



## Harris County (TX) Pollution Control Services selects Sample Master® LIMS to optimize laboratory.

Manual entry and paper have been largely eliminated, analysts are spending more time on analysis and the work required for regulatory compliance has been reduced.

### Company Profile

The Harris County Pollution Control Services (PCS) Department laboratory is accredited by the National Environmental Laboratory Accreditation Program (NELAP) under the authority of the Texas Commission on Environmental Quality (TCEQ), and is capable of performing chemical and microbiological analysis on a variety of environmental sample types, such as air, water, soil, and solid waste. These analyses include classical water quality parameters, such as BOD, pH, nutrients, E. coli, etc., and instrumental techniques such as toxic metals and organic pollutants.



The laboratory also provides analytical services and Quality Assurance oversight of the joint Harris County, City of Houston and the Texas Department of Transportation stormwater permit. Other organizations that use the laboratory's services include Harris County's Environmental Enforcement Division, the Flood Control District, and various municipalities.



**Harris County (TX) Pollution Control Services**  
Pasadena, Texas  
[pcs.harriscountytx.gov](http://pcs.harriscountytx.gov)

For over 65 years, the Harris County Pollution Control Services (PCS) Department has worked toward ensuring clean air and water for the citizens of Harris County, Texas consistent with the protection of public health, enjoyment of property, and the protection of plant, animal, and marine life. The Laboratory Services Section routinely analyzes the effluents of the approximately 175 industrial and 450 municipal permitted wastewater facilities in Harris County and provides analytical support for the various programs and services within the PCS Department.

### Their Challenge

For over twenty years, the laboratory at the Pollution Control Services Department utilized an in-house data management solution developed in Microsoft Access. The application served as their Laboratory Information Management System (LIMS) during this time and the internal name of the application was Poll Tracking LIMS (PTL). Updates and enhancements to PTL were developed by the IT department and this process continued over the next twenty years.

Although functional, PTL had some significant shortcomings that created issues that impacted factors like data quality and lab productivity. These challenges included:

- System was not designed with the capability to create audit trails.
- System did not have the ability to create unique sample IDs.
- System was not able to create or use Electronic Data Deliverables (EDD).
- System did not have an easy reporting solution - dependent on IT to create/modify reports.
- The laboratory had to adapt to a system that was not designed specifically for them.





### Harris County Pollution Control Services Department Laboratory

The lab also faced challenges completing their accreditation process for the Texas Commission on Environmental Quality (TCEQ). The TCEQ is responsible for auditing water and wastewater laboratories in Texas to ensure compliance with the National Environmental Laboratory Accreditation Program (NELAP). NELAP requires laboratories to document metrics like time collected and time analyzed on any reporting of samples with short hold times. Unfortunately, the LIMS used by PCS was not designed to keep track of this data in an automated fashion so created a challenge for lab staff to manage this data and then add it to the existing reports for NELAP compliance.

Harris County HCPHES The John H. Bushman Environmental Public Health Division		SAMPLING RECORD: PERMITTED SOURCES AND ROUTINE RUNS	
ID NO.:	433	PERMIT NO.:	OUTFALL: 00
		DATE: 7/24/14	TIME: 12:12 12PM
NAME:		KEY MAP: 446R	MS4/T(Y/N):
SITE:		LATITUDE: 29.472	LONGITUDE: 95.375
SITE DIRECTIONS:			
TESTS AND MEASUREMENTS			
<input checked="" type="checkbox"/> TOTAL C2 AFTER DETENTION (LIMT: 1.0 - 4.0 mg/l) <input type="checkbox"/> 0.048 <input checked="" type="checkbox"/> COLORIMETER <input type="checkbox"/> SCREEN		<input type="checkbox"/> DISSOLVED OXYGEN (mg/l) <input type="checkbox"/> SALINITY (ppt)	
<input type="checkbox"/> IS THIS A DECHLORINATION PLANT?: No <input type="checkbox"/> Suspended Solids: Yes <input checked="" type="checkbox"/> No		<input type="checkbox"/> SPECIFIC CONDUCTIVITY (us) <input type="checkbox"/> DEPTH (ft.)	
<input type="checkbox"/> PH <input type="checkbox"/> TEMPERATURE <input type="checkbox"/> 0°F <input type="checkbox"/> °C <input type="checkbox"/> pH standard units (LIMT: 6.0 - 9.0 units) <input type="checkbox"/> STRIP <input checked="" type="checkbox"/> METER		<input type="checkbox"/> SECCHI DISK TRANSPARENCY (meters)	
FLOW MEASUREMENTS			
DEVICE TYPE: V-notch      DEVICE SIZE: 16"      MEASURED HEAD: 6.5 inches ACTUAL FLOW: 243.1 GPM      0.3501 MOD		PERMITTED HEAD: 2.292 gpm Peak PERMITTED FLOW: 0.925 GPD Avg	
FIELD OBSERVATIONS			
<input checked="" type="checkbox"/> CLARITY: 1-clear 2-al-most cloudy 4-muddy <input type="checkbox"/> Suspended Solids: Yes <input checked="" type="checkbox"/> No		WATER ODOR: 1-sewage 2-chemical 3-rotten egg 4-mucky 5-fishy 6-grease 7-father	
<input checked="" type="checkbox"/> WATER COLOR: 1-brownish 2-redish 3-greenish 4-brownish 5-clear 6-other		PRESENT WEATHER: 1-clear 2-partly cloudy 3-cloudy 4-overcast 5-rainy	
<input type="checkbox"/> SURFACE CONDITIONS: 1-clear 2-susum 3-turbid 4-brown 5-brown		6-days since last significant rainfall (Runoff): 2	
SAMPLES			
<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> DIRECT <input type="checkbox"/> COMPOSITE <input checked="" type="checkbox"/> INDIRECT <input type="checkbox"/> SPLIT		ACCOMPANIED: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO      REPORT: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO DPRS: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO      VIOLATION: <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO OBSERVED: <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
NOTIFICATION			
CONTACT PERSON(S): CONTACT PHONE(S): OPERATOR: ST Environmental Services, Inc.      DATE: 7/24/14      TIME: 12:12 12PM PERSON CONTACTED/EDITED: <input type="checkbox"/> RESPONSE: <input checked="" type="checkbox"/> STREET he was on his way to check at 35B <input type="checkbox"/> he said he was down the road & CUSTODY should be at STP shortly RECEIVED IN LABORATORY BY: <input type="checkbox"/> DATE: 9/3/14      TIME: 2:45 AM/PT      RUN NUMBER: 20110231			

### Example of HCPCS Chain of Custody Prior to ATL Sample Master® LIMS

There were other shortcomings in the LIMS that was creating problems for PCS. There were no QA/QC features like the ability to graph results and create control charts. As a result, the lab had to create QA/QC templates in Microsoft Excel - not very efficient. The use of these disparate tools generated a significant amount of paper, which caused data quality challenges on a regular basis. And because the lab's instruments were not interfaced to the LIMS led to the fact that turnaround time on sample testing was noticeably long - something the staff and management wanted to turn around.



## Our Solution

In 2016, after over twenty years of using their in-house developed Poll Tracking LIMS, Harris County Pollution Control Services was finally able to get approval to purchase a commercial off-the-shelf Laboratory Information Management System. For several years, PCS had made this request to management but could not secure budget funding. Finally, in 2016, PCS received funding approval and went through a formal Request for Proposal (RFP). PCS considered several LIMS products before finally selecting ATL's Sample Master LIMS. The primary reasons for choosing Sample Master included the product's ease of use, configurability, a feature set that is optimal for environmental laboratories, and ATL's long-established reputation for implementation expertise and outstanding customer support.



ATL worked together with the PCS laboratory staff to implement Sample Master. The PCS staff consisted of a Laboratory Manager, two Laboratory Supervisors, lab custodian (login specialist), four analysts and a LIMS Administrator - QA/QC Officer.

Once PCS went live with Sample Master, the lab started seeing immediate benefits. With initial on-site training provided by ATL, analysts came up to speed learning how to use Sample Master and making the transition from Poll Tracking LIMS. Once the lab went live with Sample Master, there were several capabilities with the new LIMS that excited both analysts and management. This included the ability to create unique sample ID numbers, having defined roles and permission levels within Sample Master and instrument integration.



**Instrument integration accelerates data management with Sample Master LIMS**

Having the LIMS create unique sample IDs solves a host of potential data management challenges in addition to speeding up the login process. Being able to define specific roles for lab personnel and then defining what functions or permissions are available for each role was a huge benefit for a number of reasons including now having a defined approval process (review/validation/approval) that would meet NELAP compliance requirements. Instrument integration with Sample Master has made a significant impact on the lab's productivity as manual entry has been eliminated and analysts can spend more time doing sample analysis.



Another big benefit from implementing Sample Master was the enhanced reporting capabilities provided by the new LIMS. A comparison of the reporting capabilities provided by the previous LIMS vs. Sample Master (see below) demonstrates limitations on data points and formatting by the lab. Using Sample Master now provides PCS with rich reporting and formatting capabilities they did not have with their old LIMS. Sample Master was also designed to allow lab personnel to create and modify their own reports, thus freeing the lab from depending on the IT department for report creation.

 <b>Pollution Control Services Department</b> 101 S. McKinney, Suite H Pasadena, Texas 77506 FAX: 713-274-6475 713-920-2831			
<b>SAMPLE DATA</b>			
ATTN: [REDACTED]	ID NO.: [REDACTED]		
SAMPLE SITE: [REDACTED]	PERMIT NO.: [REDACTED] OUTFALL: [REDACTED]		
SAMPLE AMOUNT 1x1/2gal-P 1x100ml-P 1x250ml-P	SAMPLE DATE: 10/02/14		
APPEARANCE: Slightly Cloudy/Suspended Solids	SAMPLE TIME: 11:20 AM		
SAMPLED BY: [REDACTED]	RUN NO.: 2014J02		
PLANT TYPE: STP	VN SENT: <input checked="" type="checkbox"/>		
SAMPLE TYPE: Grab			
COPY TO: _____			
<b>FIELD MEASUREMENTS</b>			
PARAMETER mg/L (except as noted)	DETERMINED VALUE	PERMIT	LIMIT
pH	7.01	6.0	- 9.0
Cl <sub>2</sub> after detention	0.36	1.0	- 4.0
Dissolved Oxygen	4.0		
Days Since Last Significant Rain	4		
Flow (MGD)	0.0111	0.04 MGD / 92	gpm Peak
<b>LABORATORY ANALYSIS</b>		PERMIT	LIMIT
PARAMETER mg/L (except as noted)	ANALYTICAL RESULTS ORIGINAL	DUPLICATE RECHECK %	SPIKE %
Total Suspended Solids	30	28	60
Car. Bleach, Oxy. Demand	4*	5	35
Ammonia Nitrogen	0.8		15
E. coli (mpn/100ml)	31		200 MPN/l

**Example of HCPCS Report Prior to Sample Master LIMS**



**Analytical Results**  
Reported 11/6/18

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Client Sample Number:	174687	Lab Sample ID:	18103006-01					
Site:		Collection Date:	10/30/18 11:36 AM					
Matrix:	Water	Receive Date:	10/30/18 01:15 PM					
Analyte	CAS	Method	Result	RL	Permit Limit	Analysis Date	Flag	Dil
E. coli		IDEXX Collected	< 10 MPN/100ml	10	200	10/30/18 1:39:00 PM		10
Total Suspended Solids		SM 2540D	6.62 mg/L	3.85	60	10/31/18		1.54
Ammonia as Nitrogen		SM 4500-NH3 D	< 0.200 mg/L	0.200	15	10/31/18		1
Carbonaceous Biochemical Oxygen Demand		SM 5210B	3.81 mg/L	1.00	35	10/31/18 10:45:50 AM		

**Example of HCPCS Report Created in Sample Master**

A key motivating factor to getting a new LIMS was using it to reduce the work required to maintain accreditation with TCEQ and NELAP compliance. Sample Master has made a big difference as PCS uses the approval process and roles/permissions built into the LIMS to improve data quality. Implementing Sample Master has also eliminated a great deal of paper and Excel forms - everything is now in the LIMS. Auditors now come with confidence on data quality knowing that PCS has a proven LIMS that has been optimized for their laboratory. It should also be mentioned that PCS also is taking advantage of the QA/QC function in Sample Master to monitor results and react quickly to potential out-of-compliance scenarios. The lab staff and management at PCS is very pleased with Sample Master and looks forward to taking advantage of more of its capabilities.

Accelerated Technology Laboratories (ATL), headquartered in West End, NC, provides laboratory automation solutions to a variety of industries from analytical, environmental, food & beverage, water and wastewater, chemical, government, public health, clinical testing, and manufacturing. ATL's LIMS products are installed in over 575 laboratories around the world and supported by a steadfast commitment to excellence in product quality, support, and training. ATL is one of the few LIMS providers that is ISO 9001:2015 certified. For additional information, visit [www.atlab.com](http://www.atlab.com).



**Sample Master® LIMS is providing our lab with huge benefits including a dramatic reduction in turnaround time for sample results, powerful QA/QC features that allow us to qualify results quickly, and the ability to create detailed reports the way we want to see them.**

- Michael Cantu, Laboratory Manager, Harris County Pollution Control Services