

SDMC Laboratory Department Overview 2021

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Information provided by Sue Lehman, Laboratory Manager/Quality Management System Manager

Monthly	Annually	≈ Tests Per 30-day Month
606	7272	pH measurements: pH (14 daily permit, process control), acidity/alkalinity (96 monthly process control), CBOD (3 daily permit, process control)
300	3600	Ammonia, Nitrogen (12 daily: permit, process control)
270	3240	Total Residual Chlorine (9 daily: permit, process control)
300	3600	Total Phosphorus (9 daily permit, process control)
seasonal	1450	E. Coli (486 effluent April-Nov permit, MC Beaches for Park Department Grant (912 May 16 – Sep 7) (no analysis Dec-Mar) + ≈50 miscellaneous extra samples (estimated for 2021)
60	720	30-Minute Settling (2 daily process control)
540	6480	CBOD (9 daily set for analysis, 9 daily off for results)
300	3600	Total Suspended Solids (10 daily, permit, process control)
210	2520	Total Solids (7 daily, process control)
210	2520	Total Volatile Solids (7 daily, process control)
16	192	Acidity (4 weekly process control)
16	192	Alkalinity (4 weekly process control)
4	48	MLSS Microorganism Identification (1 weekly process control)
1520	18240	Temperature measurements: pH (19 daily), CBOD (4 daily), ammonia nitrogen (9 daily), acidity/alkalinity (20 weekly), equipment logs (16 daily) (analysis procedure requirements permit, process control)
		Documentable Non-routine Analysis The following are individual analysis projects. There are occasions when a SDMC staff member delivers a sample and request a verbal result. These are not documented as they are often used for process control and are not necessary to document as requested by the sampler. Analyses requested have included residual chlorine, settling, E. coli, and pH samples and are not included in these totals.
20	200	Phosphorus (Cheney Run)
20	200	Ammonia (Cheney Run)
20	200	Total Suspended Solids (Cheney Run)
20	200	Turbidity (Cheney Run)
seasonal	150	Turbidity (MC Beach)
	19	Chlorine Residual (Industrial)
4432	54643	APPROXIMATE TOTALS

Above analyses totals *approximate* the monthly and annual totals. The monthly total is calculated on a 30-day month.

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Laboratory: Total phosphorus and ammonia analyses underwent extensive method changes in 2021 replacing procedures that had been in practice since prior to the 1970's. These were the last of the equipment improvements that began with the change to the Colilert E. coli procedure in 2018 continuing through the replacement of several benchtop meters and equipment in the following years, updating CBOD, pH, chlorine, and solids testing.

In March the last of the older testing equipment failed (Beckman spectrophotometer) and the lab invested in the Hach Spectrophotometer, Reactor, and TNT methods for phosphorus and ammonia analysis.

In June the Milli-Q distilled water system was installed. This system replaced a 1970's glass still that was taken out of service several years ago when parts became unavailable. The Milli-Q system provides the distilled water that is used in all aspects of laboratory testing and reagent preparation. The water system resolved the problem of unreliable laboratory water quality that was becoming a source of concern and had been found to be the root cause of several nonconformities in CBOD testing dating back to February 2020.

In 2022 it is planned to replace the low temperature incubator for CBOD (carbonaceous biological oxygen demand) as the final large item laboratory equipment.

On the wish list for the coming year are renovations to replace the wallpaper in favor of a more durable surface and replacing the flooring with a product more suited for cleaning and sanitizing to improve the laboratory features that were originally installed during the 1985 treatment plant renovations. Another item to consider will be a household type of refrigerator, as the Kenmore purchased in 1987 that is used for sample, reagent, and reference material storage is going on 35 years old.

Lab Staff: The laboratory is staffed by four technicians, including the Laboratory/QMS Manager. The laboratory works every day of the year, including holidays. Two staff members are scheduled Sunday through Thursday and two on Tuesday through Saturday. The schedule overlaps three days Tuesday through Thursday when the bulk of weekly sampling and outside projects are scheduled.

Two members of the lab staff have Indiana Operator's Licenses. Sue Lehman, Laboratory Manager holds a Class IV Municipal Operator's license and a Class D Industrial Operator's license. Kat Vedo holds a Class II Municipal Operator's license. Laura Pasky and Dana Kinney are proficient in the testing methods and have documented competency in all NPDES permit analyses for SDMC.

Internal laboratory training is ongoing and held as necessary for lab safety, testing proficiency, and conformity to best laboratory practices.

Standard Operating Procedures for analyses, Competency, Performance Testing, and Staff Training - records available for 2021:

Ammonia as Nitrogen (SOP-203), Total Phosphorus (SOP-211)

Total Residual Chlorine (SOP-205), E. coli (SOP-208), pH (SOP-210)

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CBOD Carbonaceous Biological Oxygen Demand (SOP-204), Dissolved Oxygen (SOP-207)

Total Suspended Solids, Total Volatile Suspended Solids (SOP-213)

Total Solids, Total Volatile Solids (SOP-212), 30-Min Settling and (SOP-201)

Turbidity (SOP-214), Acidity and Alkalinity (Volatile Acid Ratio) (SOP-202), Conductivity (SOP-206)

SDMC Lab Policy Documents:

Quality Management System Documents: SOP-100 through SOP-130

Laboratory Procedure Documents (non-analytical): SOP-300 through SOP-321

Accreditation: Consultant/Assessor Carolyn Elmore, Labtopia, Inc. representing A2LA conducted the renewal assessment of the quality management system in April 2021. The Laboratory was awarded accreditation in chemical testing for the SDMC Scope of Accreditation to ISO/IEC 17025:2017 in March 2021. The phosphorus analysis had been removed from the scope during the audit as the test was transitioning between methods. In house analytical testing was resumed in April 2021.

Ms. Elmore was able to audit some aspects of the test, however quality control requirements for final inclusion in the scope namely, method detection limits (MDL), final revisions of the Standard Operating Procedure (SOP-211), and DMRQA testing had yet to be completed. In November, Ms. Elmore and the A2LA accreditation officer validated that all requirements for accreditation had been met and the phosphorus test procedure was returned to the scope of accreditation December 7, 2021.

Performance Testing: DMRQA-41 (study dates April-August 2021), and Study 315 (study dates April-May 2021) results were submitted to ERA, an accredited provider of Certified Reference Materials (CRM), for validation. Acceptable results in all parameters tested were received by September 2021.

Laboratory Reports for Operations, Projects, and NPDES Permit Requirements:

Lab-Ops Data: This report provides a daily electronic report and is available for all Sanitary District management and staff and provides laboratory results, operational data, and precipitation data with monthly averages and annual statistics. The Plant Superintendent and Lead Operator use the information within this report for the completion of their monthly activity reports. The monthly regulatory reports are created from the data in this file. (Laboratory Data, Operations Data, CSOMRO Data)

Project Reports: These reports provide the data results and include copies of the field and chain of custody sheets. These documents provide records for project personnel. Project reports are provided in a format as requested on the sample submission form when the lab is contacted to analyze a sample. (Laboratory data report verbal, electronic, or hardcopy format)

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Monthly Report of Operations (MRO) Outfall 001B: This report satisfies the NPDES requirement for reporting about the plant effluent from Outfall 001B and plant operations monitoring, including raw influent, primary effluent, secondary effluent, digesters, sludge, and chemicals used. Each month the data from the Lab-Ops report is transferred to the IDEM form that becomes an attachment to the electronic submission of the NetDMR report. (IDEM/EPA NPDES Permit IN0023752)

Monthly Report of Operations Combined Sewer Overflow (CSOMRO) Outfall 002CP: This report satisfies the NPDES requirement for reporting about the Combined Sewage Storage Basin Outfall 002cp. Each month the data from the Lab-Ops report is transferred to the IDEM form that becomes an attachment to the electronic submission of the NetDMR report. However, there has not been a discharge from this outfall since February 2018. (IDEM/EPA NPDES Permit IN0023752)

Quarterly BQ-Main Outfall Quarterly Parameters Outfall 001B: This report satisfies the requirement to report the permitted parameters which are sampled quarterly and is an electronic submission to the NetDMR due in the months of March, June, September, and December. (IDEM/EPA NPDES Permit IN0023752)

NetDMR Outfall 001B, 002CP, BQ Quarterly 001B: NetDMR is the Environmental Protection Agency (EPA) Central Data Exchange (CDX) - the Agency's electronic reporting site for NPDES permit holders to submit required reports. (IDEM/EPA NPDES Permit IN0023752)

NetDMR Biomonitoring 001B: Twice annually, this report is submitted with the Whole Effluent Toxicity (WET) results. Although the SDMC does the tests in March and October, the results are submitted in July (for March) and February (for October), as instructed by IDEM. (IDEM/EPA NPDES Permit IN0023752)