

# Mandated Modifications for Hollywood's Industrial Pretreatment Program

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The city of Hollywood, with a land area of approximately 29 square miles and a population of more than 125,000 in southeast Broward County, is a regional wastewater service provider to the city of Hollywood itself, the cities of Hallandale, Miramar, Pembroke Pines, Pembroke Park, and Dania, and to portions of unincorporated Broward County, for a total service area population of 240,000. Additionally, the WWTP receives secondary treated wastewater from the towns of Davie and Cooper City for reuse water.

Hollywood's 42-MGD Southern Regional Wastewater Treatment Facility, constructed in the 1940's, is a Category II, Class A oxygen activated sludge plant utilizing an ocean outfall and reclaimed water for treated effluent disposal. Treated effluent must comply with standards identified in its federal NPDES permit, state TOP, and state Surface Water Discharge Standards, Marine Class III (FAC 62-302.530) at the edge of the mixing zone. If a mixing zone is not granted for a parameter, then the effluent may be required to meet the water quality standards. The NPDES and TOP permits will be combined in the state Domestic Wastewater Permit, which has been applied for, and review is in process.

As a part of its ocean outfall permitting requirements, the Hollywood WWTP must sample for lead, copper, cyanide, silver and mercury on a monthly basis. State Discharge Permit limits must be achieved for silver and mercury. A Consent Order has provided interim limits for copper and silver (20 ppb and 10 ppb respectively). Cyanide and lead must be reported. In the absence of a specific numerical limit, the city considers the FAC 62-302.530 water quality standards without a mixing zone to apply for pretreatment effluent local limit development.

Wastewater originating from the six large users enters via 12 connections, which provide sampling points and flow meters to assess flow quality and quantity for monitoring and billing. Agreements with each of the users state conditions and average daily flows. Flow obligations acceptable to Hollywood were defined and reserved based on average daily flow figures from 1988 to 1989 with projections for Fiscal Year 1999-2000. The agreements provide quality standards the wastewater must meet to assure process protection and effluent and sludge quality.

## General Pretreatment Program Requirements

DEP, via FAC 62-625.110, requires Hollywood to implement certain pretreatment standards to prevent discharges to the wastewater facility that will interfere with the operation of the facility, including interference with its use or disposal of domestic wastewater residuals, or that will pass through or otherwise be incompatible with the wastewater facility. Another objective of the pretreatment standards is to improve opportunities to beneficially use domestic wastewater residuals.

FAC 62-625 identifies the requirements for industrial pretreatment programs. They must be based on legal authority and include, at a minimum, six requirements: comprehensive user database, legal authority, technical limits, compliance monitoring, administrative procedures, and operating resources. Authority and procedure must at all times be fully and effectively exercised and implemented. Each of these requirements must be evaluated to determine whether future action is needed on the part of the treatment.

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## DEP Audit

A comprehensive DEP audit of Hollywood's industrial pretreatment program in February 1996 involved a review of Hollywood's sewer use ordinance, industrial user files, and control mechanisms; a program interview; an inspection of select industrial users; and compliance monitoring and inspections. Despite its EPA approval, a number of deficiencies were found in the program. The deficiencies were addressed in Consent Order OGC Case No. 96-1832, and several actions were taken.

To accomplish a comprehensive revision to the user database, an industrial waste survey of every commercial and industrial user in the service area was undertaken, including reviews of over 9000 addresses in the seven jurisdictions that contribute raw wastewater. To date, all utility accounts identified as commercial have been gathered, and all commercial utility accounts have been reviewed to determine their connection to the sewer system. A database has been created that identifies sewer commercial utility accounts with detailed information, including name, address, usage, and presumed type of business. There have been field inspections of all commercial utility accounts connected to the sewer system. Additions and revisions to the initial database have included name changes and identification of previously unknown businesses (an example would be five bays of a warehouse, each different and separate businesses, although the utility account only indicated one business).

A brief survey was sent to each business requesting information on the nature of the business, and on chemicals and materials used. All of the survey information has been entered into the database.

Based on the updated database, priorities for inspection and sampling were assigned to all businesses.

Inspection and sampling was initiated. The collected data, along with field observations, provided several new permittees for the industrial pretreatment program.

## Technical Limits

The WWTP influent was sampled and analyzed to develop initial data on its characteristics and on WWTP removal ratios. Recognizing that detection limits used for WWTP effluent analyses were lowered to accurately reflect levels in the effluent, rather than report "BDL," the city formally initiated comprehensive analyses to be performed by the large users of the WWTP at their points of connection to the collection system. The industrial pretreatment program, in cooperation with the WWTP and water treatment plant laboratories, effected a change in laboratory for contracted services to obtain the necessary analysis quality. Sampling and analyses procedures were updated to near-clean techniques.

## Compliance Monitoring

All industrial pretreatment program permittee files were

reorganized to include self-monitoring sampling results, city monitoring sampling results, and chemical inventories/MSDSs. An executive summary provided sampling data for the past two years, the parameters analyzed, pending compliance issues, fees assessed, account status, and permitting information. Current industrial pretreatment program permittees have had monitoring locations reviewed and modified as necessary

## Operating Resources

The Regulatory Compliance Program FY96 budget was adjusted during the city's mid-year budget cycle. Prior to the adjustment, the only funding dedicated to the industrial pretreatment program was \$6,000 for contractual services (laboratory analyses for sampling). More than \$102,000 was transferred into the RCP budget, including over \$74,000 for laboratory services, the purchase of composite samplers, gas detector, and related consumable equipment.

The FY97 Budget provided funding over \$450,000 directly related to industrial pretreatment program operations. Of that, \$200,000 was budgeted for contractual laboratory services. A need was identified for laboratory services to analyze sampling from current permittees, expected new permittees, continued local limit development, collection system, business surveying and "special projects." The FY97 budget also provided for a regulatory compliance officer and additional compliance technicians, for a total of five positions.

## Results Of Activities

The regulatory compliance program began activities to meet the consent order deadline in early 1996. The compliance technicians physically visited and inspected over 8,400 businesses within the WWTP service area. All information learned about each business was recorded in a computerized database containing more than 140,000 pieces of information directly related to the IWS.

More than 2 MGD of industrial flow was identified during the local limit development program. The identification and quantification of average daily flow from potential industrial discharges was necessary to determine what portion of the flow and pollutant loading to the WWTP is domestic and therefore uncontrollable by the pretreatment program.

The regulatory compliance program sampled for every compound for which a state Class III Marine Discharge Standard exists, as well as all related compounds utilizing the same level of detail applied to the IWS. While EPA requires sampling of WWTP influent and effluent for four days to develop local limits for only six pollutants of concern, and recommends sampling for four other parameters, Hollywood analyzed the WWTP influent and effluent for more than 220 pollutants once per month for 13 consecutive months. One month also involved 24-hour discrete sampling for metals. This scope of sampling addressed all variables that could be considered in the WWTP influent and effluent quality, including weather patterns and tourist seasons.

Sampling was also performed by the compliance technicians at selected locations within the city and within the other users' jurisdictions. Sample locations were selected to represent "pure" industrial discharges from areas where industries were concentrated. Sample locations were also selected to represent typical wastewater characteristics from pure domestic sources. Data were also obtained at each users' point of connection to the Hollywood collection system.

## Sampling Results

All local limit sampling performed by the compliance technicians followed established standard procedures for preservatives, sample containers, sample collection order, specific equipment to minimize contamination of trace metals, specific cleaning

procedures to minimize trace metal contamination, and implementation of tamper-proofing of collected samples. Field blanks were taken at each sampling event to ensure the integrity of the sample result. Laboratory analysis detection levels for each parameter sampled were specifically selected to ensure the lowest detection limits were utilized with locally available technology. The program developed "near-clean techniques" for sampling. Analysis of samples using true clean techniques and the city's near-clean methodology show minimal difference. Several research quality labs have observed the near-clean techniques and have provided a favorable response.

The state discharge standard for silver is 2.3 ppb. The city had been granted a mixing zone for silver increasing the standard to 4.5 ppb. The average WWTP effluent silver level violation (for which the consent order was issued) was 10 ppb. The average WWTP effluent value obtained via sampling was 1.14 ppb. Of all the composite WWTP effluent silver samples, 54% were less than 1 ppb. All of the 24-hour discrete samples were less than 1 ppb (with an average of 0.48 ppb). One of the 13 samples for silver exceeded the state standard (by 0.5 ppb). All silver results in the domestic sampling locations and in the industrial locations were less than 0.5 ppb. Silver analyzed by a laboratory with an EPA Level 4 QA/QC Plan and a silver detection limit of 0.006 ppb showed less than 1 ppb was standard. Silver was not the problem it was anticipated to be.

The average WWTP effluent violation for copper was 21.6 ppb as compared to the state water quality standard of 2.9 ppb. The average composite sample level of copper obtained by sampling was 2.8 ppb. The average copper level in the discrete samples was 1.17 ppb. Three of the 13 samples for copper exceeded the state water quality standard, ranging from 0.80 to 6.8 ppb above the limit. No copper samples exceeded 10 ppb.

Industries discharging process wastewater containing copper represent less than 2% of the total WWTP average daily flow. Copper was identified at those locations at an average level of 19 ppb. Averaging composite and discrete data, copper was identified in the WWTP influent at a level of 12 ppb. The average influent level of copper utilizing strictly 24-hour composite data was 21 ppb. The copper level in domestic sampling locations ranged from 10-20 ppb.

Copper in domestic discharges is not within the purview of the industrial pretreatment program and cannot be addressed through public education. Copper levels in domestic discharges are believed to be due to copper piping and the presence of copper in the raw, untreated water supply.

The average WWTP removal ratio for copper was 87%. With this ratio, the WWTP appears to have the ability to effectively remove copper loading. In fact, all effluent copper levels were less than the state water quality standard when influent copper levels ranged from 30 to 50 ppb. A mixing zone request is pending for copper.

Lead levels exceeding the state discharge standard of 5.6 ppb had been reported in the past, most recently in September 1998. The average WWTP effluent value for lead obtained via regulatory compliance's sampling was less than 1 ppb. All of the effluent lead samples were in compliance with the state discharge standard. Of regulatory compliance's composite WWTP effluent lead samples, 92% were less than 1 ppb. All of the 24 hour discrete effluent lead samples were less than 1 ppb (with an average of 0.27 ppb). All lead results in the domestic sampling locations and in the industrial locations were less than 0.5 ppb. No evidence was found that lead is a problem.

WWTP effluent free (not amenable to chlorination) cyanide levels exceeding the state water quality standard of 1 ppb for total cyanide had been reported to DEP in the past, most recently in August 1998. The best locally available technology detection limit for cyanide is 4 ppb. While this detection limit is

acceptable to DEP, it does not meet the regulatory requirements of the FAC. Regulatory compliance has experience sampling industries that utilize cyanide and discharge limited amounts of cyanide into the collection system. Results for such samples have rarely exceeded 30 ppb. Cyanide users discharging wastewater to the Hollywood WWTP represent less than 1% of the total WWTP flow. With the knowledge of the relatively low end-of-pipe concentrations for direct dischargers, the presence of cyanide in WWTP effluent at any level above 4 ppb was questionable.

Special sampling projects indicated cyanide was present where it was expected to be present, and not present where it was not expected (e.g., water plant brine). All WWTP effluent samples for total and free cyanide have been less than 4 ppb since the institution of the field preservation procedures. However, sampling of WWTP influent, domestic sources, and industrial concentrations have generally not been performed using the necessary techniques. Nitrates can have a positive interference with cyanide analyses if not properly addressed by the laboratory, while sulfides, even in concentrations below the detectable limits, can cause false positives in cyanide analyses without the appropriate field preservation methods. The presence of cyanide in the collection system and in WWTP influent and effluent was determined not to be a problem despite prior results to the contrary. The analysis of cyanide at part per billion levels continues to be investigated. Many other entities, including the state of North Carolina, are investigating alternative forms of cyanide analysis because of the complexities of wastewater matrices.

The state water quality standard for iron is 0.3 ppm. While the Hollywood WWTP does not sample monthly for iron as part of its NPDES/DEP requirements, regulatory compliance sampled for it monthly for 12 months. The average influent concentration of iron was 1.36 ppm, and the average effluent concentration was 0.37 ppm. The WWTP iron level exceeded the state water quality standard in 42% of the effluent sampling events. The average domestic concentration for iron was 1.02 ppm. The effects of iron leaching from the sewer collection piping system and in groundwater in western areas contributes to the problem. The Hollywood potable water supply contains an average iron concentration less than 0.05 ppm.

The state water quality standard for hexavalent chromium is 50 ppb. All sample results for WWTP effluent, domestic, and industrial concentrations were less than 10 ppb. One of the 13 WWTP influent samples indicated the presence of hexavalent chromium at a level of 52 ppb. The corresponding effluent sample was less than 10 ppb.

The state water quality standard for nickel is 8.3 ppb. Nickel was not identified above a detection limit of 5 ppb in domestic and industrial sampling locations, or in any WWTP effluent samples. Nickel was identified in 3 of the 13 WWTP influent samples at levels ranging from 5 ppb to 25 ppb.

The state discharge standard for zinc is 86 ppb. Zinc was identified in all domestic samples, WWTP influent samples, 12 of the 13 effluent samples, and half of the industrial concentration samples. The average WWTP influent zinc level was 107 ppb. The average WWTP effluent zinc level was 43 ppb. All of the WWTP effluent samples for zinc were in compliance with the state discharge standard. The average domestic zinc level was 87 ppb. The average WWTP removal efficiency for zinc was 59%. The WWTP was in compliance with zinc standards.

The state discharge standard for aluminum is 1.5 ppm. Aluminum data obtained to date indicate a domestic concentration ranging from less than 10 ppb to 5 ppm. Data collected within industrial areas indicate aluminum concentrations of less than 10 ppb to as much as 300 ppb.

The state discharge standard for mercury is 0.025 ppb. Mercury data for WWTP influent and effluent, as well as domestic concentrations and industrial concentrations, indicate concentrations less than 0.2 ppb (the best locally available detection limit).

Regulatory compliance sampling of WWTP influent, effluent, pure domestic discharges, and concentrated industrial discharges for beryllium, arsenic, mercury, cadmium, thallium, selenium, chromium, and antimony did not identify concentrations above detection limits, which were the lowest available utilizing local technology; less than the state marine water quality standards for arsenic, cadmium, thallium, selenium, and antimony. Local technology was not sufficient to quantify beryllium and mercury at levels less than the state marine water quality standard.

Sampling of the WWTP influent and effluent, as well as domestic and industrial locations, did not provide data on any pesticide, herbicide, PCB, radioactive element, or volatile or semi-volatile compounds, other than lindane, heptachlor, and endrin, which could lead to violations of the state marine water quality standards, interference to the WWTP, harm to sewer collection system workers, or violations of sludge ceiling concentration limits.

Sampling results indicated that COD, BOD, TSS, and TKN were representative of concentrations found in domestic wastewater, while TKN in domestic sampling and WWTP influent sampling were approximately double the concentrations found in domestic wastewater.

The state discharge standard for oil and grease is 5 ppm. Hollywood's local limit is 100 ppm (a reflective of domestic concentrations). The average domestic concentration obtained by regulatory compliance was 42 ppm. It is believed this average is artificially elevated due to a suspect data point from one of the users. The average WWTP influent level in the regulatory compliance sampling was 19 ppm. The average effluent level was 1.8 ppm (an average removal ratio of 90%). The effluent level never exceeded the state discharge standard in 13 sampling events. Regulatory compliance personnel are considering the implementation of a grease-trap inspection program, or developing a surcharge limit for oil and grease, as its presence in the wastewater collection system can adversely affect operations.

## Conclusions & Recommendations

None of the efforts of the pretreatment program was able to identify any areas in which the Hollywood WWTP was creating a problem in the protection of Florida's environment. There is no indication that industry is a significant contributor of pollutants to the Hollywood WWTP, which is effective at removing significant amounts of the pollutants it receives. Improper sampling techniques and/or laboratory analysis procedures may have been responsible for results indicating that the city had violated its permit standards. Because of those faulty results, the city may have been subjected to a consent order for which no true violations occurred.

**Most technical articles from back issues of the *Florida Water Resources Journal*, beginning with January 1995, are available at [www.fwrj.com](http://www.fwrj.com).**

# Teamwork Meets a Critical Water Need

Linda Seashore Larsen

In response to severe drought conditions in the spring of 1999, the Sarasota board of county commissioners directed the county's environmental services/utilities department to arrange for temporary emergency water supplies for citizens with dry wells.

In cooperation with other county and state agencies, the community, and the media, the department responded with both short- and long-term plans for meeting citizens' needs. The team, with disparate viewpoints and resources, came together to solve an immediate problem. It stayed together to determine ongoing methods to identify and conserve water resources.

Team accomplishments included:

- Providing an emergency supply of potable water to affected areas;
- Engineering an innovative temporary supply of non-potable water at individual properties;
- Reaching out and educating the public about water conservation and the drought situation;
- Creating increased water restrictions and strongly enforcing them; and
- Devising a plan to identify and mitigate the causes of the emergency.

## The Situation

In the spring of 1999 Sarasota County was experiencing a severe drought that caused many of the wells in the county to fail. Lack of rain is a double-edged sword. Dry weather increases demand for outdoor irrigation and, at the same time, decreases the supply available to irrigate, thus causing an additional strain on water supplies. Water tables dropped due to the drought, and the problem was exacerbated by increased watering by those using irrigation wells. Residents irrigating their lawns compete for the same resource as homeowners using wells as their only source of water for drinking and cooking as well as for sanitation.

Some areas in the county did not have existing water lines for residents' connection. In addition, capacity fees and other connection costs were more than some families could afford in some neighborhoods where lines did exist. Citizens turned to local government for relief.

## The Program

A meeting of staff representing all county business centers, the Health Department, and SWFWMD was held to discuss ways of meeting the emergency. After discussion of the situation there was a realization that we were facing one core problem: how to provide a safe, reliable source of water to residents.

The group was divided into committees to work on the following goals:

- Provide non-potable and potable water to citizens with dry wells;
- Educate the public about water conservation and the drought;
- Strengthen water restrictions and enforcement;
- Confirm community interest in water line extensions;
- Expedite water line extensions in selected communities; and
- Develop long term water resource management plans and strategies.

## Short-Term Response

The team members immediately began to work to provide an emergency supply of potable water within or near affected

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areas. A sterilized water tank and water faucets attached to fire hydrants were utilized as delivery systems. Residents could bring containers to several sites and fill them with free potable water. Community groups helped to coordinate, to share information among neighbors, and to organize meetings to update homeowners.

The committee also investigated the problem of bringing non-potable water to houses for showers, laundry, and other non-potable uses. After studying several alternatives, it was decided to buy 220-gallon portable water tanks and set them up when requested on the property of individuals with dry wells. A team of people, looking at a serious problem, created this innovative solution serving a public need.

Requests for temporary service were handled in the same manner as any request for water service. A minimal security deposit was required and homeowners billed monthly at a nominal rate.

Albritton's, a local fruit packing company, offered its warehouse and loading dock to receive the shipment of emergency tanks and store them for a short time. Utilities field operations staff, responsible for placement of the temporary water tanks, engineered a method of setting the 220-gallon plastic tanks on plywood platforms on a cinderblock base raising it to a level convenient for customers to fill containers. The Health Department supplied information for water disinfection that was distributed with each application for temporary service. Volunteer firefighters and county utilities personnel worked daily to keep the tanks full. The program is still ongoing.

Publicity was needed to gain the cooperation of citizens. A brochure explaining the "Drought of '99" and how citizens could help was written, printed, and distributed by volunteers to libraries, parks, county lobbies, extension service, homeowner associations, and businesses dealing with water and well supplies. Additional efforts included media interviews, press releases, and public speaking engagements at such groups as the Rotary Club and the homeowner associations. Daily updates were electronically sent to county administration, all team members, interested homeowners, SWFWMD, and all business center directors.

On May 25, 1999, the Sarasota board of county commissioners increased fines for irrigation violations and decreased hours that residents were allowed to irrigate landscape. Additional staff was hired to strongly enforce the new regulations. County staff out in the field throughout the county, as well as concerned citizens, enhanced their efforts. A phone number was published to identify violations and "Water Police," as they were dubbed, went to the locations and gave warnings and educational materials.

For individuals who could connect to existing lines, a payment plan was implemented for required fees. Residents could finance the fees for up to twenty years at 3% interest instead of having to pay a single lump sum up front.

After the initial emergency was under control, the team remained together to tackle long-term water resource management plans and strategies. A Countywide Water Council spearheaded efforts, and work continues today. A new water conservation ordinance was written with input from the council and adopted by the board of county commissioners. A pamphlet dealing with outdoor landscape irrigation is in draft form. A water conservation Web site is being created to keep restrictions



News media reporting on 220-gallon temporary tank installed during the "Drought of '99." Most are still in place and being used.



A volunteer firefighter filling tank while news media camera films. Utilities staff continue to fill tanks daily.

current and to give suggestions about what people can do to save water indoors and outdoors. Landscape codes are being reviewed. News articles and video interviews have been produced informing residents about such things as using drought tolerant ground covers.

Sarasota County recently entered into a joint funding agreement for a groundwater study in one of the areas hardest hit by dry wells. Its purpose is to identify problems and management options to solve the groundwater supply problem. The project will also produce a map identifying areas countywide that use wells for drinking water, and that will help the planning of future water lines.

To confirm community interest in water line extensions, 1600 surveys were mailed to property owners in identified areas with dry wells or a history of dry well problems. Returned surveys formed the basis for a list of priority areas to receive

central water. An allocation of \$1.2 million was made to build water lines to the priority areas. Currently water lines are in design, or contracts have been awarded. The most impacted area will have water lines by the time you read this. Current plans call for \$1.2 million each year to extend water lines to areas currently served by individual wells.

The teamwork has even been recognized by the *Sarasota Herald Tribune*, which, on August 8, 1999, published an article titled "Jobs Well Done." The first sentence was "Now that the peak of a local water shortage appears over, some unsung heroes are due a little public applause." The article went on to identify the efforts of the team.

As the council continues to work together, the mission of serving Sarasota County in the preparation for and response to drought events, and the development of long-term water resource strategies, becomes more and more a reality. ■

### Glossary of Common Terms

AWT	advanced water treatment
AWWT	advanced wastewater treatment
AWWA	American Water Works Association
BOD	5-day biochemical oxygen demand
BOD <sub>5</sub>	BOD test based on other than 5 days
CBOD	5-day carbonaceous BOD
COD	chemical oxygen demand
CWA	Clean Water Act
DEP	Florida Dept. of Environmental Protection
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FAC	Florida Administrative Code
FSAWWA	Florida Section of AWWA
FWEA	Florida Water Environment Association
FWPCOA	Fla. Water & Pollution Control Operators Assoc.
GIS	Geographic Information System
gpcd	gallons per capita per day
gpd	gallons per day
gpm	gallons per minute
hp	horsepower
MGD	million gallons per day
mg/L	milligrams per liter
MLSS	mixed liquor suspended solids
MLTSS	mixed liquor total suspended solids
NPDES	Nat. Pollutant Discharge Elimination System
NTU	nephelometric turbidity units
POTW	public-owned treatment works
ppm	parts per million
ppb	parts per billion
psi	pounds per square inch
RO	reverse osmosis
SCADA	supervisory control and data acquisition
SJRWMD	St. Johns River Water Management District
SFWMD	South Florida Water Management District
SRWMD	Suwannee River Water Management District
SFWFMD	Southwest Florida Water Management District
TDS	total dissolved solids
TOC	total organic carbon
TSS	total suspended solids
USGS	United States Geological Survey
WEF	Water Environment Federation
WRF	water reclamation facility
WTP	water treatment plant
WWTP	wastewater treatment plant