pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

Quality Assurance Project Plan

for

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

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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.

Revision History

Document Control Number	History/ Changes	Effective Date
N/A	Initial version	July 2008
N/A	Incorporated numerous updates in the 2014 Chesapeake Bay Watershed Agreement and the development of the CBPO web application for data verification and submission of the annual report.	December 2020
	Revised approval sheet and Organization Chart. Minor changes throughout.	November 2021

Table of Contents

Acronym List

BOD_5 – Five-day biochemical oxygen demand

CBPO – U.S. Environmental Protection Agency's Chesapeake Bay Program Office

DMR – Discharge Monitoring Report

eDMR – electronic Discharge Monitoring Report system

EPA – U.S. Environmental Protection Agency

ICIS – EPA's Integrated Compliance Information System

ECHO – EPA's Enforcement and Compliance History Online

MDL – Method Detection Limit

NH_3-N – Ammonia nitrogen

NO_2/NO_3-N – Nitrite and nitrate as nitrogen

NPDES – National Pollutant Discharge Elimination System

PADEP – Pennsylvania Department of Environmental Protection

PO_4 – Phosphate

MGD – Million Gallons per Day

QAPP – Quality Assurance Project Plan

QA/QC – Quality Assurance / Quality Control

RL – Reporting Limit

SIS – PADEP Sample Information System

TKN – Total Kjeldahl Nitrogen

Total N – Total Nitrogen

TON – Total Organic Nitrogen

TOP – Total Organic Phosphorus

Total P – Total Phosphorus

BCW – PADEP Bureau of Clean Water

INTRODUCTION

This Quality Assurance Project Plan (QAPP) was developed for documenting quality assurance / quality control (QA/QC) activities that the Pennsylvania Department of Environmental Protection (PADEP) will perform prior to submission of National Pollutant Discharge Elimination System (NPDES) facility effluent monitoring data (point source data) to U.S. Environmental Protection Agency's (EPA's) Chesapeake Bay Program Office (CBPO). Per the 2014 Chesapeake Bay Watershed Agreement, this QAPP will be reviewed periodically and revised, as necessary, as data reporting requests or requirements change. All updates to this document will be prepared in draft form and sent to EPA CBPO for concurrence prior to implementation. The NPDES Data Management Section within PADEP's Bureau of Clean Water (BCW) will be the contact for Chesapeake Bay point source data reporting.

This QAPP is designed in accordance with the EPA Requirements for Quality Assurance Project Plans (EPA QA/R-5).

REPORTING PROCEDURES

PADEP will submit its point source data report to EPA CBPO on an annual basis by the EPA-mandated deadline, usually December 1, which will include point source data for the previous July 1 – June 30 period.

Due to EPA's development of the Chesapeake Bay Program Office Point Source Data Submission web Application ("App"), and the obligation of the states to use this application for point source data submission, data for the reporting period (July 1 – June 30) is reported electronically using this tool.
The App can be found at Home Page - Point Source Application (chesapeakebay.net)

A trend report is generated by the CBPO web application and the data verified by PADEP for final submission. Listed below are the parameters that will be reported to EPA through the CBPO web application:

Parameter Name	ICIS Parameter Code	Statistical Base Code(s) Reported
Dissolved Oxygen	00300	Minimum (mg/L) *
Total Nitrogen**	00600, 51445	Average Monthly (mg/L)
Ammonia Nitrogen	00610, 51446	Average Monthly (mg/L)
Total Kjeldahl Nitrogen	00625, 51449	Average Monthly (mg/L)
Nitrate and Nitrite Nitrogen	00630, 51450	Average Monthly (mg/L)
Total Phosphorus***	00665, 51451	Average Monthly (mg/L)
Flow	50050	Average Monthly (MGD)
$CBOD_5$	80082	Average Monthly (mg/L)
Total Suspended Solids	00530	Average Monthly (mg/L)

* Dissolved Oxygen concentrations are generally only reported on DMRs in PA as minimum values obtained during the month.

** PA facilities typically do not monitor for TON, although the CBPO web application requests TON data. The default of TKN-NH_3 is used per the CBPO web application guidance or, in instances where NH_3>TKN, TKN+ **(**NO_2/NO_3-N).

*** PA facilities typically do not monitor for phosphates or TOP, but rather Total Phosphorus, although the data reporting guidance requested phosphate and TOP data. PADEP will use the general species relationship for PO_4/TP and TOP/TP presented in the guidance to report phosphate and TOP concentrations and loads. [Note: EPA Default: PO_4 calculated as 85% of TP by CBP species ratio and TOP calculated as 15% of TP by CBP species ratio.]

Data quantity will conform to EPA CBPO's latest grant guidance. All concentrations will be presented as gross values for sewage facilities, i.e., subtraction to account for ambient or background concentrations (net concentrations and loads) will not be conducted unless specifically requested. Concentrations for industrial facilities will be presented as net values per the grant guidance; however, until NPDES permits require collection of influent samples and analysis for Chesapeake Bay parameters, influent sample concentrations will be assumed to be zero (i.e., in the absence of any information on ambient concentrations, it should be assumed, without further EPA guidance, that the gross values reported to EPA are net values). If influent sample data are available for any facilities, the values will be subtracted from effluent values so that accurate net values can be reported.

The report will be transmitted to the CBPO via the CBPO web application.

QA/QC PROCEDURES

PADEP will perform a series of procedures to assure consistency and integrity in the list of NPDES facilities that are reported and point source data. These procedures are discussed sequentially below.

Facilities

PADEP has segregated sewage (municipal and non-municipal) discharges in the Chesapeake Bay watershed into five groups or phases, based on discharge flow rates, corresponding to the timing of NPDES permitting requirements for attainment of annual Total Nitrogen (Total N) and Total Phosphorus (Total P) load limitations. Sewage discharges with design flows of at least 0.4 MGD, are, for reporting purposes, assigned to Phases 1 through 3 ("significant").

PADEP has delineated industrial waste discharges in the Chesapeake Bay watershed into two groups, based on the estimated Total N and Total P loads. An industrial waste discharge with an estimated Total N and Total P loads of 75 lbs/day and 25 lbs/day, respectively, is considered "significant".

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 (see link below) and provided to EPA in Section 106 Grant Semi-Annual Status Reports.
(https://www.dep.pa.gov/Business/Water/Pennsylvania%E2%80%99s%20Chesapeake%20Bay%20Program%20Office/WIP3/Pages/PAs-Plan.aspx)

Newly identified facilities will be added into the CBPO web application each year before work on the data begins. The location of each facility outfall will be reported by county and by latitude/longitude coordinates.

Effluent Monitoring Data

Data Collection

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.

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

The source of monitoring data is PADEP's eDMR system. Beginning with the June 2009 monitoring period, all eDMR data for Significant Bay Facilities is automatically uploaded to and available from ICIS. Additionally, with the advent of the EPA's eReporting Rule, nearly all CB facilities are currently reporting via eDMR.

There are still permits in PA that do not have the full suite of monitoring requirements. When no data are available due to lack of monitoring, PADEP will use approaches identified below to develop concentration estimates for reporting purposes.

Identifying Data Gaps

Missing total monthly loads, as well as missing concentration values, will be considered data gaps. When utilizing the CBPO web application, the data checks identify this data.

Missing data falls into one of the following categories:
1) there was no discharge from the facility, resulting in no data,
2) there was a discharge and analyses were completed, but data are not available, and
3) there was a discharge and analyses were not completed.

The following efforts will be made to identify and fill data gaps:

- Identification of "No Discharge" Data Gaps – PADEP will identify "No Discharge" reported on DMRs via the CBPO web application data checks. If data are missing as a result of there not being a discharge during the period of interest, fields will remain "0."

- Identification of Data Gaps Where Analyses Were and Were Not Completed –If permits did not require monitoring, PADEP will implement measures described below.

Estimates and Defaults

Upon completion of the identification of data gaps, PADEP will assign values to each field (except for the "No Discharge" scenario), using the following approaches, using functions embedded in the CBPO web application:

- In the event that zero (0) or "non-detect" values are reported, PADEP will utilize the "average" data correction when available or estimate a value when the average is not available. If data are reported as "< QL", the "<" sign is dropped, and the value is used. For example, for a reported value of "< 0.5", the less than sign is dropped and "0.5" is used.

- If only partial monthly data is reported, calculations will be performed where appropriate to determine or estimate the remaining data. For instance: 1) if Total Nitrogen and NH_3-N concentrations are reported, TKN will be calculated from the reported data [Note: EPA Default - Calculated as $NO_{2\text{-}3}$ = TN – TKN]; 2) If monthly average flow and Total Nitrogen concentration is reported, the estimated monthly Total Nitrogen load will be calculated.

- Where parameter value data has 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 exists for a facility for 6 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 exists because the facility does not monitor for those constituents, PA DEP will use values based on estimated performance.

The CBPO web application on which PADEP collects reported data will flag (qualify) all data that is altered based on calculations, estimates, and assumptions.

QA/QC Protocol

Once all data fields are populated, PADEP will conduct quality assurance on the data as follows:

- As the procedures listed above are conducted, any data that appears to be outside the predominant data pattern for an individual facility will be highlighted for further evaluation. Expected seasonal variations and across the board high and low flow trends will be taken into account.

- PADEP will use 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 contact the facility or regional staff to assure the validity of the 0.18 mg/L entry. If the entry is invalid, PADEP will make the change in the CBPO web application accordingly. However, PADEP will apply caution to the rejection of data that could be lower than historical statistics, as it is possible a facility has implemented nutrient removal technologies.

- PADEP will also use technical judgment for replacing data that appear to be grossly miscalculated. For example, if the reported Total Nitrogen 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 CBPO web application. For facilities where these types of gross miscalculations are prevalent, PADEP will contact the permitee to discuss the correct calculation procedures.

- Other QA/QC Procedures – PADEP will apply the following rules in validating data using the CBPO web application:

    - TKN concentration and load must be greater than the NH_3-N concentration and load. In the event that NH_3-N values exceed TKN values, the TKN values will be matched to the NH_3-N values.

    - Total N values must equal TKN values plus NO_2/NO_3-N values. If not, Total N values will be adjusted to equal TKN plus NO_2/NO_3-N. [Note: EPA Default - Calculated as NO_{2-3} = TN - TKN.]

    - Total P values must exceed PO_4 values (since facilities typically monitor for only Total P, it is rare that this verification will need to be performed).

    - Verify that there are no missing or negative values in the report.

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

    - As resources allow, the following additional QA/QC procedures may be performed:

        - Evaluation of Facility-Specific Data Trends and Variability – PADEP may compile all historical non-default monitoring data for a facility (as submitted to EPA CBPO and as available) that have undergone quality assurance review and generate mean and standard deviation values for concentrations. The period of record would then be compared with the historical data to determine outliers. A reported value in the period of record would be rejected if the value is greater than or equal to three standard deviations from the historical mean value. For example, if Total Nitrogen was monitored during the past, mean and standard deviation values will be determined for previous years and serve as baseline for comparison to current values. If an outlier is identified, the value will be replaced with the historical mean value. This replacement

will not apply if site-specific information is available to support the apparent outlier, for example, newly completed construction of facility upgrades.

- For situations where there are no historical data, PADEP may conduct a "sensitivity analysis" to evaluate whether one or more outliers exist by removing values that appear to be outside normal variability for the period of interest and determining the mean and standard deviation of the remaining data. If the inclusion of data suspected to be outliers results in an increase in the standard deviation of 300% or more, the data will be removed and replaced with the mean value for the remaining data, or a calculated value based on the species relationships, or actual flow and concentrations values, if applicable.

- All of these functions are available in the CBPO web application as "data fixes". New functions are continually being added and can be utilized to further improve data quality.

- The final product of the CBPO web application is a trend report. This trend report is reviewed by the QA officer for anomalies. If necessary, a subset set of data will be re-processed using the CBPO web application and corrected data merged into a revised trend report

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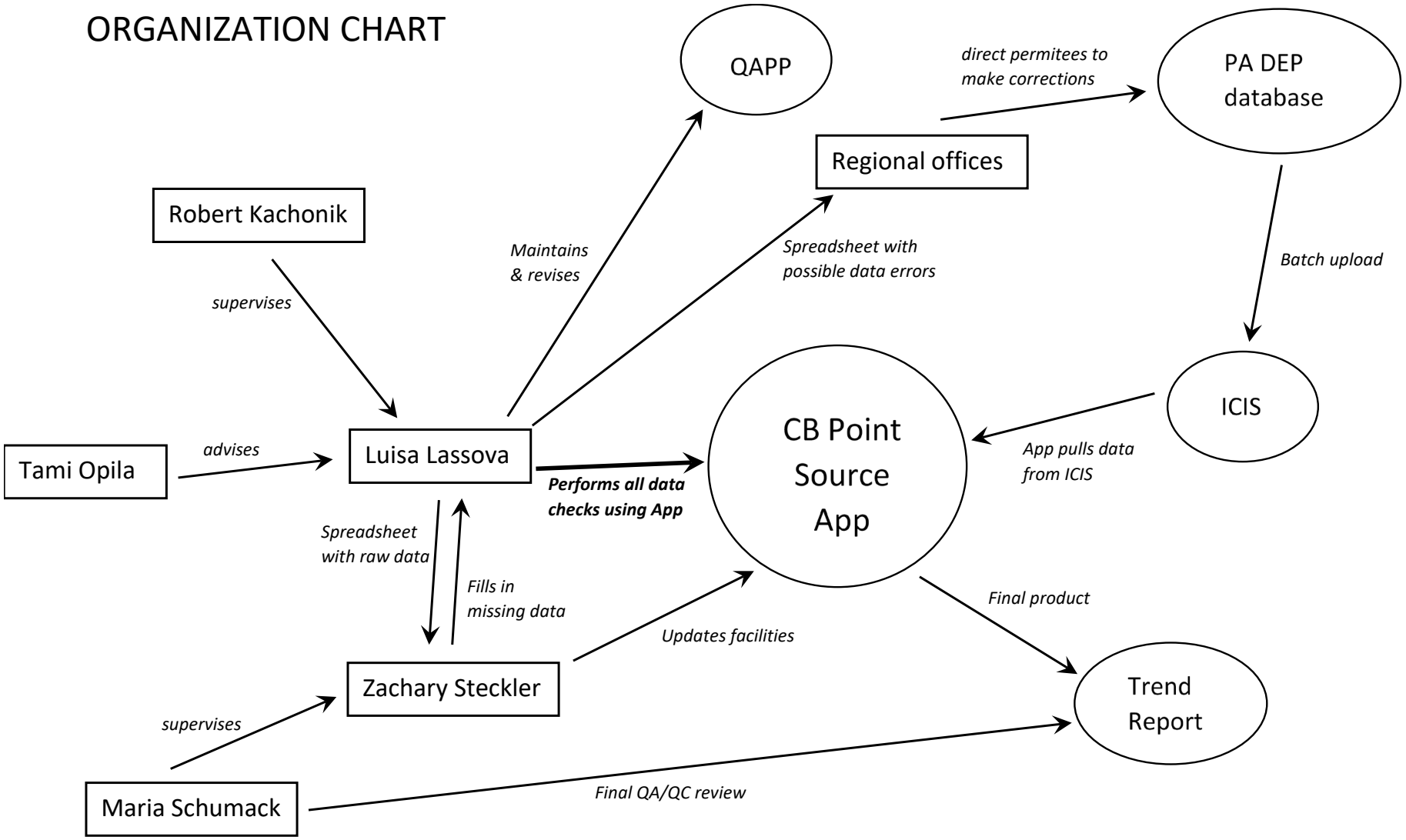
ORGANIZATION CHART



EPA Region 3 Quality System

PRE-SUBMITTAL QUALITY ASSURANCE DOCUMENT REVIEW CHECKLIST

Document Title: Reporting of Pennsylvania NPDES Point Source Data to EPA's Chesapeake Bay Pro

QA Document Type: QAPP **Completed by:** Luisa Lassova **Date:** 11/18/21

Preparer's Signature: Luisa Lassova

The purpose of this checklist is to ensure document completeness (not adequacy) prior to submittal to R3 for quality review and approval. These questions represent common omissions which render a document incomplete in meeting EPA QA requirements. Once all questions are checked, (if N/A, please explain in comments).

Project Management	Yes	N/A	Comments (incl. page # or section)
1) Is there a title, organization name, date, revision number and page numbers?	☑	☐	
2) Are appropriate approval lines and signatures present? Minimum requirements include: *a*, Outside Organization Project Manager *b*. Outside Organization QA Officer *c*. EPA DPM (Designated Project Manager) d. EPA Delegated Approving Official (DAO)	☑	☐	
3) Is there a list of individuals who are to receive a copy of the QA document?	☑	☐	
4) Are roles/responsibilities of staff defined, incl. maintaining the QA document?	☑	☐	
5) Is an organizational chart present with all program/project individuals identified?	☑	☐	
6) Does the description state task(s), purpose(s), work schedule(s), and location?	☐	☑	
7) Does it discuss Data Quality Objectives- performance/measurement criteria (action levels) for information to be collected, including precision, accuracy/bias, representativeness, completeness, comparability, and sensitivity?	☐	☑	
8) Do quantitation limits meet standards (e.g., cleanup goals, permit limits)?	☐	☑	
9) Are training requirements, delivery method, & personnel responsible identified?	☐	☑	
10) Does the documentation & records section accurately represent the program/project needs?	☐	☑	
Data Generation/Acquisition	**Yes**	**N/A**	**Comments**
11) Are sampling design components, including the number of samples collected, locations (e.g., maps), and methods, described?	☐	☑	
12) Are valid hyperlinks or attachments present for referenced methods and SOPs?	☐	☑	
13) For laboratory samples, are sample methods, containers, volumes, collection type (e.g., composited, split), and preservatives listed?	☐	☑	
14) For laboratory samples, is language included regarding lab accreditation?	☐	☑	
15) Is chain of custody included or referenced and does it describe sample handling?	☐	☑	
16) Are procedures identified to follow when failures occur, identifying individual responsible for corrective action and documentation?	☐	☑	
17) Are the laboratory and field quality control activities clearly identified?	☐	☑	
18) Is equipment cleaning, calibration, testing, inspection & maintenance included?	☐	☑	
19) Are critical supplies and consumables identified?	☐	☑	
20) If using existing data (i.e., secondary data, non-direct measurements), does it include data sources and acceptance criteria?	☐	☑	
21) Is the data management scheme described from field to final use?	☐	☑	
Assessment & Oversight	**Yes**	**N/A**	**Comments**
22) Does it describe assessment activities and response action procedures (to include audits, corrective actions, reporting to management)?	☐	☑	
Data Validation and Usability	**Yes**	**N/A**	**Comments**
23) Does it describe criteria for accepting, rejecting, or qualifying data?	☑	☐	
24) Does it describe data verification [verifying performance of field or laboratory operations (e.g., blanks, duplicates, preservation times, chain of custody)], responsible parties for verification, issue resolution process (e.g., limitations on data), and data validation (if necessary, e.g. independent third party)?	☐	☑	

Please submit completed checklist with QA document to EPA DPM (e.g. RPM, OSC, SAM, PO). EPA DPM will then submit QA document package for review to CBP QA Coordinator at dghosh@chesapeakebay.net QA document package should include:

1. QA document (and if applicable, other supporting documentation)
2. ~~QA Document Review Request Form~~
3. This pre-submittal Quality Assurance Document Review Checklist

QA Documents must be approved prior to any data collection work or use, except under circumstances requiring immediate action to protect human health and the environment or operations conducted under police powers.

Quality Assurance Programmatic Plan (QAPrPs) - QAPrPs define and document type and quality of data and methods required for collecting, analyzing, and assessing data to support decisions across recurring or like activities within a single program. QAPrPs shall describe the QA elements that remain constant among the different projects, activities, or sites. Most QAPrPs shall be supported by project-specific, activity-specific, or site-specific documentation (e.g., FSPs, Work Plans, inspection checklists, or equivalent). These documents shall address specific QA elements articulated in EPA's QA/R-5 (QAPP requirements) and QA/G-5 (QAPP guidance) documents and are unique to each project, activity, or site. QAPrPs and supporting documents undergo technical reviews for accuracy, completeness, and compliance with programmatic guidance.

Quality Assurance Project Plan (QAPP) - describe in detail the necessary QA, QC, & other technical activities for projects. R3 policy requires results of the systematic planning process be documented in a QAPP or equivalent QA document approved by authorized personnel (e.g. DAO) prior to implementation. The level of detail found in the QAPP shall be commensurate with the nature of the work being performed and intended use of the data (i.e., graded approach). If a particular QAPP element does not apply to the project, the element must be included and an explanation describing why it does not apply. QAPP requirements apply to all environmental data operations, including existing data, conducted by Regional staff or through grants, cooperative agreements, contracts, IAs, and compliance orders.

Field sampling plan (FSP) – project, site or activity specific companion quality document, supported by a quality assurance project plan which describes project objectives, sampling locations and rationales for their selection, sampling methods, analytical methods, preservation, chain-of-custody and shipping requirements. A FSP will contain quality control acceptance criteria for field samples but may or may not contain this information for laboratory analyses. (Note: for FSPs, some items will be missing from this checklist since should be detailed in the programmatic QAPP (i.e., QAPrP, generic QAPP).

Sampling and analysis plan (SAP)* - as outlined in the National Contingency Plan, detail procedures for conducting field activities and have two components, 1. a QAPP or QAPrP and 2. a FSP. *Applicable to CERCLA only

R3 Quality Resources
Internal: https://intranet.epa.gov/r3intran/qa/
External: https://www.epa.gov/quality/managing-quality-environmental-data-epa-region-3