![pennsylvania DEPARTMENT OF ENVIRONMENTAL PROTECTION]

Quality Assurance Project Plan

for

Reporting of Pennsylvania NPDES Point Source Data to EPA's Chesapeake Bay Program

Project ID: N/A

Effective Date: September 1st, 2023

EPA Document Control
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This quality assurance project plan (QAPP) has been prepared according to guidance provided in the following documents to ensure that environmental and related data collected, compiled, and/or generated for this project are complete, accurate, and of the type, quantity, and quality required for their intended use:

- *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5, EPA/240/B-01/003, U.S. Environmental Protection Agency, Office of Environmental Information, Washington DC, March 2001 [Reissued May 2006]). http://www.epa.gov/quality/qs-docs/r5-final.pdf
- *Guidance for Quality Assurance Project Plans. EPA QA/G-5* (EPA 240/R-02/009), U.S. Environmental Protection Agency, Office of Environmental Information, Washington, DC, December 2002. http://www.epa.gov/sites/production/files/2015-06/documents/g5-final.pdf

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A1 - Approvals

Approval Sheet

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EPA Region 3

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Approval
EPA Region 3

Name: Durga Ghosh Title: R3 Delegated Approving Official Organization: CBP / USGS	Signature: *Durga Ghosh* *02/14/2024* Date:

Note: This approval action represents EPA's determination that the document(s) under review comply with applicable requirements of the EPA Region 3 Quality Management Plan [https://www.epa.gov/sites/production/files/2020-06/documents/r3qmp-final-r3-signatures-2020.pdf] and other applicable requirements in EPA quality regulations and policies [https://www.epa.gov/quality]. This approval action does **not** represent EPA's verification of the accuracy or completeness of document(s) under review and is **not** intended to constitute EPA direction of work by contractors, grantees or subgrantees, or other non-EPA parties.

A2 - Table of Contents

ACRONYMS AND ABBREVIATIONS

BCW	PADEP Bureau of Clean Water
BOD_5	Five-day Biochemical Oxygen Demand
CBP	Chesapeake Bay Program
CBPO	U.S. Environmental Protection Agency's Chesapeake Bay Program Office
DMR	Discharge Monitoring Report
eDMR	electronic Discharge Monitoring Report system
DQO	Data Quality Objectives
ECHO	EPA's Enforcement and Compliance History Online
EPA	US Environmental Protection Agency
ICIS	Integrated Compliance Information System
MGD	Million Gallons per Day
NH_3-N	Ammonia Nitrogen
$NO_{2/3}$-N	Nitrite and/or Nitrate as Nitrogen
NPDES	National Pollutant Discharge Elimination System
PADEP	Pennsylvania Department of Environmental Protection
PM	Project Manager
PO_4	Phosphate
QA/QC	Quality Assurance / Quality Control
QAO	Quality Assurance Officer
QAPP	Quality Assurance Project Plan
QNCR	Quarterly Non-compliance Reports
SOP	Standard Operating Procedure
TKN	Total Kjeldahl Nitrogen
Total N	Total Nitrogen
TON	Total Organic Nitrogen
TOP	Total Organic Phosphorus
Total P	Total Phosphorus
TMDL	Total Maximum Daily Load
WIP	Watershed Implementation Plan
WMS	Water Management System
WWTP	Wastewater Treatment Plant

A PROJECT MANAGEMENT

A3 DISTRIBUTION LIST

This Quality Assurance Project Plan (QAPP) will be distributed to the following staff:

PADEP

Victor Landis, Environmental Program Manager, Data Management Section, BCW

Robert Kachonik, Environmental Group Manager, Data Management Section, BCW

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A4 PROJECT ORGANIZATION

The project organization chart, below, includes relationships and lines of communication among all participants and data users at PADEP. The responsibilities of these persons are described below.
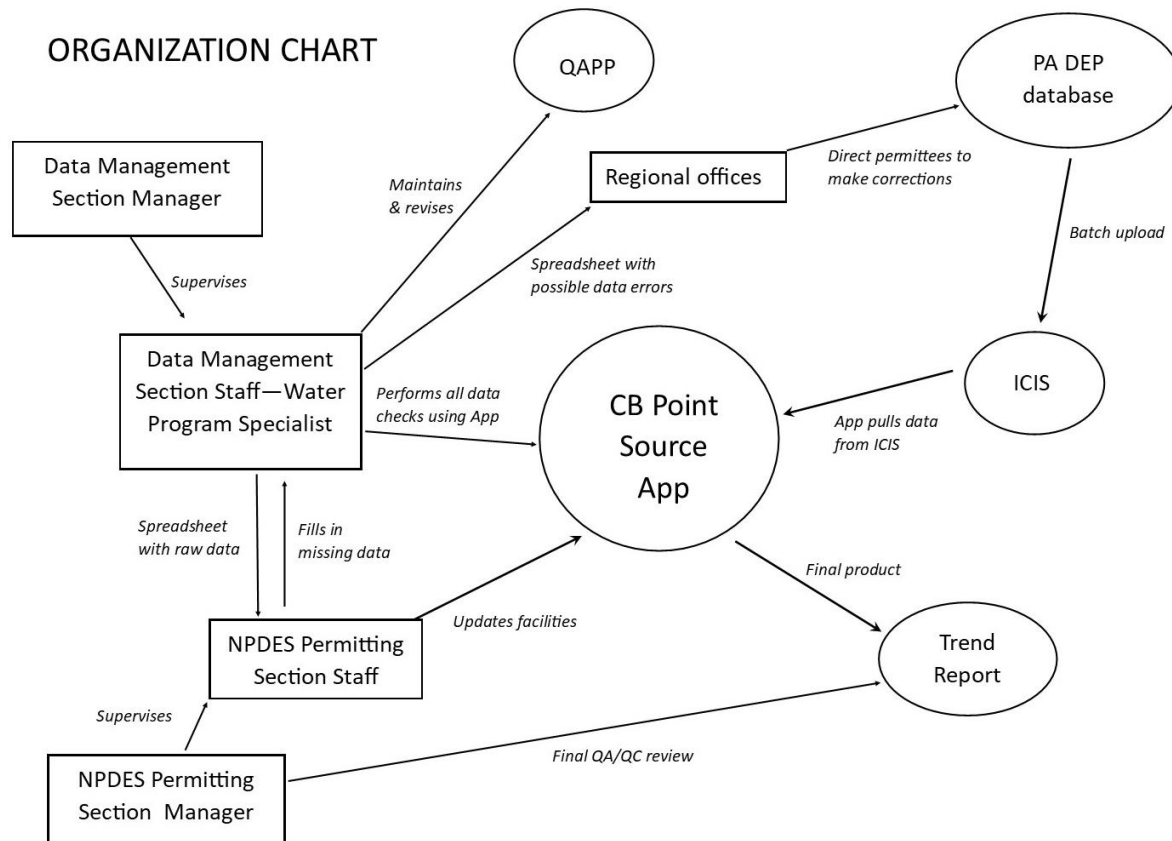
PADEP BCW Data Management Section Water Program Specialist staff are responsible for data processing through the Point Source Data Submission Web Application (App) and for maintaining this QAPP. They also alert regional offices about data errors and follows up to make sure revised eDMRs are submitted.

PADEP BCW NPDES Permitting Section Engineer staff are responsible for updating facilities in the App and providing estimates and default data when eDMR data is not available.

The PADEP BCW NPDES Permitting Section Manager is the QA Officer for this project. This staff member reviews the final trend reports.

The PADEP BCW Data Management Section Manager provides overall oversight for the project.

A5 PROBLEM DEFINITION/BACKGROUND

PADEP's point source data collection focuses on collecting data from NPDES-permitted industrial and municipal facilities within the Chesapeake Bay watershed in Pennsylvania. Data are collected by the permitted facilities or authorized contracted laboratories that use methods approved through 40 CFR Part 136, as required by the facilities' NPDES permits. Data are reported electronically by permittees using the electronic Discharge Monitoring Report (eDMR) online reporting system. eDMRs are reports that provide analytical results of chemicals and nutrients being discharged by NPDES permitted facilities (point sources) into the waterways of Pennsylvania. The data are entered into PA's online reporting eDMR system (Keystone GreenPort/WMS) by the permittees themselves, or their designees (consultants). The reports are then sent by batch upload to EPA's Integrated Compliance Information System (ICIS).

These data submitted by permittees are compiled annually into a report to be used by the EPA's Chesapeake Bay Program's Chesapeake Bay Watershed Model to assess trends in nutrient and sediment loading in the Chesapeake Bay and its tributaries. The report, due December 1st each year, looks at data collected over the period from July 1st of the previous year to June 30th of the reporting year. To compile these data and generate a report, data are first pulled from ICIS into the Chesapeake Bay Program Office's Point Source Data Submission Web Application (henceforth referenced as the "App"), and evaluated within the App. The App can be found at https://pointsource.chesapeakebay.net/. As a product of the process, a final dataset and trend report are generated by the App and downloaded. Then EPA is notified by email that the process is complete.

The Chesapeake Bay Program Grant Guidance requires a Quality Assurance Project Plan (QAPP) for the collection and use of environmental data. PADEP's Chesapeake Bay Point Source program utilizes data collected and reported from permittees. Therefore, PADEP has created a QAPP that describes methods by which PADEP staff verify that data are collected and reported accurately and thoroughly. This QAPP describes the data verification and data cleanup process that PADEP staff perform using the EPA's App.

A6 PROJECT/TASK DESCRIPTION

The project described in this QAPP entails collecting, compiling, assessing, and summarizing permitted discharge monitoring data and analytical results, and performing a series of QA/QC checks that are contained within the App. This project does not require primary data collection through direct environmental measurement or generation of laboratory data but solely involves the use of data generated by permittees. No original DMR data collection takes place as part of this project. Accordingly, the most relevant QA/QC procedure for this project is the review of secondary data.

Municipal and industrial wastewater discharge facilities are typically categorized as Significant Bay Dischargers ("significant") or Non-Significant Bay Dischargers ("insignificant") based on permitted or existing flow characteristics (or comparable loads, in the case of industrial discharge facilities). In accordance with Pennsylvania's Watershed Implementation Plan (WIP), that flow designation for municipal facilities is an existing flow ≥ 0.4 million gallons per day (MGD), or for industrial wastewater facilities, ≥ 9125 total phosphorus or ≥ 27000 total nitrogen (estimated

pounds per year). Specific facilities may also be identified as significant in Pennsylvania's Watershed Implementation Plan (WIP). Facilities not meeting the above criteria, and not otherwise identified in the WIP, are considered insignificant facilities. The App also distinguishes between these significant and insignificant facilities in the data check processes.

PADEP Bureau of Clean Water (BCW) monitors NPDES permits issued by the DEP regional offices, and updates the list of Significant Bay Dischargers as necessary in its Phase 3 Watershed Implementation Plan (WIP) Wastewater Supplement document, available on DEP's website (Phase 3 WIP) and provided to EPA in Section 106 Grant Semi-Annual Status Reports.

PADEP adds newly identified facilities into the App each year before work on the data begins. The location of each facility outfall (discharge point) is reported by county and by latitude/longitude coordinates. Any facilities that are newly added to the data report or permits terminated during the progress year are updated using the "Active/Inactive" status in the App. Any changes for a facility between significant and insignificant status are also included.

The App allows the user to divide the data into smaller datasets for ease of processing. PADEP creates four initial datasets: SIG-IND, SIG-MUNI, INSIG-IND, and INSIG-MUNI. Each dataset is put through the App individually and merged at the end. The App involves a step-by-step review of flow and nutrient data with the option to correct suspect values. Outliers are reviewed against DMR data and corrected with the help of attached supplemental reports. For insignificant facilities, there is also the option to fill in gaps with last year's data. A spreadsheet of all data errors is maintained by PADEP Central Office and sent to the regional offices. Regions then follow up with individual facilities to make sure all errors are corrected in PADEP's online database Water Management System (Keystone GreenPort/WMS) and revised eDMR reports submitted. Once all datasets are completed, the App provides a trend report, which is reviewed by the NPDES permitting section. Staff from the permitting section might select facilities for a rerun, if any issues with the data are identified. The rerun dataset is then merged with the final dataset.

PADEP uses the App to collect wastewater facility Discharge Monitoring Report (DMR) data from all applicable facilities in the Chesapeake Bay Watershed. Monthly concentration and flow data for all parameters for each discharging facility are stored in WMS and ICIS. Data for the following parameters are submitted: Flow and concentrations of NH_3, TKN, $NO_{2/3}$, TN, PO_4, TP, BOD_5, DO, and TSS. All nitrogen species are reported as nitrogen and phosphorus species as phosphorus. PADEP performs all QA/QC procedures within the App. For any missing concentration data, PADEP submits default concentration data or estimates.

A7 QUALITY OBJECTIVES AND CRITERIA

As specified in the Chesapeake Bay Program Wastewater Facility and BMP Implementation Data Submission Specifications and Requirements guidance document (Revised March 2022),

each jurisdictional agency must review all wastewater facility data prior to submission to EPA's Chesapeake Bay Program Office to ensure the adequacy of data in relation to their intended use. To meet this requirement, PADEP reviews the existing data collected by permitted facilities for accuracy and completeness using the Data Quality Objectives described below:

1) Accuracy Objectives (Qualitative)
   - Ensure data are within normal variation range compared with current and previous years' numbers
     ° In cases where outliers are found, the questionable value will be replaced with a modified value
2) Completeness Objectives (Quantitative)
   - Ensure all submitted data have been uploaded to ICIS and pulled into the App
   - Identify data gaps
     ° Update the data set with corrected and/or verified data
     ° Set the data to zero for months of no discharge
     ° Use annual average, previous year's data, or default values to fill in gaps

A8 SPECIAL TRAINING REQUIREMENTS/CERTIFICATION

Staff performing this task must be at least a Water Program Specialist, Environmental Engineer or equivalent. They need to understand discharge parameter data and be familiar with NPDES permits and reporting requirements. No other special training is required, beyond a proficiency in Excel and a familiarity with WMS and ICIS.

A9 DOCUMENTATION AND RECORDS

The current QAPP and previous revisions are stored electronically in the PADEP shared folder at

\\pa.lcl\epshares\CleanWater\Data_Mgmt\Data\Internal\Chesapeake_Bay\Point Source Data QAPP

Materials related to the Point Source Data submission are stored electronically at

\\pa.lcl\epshares\CleanWater\Data_Mgmt\Data\Internal\Chesapeake_Bay\Point Source Data Reports

All eDMR data are stored electronically in WMS and ICIS. The App also retains historical records of all data starting from 1975.

B DATA GENERATION AND ACQUISITION

The tasks described in this QAPP do not involve primary data generation, acquisition, and management. Permitted facilities (or their contracted laboratories) are responsible for acquiring, analyzing, and submitting reports on the primary data. This QAPP focuses solely on secondary data collection, analysis, and compilation.

B1 SAMPLING PROCESS DESIGN

N/A

B2 SAMPLING METHODS

N/A

B3 SAMPLE HANDLING AND CUSTODY

N/A

B4 ANALYTICAL METHODS

N/A

B5 QUALITY CONTROL

N/A

B6 INSTRUMENT/EQUIPMENT TESTING, INSPECTION, AND MAINTENANCE

N/A

B7 INSTRUMENT/EQUIPMENT CALIBRATION AND FREQUENCY

N/A

B8 INSPECTION/ACCEPTANCE OF SUPPLIES AND CONSUMABLES

N/A

B9 NONDIRECT MEASUREMENTS

Non-direct measurements (also referred to as secondary data) are data that were previously collected under an effort outside this project. All data relevant for this QAPP are secondary data. Data are collected by permittees and entered into Keystone GreenPort/WMS, then batch-uploaded to ICIS. The EPA Chesapeake Bay Program released the App in 2018, and PADEP has used the App thereafter to performs all the facility/data checks and fixes. The parameter (referred to as "species" in the App) checks and fixes are built into the App.

As a first step in the data collection process, PADEP utilizes the App to gather all available monitoring data for the period of record. The resulting report is run through the App data checks to ensure the validity and completeness of the data.

Data for the following parameters are imported by the App from ICIS:

- Ammonia (NH_3)
- Carbonaceous Biochemical Oxygen Demand/Biochemical Oxygen Demand ($CBOD_5/BOD_5$)
- Dissolved Oxygen (DO)
- Flow
- Nitrite/Nitrate ($NO_{2/3}$)
- Phosphate (PO_4)
- Total Kjeldahl Nitrogen (TKN)
- Total Nitrogen (TN)
- Total Organic Nitrogen (TON)
- Total Organic Phosphorus (TOP)
- Total Phosphorus (TP)
- Total Suspended Solids (TSS)

At this time, most of the Significant Bay Dischargers have monitoring requirements in their NPDES permits for the full suite of parameters that must be reported to EPA. The effluent limits and DMRs for all past and current significant Bay Dischargers are coded in ICIS. Therefore, with few exceptions, all reported data needed to construct the annual Bay report should be available in ICIS.

There are still permits (insignificant facilities) in PA that do not have the full suite of monitoring requirements. When no data are available due to lack of monitoring, PADEP fills in the missing data with estimates. Facilities with an average annual design flow of 0.002 to 0.2 MGD may not be required to monitor and report TN and TP after conducting at least two years of nutrient monitoring, assuming there are no changes to facility operations. In these cases, the most recent monitoring data is used to estimate the facility's load. For many Small Flow or Single Residence facilities that do not require nutrient or flow monitoring, data values are estimated based on the permitted design flow (typically 0.0004 MGD for Single Residences) and average estimated insignificant sewage facility concentrations of 25 mg/L TN, 4 mg/L TP, and 10 mg/L TSS. For facilities that only report data on a quarterly basis or less, data values are estimated for the entire year based on the reported data.

B10 DATA MANAGEMENT

Primary data is collected by NPDES permitted facilities, then reported electronically in the form of an electronic Discharge Monitoring Report (eDMR) that is entered into WMS through Keystone GreenPort. Regulations and permits require that records of monitoring activities be retained by the permittee for a certain time, a minimum of three years for NPDES data and five years for biosolids data. However, PADEP's electronic submission systems (WMS and Keystone Greenport) retain the submitted electronic DMRs indefinitely; the reports can be retrieved

anytime for verification purposes. After submitting reports through eDMR, the facility may either print a copy of the report and file it or save the report electronically to an on-site computer to satisfy retention requirements.

PADEP's electronic submission systems (WMS and Keystone Greenport) are maintained by internal information technology (IT) staff.

C ASSESSMENT AND OVERSIGHT

C1 ASSESSMENT AND RESPONSE ACTIONS

PADEP staff conduct routine data quality assessments throughout the project to ensure data are suitable for their intended use and identify if project specifications were met. As the scope of work described in this QAPP usually takes only 1-2 months to complete, there is no need for elaborate assessments. As each of the datasets (SIG-IND, SIG-MUNI, INSIG-IND, and INSIG-MUNI) is completed, the permitting section reviews the trend report generated from that dataset to look for any questionable results. Facilities identified during this review are evaluated for a potential rerun of the data. The rerun dataset is merged with the other data into a final dataset at the end.

C2 REPORTS TO MANAGEMENT

Communication with EPA generally occurs by email, if needed. If there are no problems with the App, the only communication is the notification that data submission through the App has been completed. If there are technical issues with the App, such as malfunctioning or questionable calculations, PADEP staff notify EPA immediately so that a resolution can be achieved before the submission deadline.

Internal DEP communication occurs by email and in person. Supervisors and the Bureau Director are kept informed about progress on a regular basis.

D DATA VALIDATION AND USABILITY

D1 DATA REVIEW, VERIFICATION, AND VALIDATION

PADEP has multiple systems in place to reject data prior to it entering the electronic databases used to compile and report information. DMR data can be rejected in Keystone Greenport/WMS and ICIS if it does not pass automated validations put in place to ensure accurate and complete data. After the data is uploaded into the App from ICIS, it is reviewed by PADEP staff with the help of QA/QC checks embedded within the App. Any questionable values are identified and corrected. Data anomalies may include incorrect reporting units, incorrect load calculations, typographical errors, and misplaced decimal points.

After all steps in the App are completed, trend reports and final data spreadsheets are

downloaded and reviewed. Any errors found during this process are corrected by rerunning data for selected facilities in the App and merging with the final report.

D2 VERIFICATION AND VALIDATION METHODS

After data are collected from ICIS using the App, they are reviewed and corrected through various checks in the App. Any data errors found during this process are compiled by PADEP staff in a spreadsheet which is sent to PADEP regional offices shortly after December 1st of each year. Regional offices have until a set deadline (usually mid-January) to contact permittees and make sure that questionable data are reviewed, and revised eDMR reports submitted where necessary.

Any data that appear to be outside the predominant data pattern for an individual facility is highlighted by the App for further evaluation. For each check, the App generates "errors" and "warnings." All errors need to be addressed before moving to the next step. Warnings can be either addressed or ignored. For significant facilities, all errors and warnings are individually investigated and corrected, if applicable. For insignificant facilities, errors are addressed individually, and warnings are evaluated, with the biggest outliers investigated as needed. It is also possible to apply a filter to the warnings to catch the most extreme outliers. Flow values and warnings are investigated most thoroughly, as flow values impact all load calculations and trend reports.

The App will guide the user through a series of checks in the order listed in the table below. Most checks have 2 parts:

- Part 1: Data check – missing data can be filled in or set to zero.
- Part 2: Out-of-range check – The App looks for unusual patterns and creates errors and warnings. The user will make corrections directly in the App (and make a note in the errors spreadsheet that is sent to the regions) or ignore the warning.

Checks contained in the App
Facility check
Insig Missing Data check
Flow Data Check
Flow – Out of Range Check
Dissolved Oxygen Data Check
DO – Out of Range Check
Nutrient Data Check
Nutrients – Out of Range Check

Nutrient Species Data Check
Species Ratio Check
Species Out-of-range Check

If data gaps are identified by the App, PADEP assigns values to each field using functions embedded in the App as described below. If there are no flow data available for a particular month, that month can be set within the App as a "No Discharge-month" and all parameter values will be set to zero. Missing data (other than flow) are filled in using average values or estimates. For insignificant facilities, the App also allows the option to fill all data gaps with last year's data. Where parameter value data have been required on a quarterly basis rather than monthly or more frequently, the quarterly value will be applied to the other months in that monitoring period. If parameter value data exist for a facility for six or more months during the reporting period but not others, average data for available months for that facility will be used to populate blank fields. Where no data exist because the facility does not monitor for that parameter, PADEP will use values based on estimated performance. If no estimate is possible, a value of "zero" may also be entered for missing parameters.

If an outlier is identified, the questionable value will be replaced with a modified value. Individual data values might be in error because of transcription errors or equipment malfunctions. If the error results in an anomalous or unrealistic value, it can be detected and excluded from analysis. PADEP examines the data for anomalous values and corrects values that are beyond the range of observed variability. In cases where the correct value can be obtained from supplemental reports attached to the eDMR data submission, that number is used. If the correct value can be inferred from comparison with other submitted data (in the case of obvious typos or decimal misplacement), that value is used. Otherwise, a historical mean value or estimate is used.

As time allows, where data discrepancies are discovered for users of PADEP's eDMR system, the eDMR submission will be examined for inclusion of DMR supplemental forms where raw sampling data are recorded. The permittee's calculation method and their reporting accuracy will be evaluated. The value in question may be recalculated using the raw data. Data errors will be corrected on the final data set in the App and a spreadsheet will be sent to the regions with possible data errors. Regions will then direct permittees to make the appropriate revisions to their eDMR reports.

Pennsylvania facilities typically do not monitor for phosphates (PO_4) or Total Organic Phosphorus (TOP), but rather Total Phosphorus (TP). For missing TOP and PO_4 values, PADEP uses the "percent of other measured value" data fix to calculate TOP as 15% of TP and PO_4 as 85% of TP.

PADEP will use its best professional judgment in identifying data entry errors and make appropriate corrections. For example, if average monthly Total Phosphorus concentrations are 1.2, 1.5, 1.8, 1.8, 1.4, and 0.18 mg/L, PADEP will evaluate eDMR supplemental reports to investigate the validity of the 0.18 mg/L entry. Based on the overall pattern, it will be assumed

that the correct value is 1.8 (decimal entry error). The error is then corrected within the App and noted in the data errors spreadsheet.

PADEP will also use its technical judgment for replacing data that appear to be grossly miscalculated. For example, if the reported Total Nitrogen (TN) monthly load is significantly lower (less than half) than its expected level based on flows and TN concentrations, a DEP-calculated TN total load may replace the reported value in the App. The original value and suggested value are noted on the error spreadsheet. For facilities where these types of gross miscalculations are prevalent, the PADEP regional office will contact the permittee to discuss the correct calculation procedures.

After each data set is considered QA/QC complete by the App, a trend report will be generated and made available for download. This is the final product of the process. This trend report is reviewed by the project QA officer for anomalies. If necessary, a subset of data is re-processed, and the corrected data merged into a final dataset and a revised trend report is generated.

D3 RECONCILIATION WITH USER REQUIREMENTS

After all data have been processed with the App and the final merged report generated, EPA is notified via email. EPA reviews the data and contacts PADEP if any adjustments are needed. The above-mentioned errors spreadsheet is distributed to regional offices who contact the permittees to correct data errors in a timely manner.