractable and base/neutral compounds. Grab samples for volatile organics were taken every four hours and were composited before analysis. Samples were taken over a period when all production lines were operating at peak production rates. Samples were analyzed by gas chromatography with compound identification and quantification by mass spectrophotometer (GC/MS). EPA procedures 624 and 625 were followed for GC/MS analysis. Toxic organic compounds detected at concentrations greater than 0.01 mg/L are listed in Table 1.

Table 1

Compound	**Concentration (mg/L)**
1,1,1-Trichloroethane	1.320
Naphthalene	0.210
Chloroethane	0.131
Benzene	0.532
Phenol	0.681

2. Identification of Solvents Used in Manufacturing Operations

a. Greasefree is a degreasing solvent used in the forming process. Greasefree's principle ingredient is 1,1,1-trichloroethane. We have contacted the manufacturer of Greasefree, Doubt Chemical Corporation, who informs us that their analysis of Greasefree indicates that no other priority toxic pollutants are contained in Greasefree. Doubt's letter confirming its analysis is enclosed as Attachment 1.

b. Hougewash is a degreasing solvent used in the metal castings process. Rinsewash is a multicomponent solvent we purchase from Pound Chemical Corporation. At our request Pound has analyzed Hougewash and found it contains naphthalene, benzene, and phenol. Pound represents that no other toxic organic pollutants were identified in its analysis of Hougewash. Pound's letter documenting its analysis is enclosed as Attachment 2.

c. Rustaway is a corrosion inhibitor used during the metal castings washing process to prevent rust formation. We buy Rustaway from the Exit Chemicals Corporation. The primary ingredient of Rustaway is carbon disulfide. Exit refused our request for a chemical analysis of Rustaway. We, therefore, submitted an aliquot of Rustaway to Whatsinit Laboratories, Inc., for analysis. Whatsinit's report is enclosed as Attachment 3 and documents that Rustaway contains chloroethane. No other toxic organics were detected.

3. Identification of Other Potential Sources of Solvent and Toxic Organic Pollutant Introduction to the Wastewater Treatment System

a. Durable Paints are used to finish the forming process items. Although not detected in the wastewater analysis, Durable Paints are known to contain toluene. The floor drains in the forming process painting area discharge to the wastewater treatment system. Therefore, any spilled paint would enter the process wastewater treatment system.

b. Degreasing Areas – Floor drains in both degreasing areas similarly are connected to the main wastewater system. Therefore, spills of degreasing agents could enter the treatment system.

c. Solvent Storage Areas – Solvents, paints, and corrosion inhibitors are stored in bulk quantities in four different areas of the plant—the two degreasing areas, the washing area, and the painting area. Spills could occur by accidental dumping, spillage during routine transfer, etc. Such spills would enter the wastewater treatment system through the floor drains.

II. Description of Control Options Explored

A. Solvent Substitution

For the degreasing, corrosion inhibitor, and painting sources of toxic organics, ABC explored the feasibility of substituting another product that does not contain toxic organic materials. Obviously, this would be the most effective manner of eliminating toxic organic discharges both from process operations and from potential spillage into floor drains. ABC obtained samples of degreasing agents, corrosion inhibitors, and paints that do not contain toxic organics from vendors and conducted pilot tests of their effectiveness. ABC concluded after these tests that the alternative degreasing agents and paints could not be used without adversely affecting the process and final products. The alternative degreasing agents were not nearly as effective as the ones currently used and, therefore, would impair the effectiveness of subsequent operations. Alternative paints could not be applied evenly to our products. One alternative corrosion inhibitor, Chromisorb, appears to be an acceptable alternative to the Rustaway and contains the toxic metals zinc and chromium. Thus, the option of eliminating chloroethane discharges by substituting Chromasorb for Rustaway as a corrosion inhibitor was considered.

B. Process Modifications

The major alternative to the substitution of degreasing agents is to institute changes in the degreasing process that do not result in wastewater discharge. This would be accomplished by wiping parts rather than rinsing them. After a thorough wipedown, parts would be air dried in an area under a vacuum hood. The vacuum hood is integrated with the facility's air pollution control devices. Any material used for wiping would, of course, be treated as a hazardous material. It would be transferred to drums and disposed of to a licensed disposer or reclaimer. Thus, process changes could be made that would eliminate discharge of process wastewaters containing 1,1,1-trichloroethane, naphthalene, benzene, and phenol. Solid waste generation would, of course, increase.

C. Segregated Drain System

Spills of toxic organics could be eliminated from the process wastewater stream if a segregated floor drain system were constructed. ABC investigated this option and found that, because of the location of some existing drain pipes, such modification would require a major disruption of the plant and would cost far more than routine TTO monitoring. Moreover, such an option would create a significant additional wastewater treatment problem for those cases in which drained water is not contaminated by spilled material.

D. Sealing Floor Drains

Introduction of toxic organics to wastewaters through floor drains could be eliminated if floor drains were sealed. In the process areas this option is not feasible because of state safety requirements. In storage areas, however, such an option may be practical.

E. Installing Sumps in the Floor Drains

Under this option sumps would be installed such that prior to entering the drain, floor waters would pass through a sump or holding tank. The sump would be as large as the largest spill of solvent reasonably expected plus a 10 percent freeboard allowance. Thus, if a solvent spilled, the discharge to the drain would be turned off. The solvent could, then, collect in the sump and be recovered.

III. Solvent and Toxic Organics Management Plan

As a result of the above analyses, ABC believes that all of its toxic organic pollutant discharges can be controlled by a toxic organic management plan in lieu of routine toxic organic monitoring.

A. Solvent Substitution

Discharge of chloroethane will be eliminated by use of a substitute rust inhibitor. ABC will discontinue use of Rustaway as a rust inhibitor. Instead, ABC will use Chromasorb to prevent rust formation in its metal casting line. Chromasorb is a zinc-chromate rust inhibitor that can be used to prevent rust formation in place of Rustaway. Chromasorb contains the toxic metals chromium and zinc. The existing wastewater treatment system, however, is designed to remove metallic pollutants. By adjustment of the chemical and polymer feed, ABC anticipates that it can maintain current levels of metals discharge while eliminating chloroethane discharges.

B. Process Changes

ABC will eliminate discharge of process wastewaters containing 1,1,1-trichloroethane, naphthalene, benzene, and phenol by instituting changes in the degreasing process. Solvent cleaning will be accomplished by immersion and manual wipedown. Parts will be allowed to air dry in an area covered by a vacuum hood prior to any water washing. Materials used for wipedown will be collected in drums, sealed, stored in a secure area and transferred to Usitagin Reclamation Company. Usitagin is a licensed hazardous waste disposer.

C. Solvent Storage Procedures

Storage procedures for all solvents containing toxic organic compounds will be changed. Storage will be in a central location for all such materials, including paints. The storage area will be diked to contain a volume equal to the largest contained stored, 55 gallons, plus 50 percent. There will be no floor drains in this area.

All incoming containers of solvents or paints will be labeled upon receipt with the following information:

Material Contains Regulated Organic Solvents

1. Use only in designated areas
2. Do not permit this material to enter plant wastewater stream
3. Dispose of only in designated and identified containers

All in-plant usage containers will also be marked with the above information.

D. Installation of Sumps in Process Areas

In all process areas where materials containing toxic organic compounds are used, sumps will be installed prior to any floor drains. The sumps will be designed to allow rapid shut-off of flow to the drain and to hold a volume equal to the largest container of solvent used in that area plus ten percent.

E. Spent Solvent Disposal Practices

Spent solvents are collected in 55 gallon drums, sealed, and stored in an existing, secured storage area. The storage area contains no floor drains. ABC sells spent solvent to the Usitagin Reclamation Company.

F. Training

All personnel involved in degreasing, chromating, painting, and clean-up activities will receive instruction in the proper handling and disposal of solvents and clean-up materials in order to keep regulated toxic organics out of industrial wastewater. New employees will be trained in these procedures immediately. All personnel working in these activities are familiar with this toxic organic management plan and will follow the procedure established in that standard to eliminate regulated organics from entering the water wash system.

Training consists of classroom instruction which reviews the following:

1. The organic solvents and cleaners known to be in use at the plant and the areas in which they are used.

2. The location of lift stations and drains with emphasis upon the location of pretreatment sewer systems for each area in the plant.

3. The Toxic Organic Management Plan and the proper procedures for handling and disposing of the respective solvents.

G. Inspections

1. Degreasers, spray booths, and cleaning operations will be inspected routinely by the area supervisor to verify cleaning procedures and adherence to this Toxic Organic Management Plan to insure that TTOs do not spill or leak into plant sewers.

2. Centrally located cleaning and solvent handling, reuse, and collection areas, as well as raw material and waste solvent storage areas, will be inspected weekly by a designated environmental representative to verify proper solvent storage, handling, and collection. A log of inspections and sign-off will be maintained by the designated environmental representative.

H. Implementation

All provisions of this plan will be fully implemented by January 1, 2013.

IV. Certification

"Based on my inquiry of the person or persons directly responsible for managing compliance with the TTO limitations. I certify that, to the best of my knowledge and belief, no dumping of concentrated solvents and/or toxic organics into the wastewaters has occurred since filing the last report. I further certify that this facility is implementing the toxic organic pollutant management plan submitted to the Department on January 1, 2013."

Darrell Royal
Plant Manager
High Point Plant