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QUALITY ASSURANCE PROJECT PLAN
EVALUATION OF THE PRESENCE OF POLYCHLORINATED BIPHENYLS IN TITANIUM DIOXIDE

DRAFT

February 24, 2020

Prepared for:

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Project No. 20198822

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List of Abbreviations and Acronyms

<	less than
≤	less than or equal to
>	greater than
≥	greater than or equal to
%D	percent deviation
% R	percent recovery
%RSD	percent relative standard deviation
AMU	atomic mass unit
CCV	continuing calibration verification
COC	chain-of-custody
DL	detection limit
DQO	data quality objective
EDL	estimated detection limit
EMPC	estimated maximum potential concentration
GC/MS	gas chromatography/mass spectrometry
GPC	gel permeation chromatography
HRGC/HRMS	high-resolution gas chromatography/high-resolution mass spectrometry
ICAL	initial calibration
ICP/MS	inductively coupled plasma-mass spectrometry
ICV	initial calibration verification
LCS	laboratory control sample
MDL	method detection limit
MPC	measurement performance criteria
MS	matrix spike
MSD	matrix spike duplicate
NA	not applicable
OPR	ongoing precision and recovery
oz	ounce
PARCC	precision, accuracy, representativeness, completeness, and comparability
PCB	polychlorinated biphenyl
QA	quality assurance
QA/QC	quality assurance/quality control
QAPP	Quality Assurance Project Plan
QL	quantitation limit
RPD	relative percent difference
RSD	relative standard deviation
SGS	SGS North America, Inc.
SOP	Standard Operating Procedure
TBD	to be determined
USDOT	United States Department of Transportation
US EPA	U.S. Environmental Protection Agency

1.0 INTRODUCTION

Environmental Standards, Inc. (Environmental Standards) has prepared this Quality Assurance Project Plan (QAPP) to describe the quality assurance/quality control (QA/QC) aspects of the sampling and analysis of Titanium Dioxide (TIO_2) to assess the possible occurrence of inadvertent polychlorinated biphenyls (PCBs) to be undertaken by the American Chemistry Council's (ACC) Titanium Dioxide Stewardship Council (TDSC). Specifically, sample collection, processing, and shipping activities to be conducted for this study are detailed herein. In addition, laboratory analytical procedures and data quality review requirements are described in this QAPP.

Background

The Spokane River Regional Toxics and Task Force (SRRTTF) and City of Spokane have been evaluating PCBs in the Spokane River and mechanisms to reduce entry of PCBs into the river. The SRRTTF commissioned Northwest Green Chemistry (NGC) to prepare a white paper that evaluated production of TIO_2 and the potential to produce inadvertent PCBs that could end up in consumer and industrial products and potentially impact the Spokane River. The NGC white paper, "*The Potential for Generating Inadvertent PCBs through TiO_2 Manufacturing Using the Chloride Process" (*NGC, February 27, 2019) indicates that expert industry opinions are that PCBs are not expected in TiO_2 from the chloride process due to the high temperature processes that should destroy PCBs. The white paper further indicates that little testing data are available, but that a supplier that purchases TiO_2 "…shared results from testing two batches of TiO_2 powder from two different manufacturers and found PCB levels at 85ppb using EPA Method 1668C."

The ACC TDSC agreed to undertake a voluntary project to test for inadvertent PCBs in TiO_2 produced by the chloride process and sold into the following end-use markets in the United States: paints and coatings; plastic; and paper and paperboard.

2.0 REFERENCES

The Potential for Generating Inadvertent PCBs through TiO_2 Manufacturing Using the Chloride Process" (Northwest Green Chemistry, February 27, 2019).

Intergovernmental Data Quality Task Force. Uniform Federal Policy for Implementing Environmental Quality Systems Evaluating, Assessing, and Documenting Environmental Data Collection/Use and Technology Programs. Intergovernmental Task Force, March 2012.

US EPA (US Environmental Protection Agency). EPA Requirements for Quality Assurance Project Plans. EPA QA/R-5. Office of Environmental Information. Washington, DC, March 2001.

US EPA. EPA Guidance for Quality Assurance Project Plans. EPA QA/G-5. Office of Environmental Information. Washington, DC, December 2002.

US EPA. EPA Guidance on Systematic Planning Using the Data Quality Objectives Process. US EPA QA/G-4. Office of Environmental Information. Washington, DC, February 2006.

US EPA. US EPA Guidance on Environmental Data Verification and Data Validation. US EPA QA/G-8. Washington, DC, November 2002.

US EPA. US EPA Guidance for Data Quality Assessment, Practice Methods for Data Analysis. US EPA QA/G-9. Washington, DC, July 2000.

US EPA. Data Quality Assessment: A Reviewer's Guide. US EPA QA/G-9R. Washington, DC, February 2006.

US EPA. Data Quality Assessment: Statistical Methods for Practitioners. US EPA QA/G-9S. Washington, DC, February 2006.

US EPA. Method 1668C: Chlorinated Biphenyl Congeners in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS. EPA 821-R-08-020. Office of Water, April 2010.

US EPA. National Functional Guidelines for High Resolution Superfund Methods Data Review. EPA-542-B-16-001. Office of Superfund Remediation and Technology Innovation, April 2016.

US EPA. National Functional Guidelines for Organic Superfund Methods Data Review. EPA-540-R-2017-02. Office of Superfund Remediation and Technology Innovation, January 2017.

QAPP Worksheet #1 and #2: Title and Approval Page

(UFP-QAPP Manual Section 2.1)
(USEPA 2106-G-05 Section 2.2.1)

Site Name/Project Name: ACC TDSC; PCBs in Titanium Dioxide
Site Location: Not applicable (NA)
Site Number/Code: NA
Contractor Name: Environmental Standards, Inc. (Environmental Standards)

Contractor Number: NA
Work Assignment Number: NA

Lead Organization: ACC TDSC

ACC TDSC Project Manager:

_____
Jay West/ACC

Project Quality Assurance Officer:

_____
David R. Blye, CEAC/Environmental Standards

Identify guidance used to prepare Quality Assurance Project Plan (QAPP):

- Uniform Federal Policy for Implementing Environmental Quality Systems Evaluating, Assessing, and Documenting Environmental Data Collection/Use and Technology Programs. Intergovernmental Task Force, March 2012.
- US EPA Requirements for Quality Assurance Project Plans. EPA QA/R-5. Office of Environmental Information. Washington, DC, March 2001.
- US EPA Guidance for Quality Assurance Project Plans. EPA QA/G-5. Office of Environmental Information. Washington, DC, December 2002.
- US EPA Guidance on Systematic Planning Using the Data Quality Objectives Process. US EPA QA/G-4. Office of Environmental Information. Washington, DC, February 2006.
- US EPA Guidance on Environmental Data Verification and Data Validation. US EPA QA/G-8. Washington, DC, November 2002.
- US EPA Guidance for Data Quality Assessment, Practice Methods for Data Analysis. US EPA QA/G-9. Washington, DC, July 2000.
- US EPA Data Quality Assessment: A Reviewer's Guide. US EPA QA/G-9R. Washington, DC, February 2006.

Identify regulatory program: NA, voluntary implementation.

QAPP is Project-Specific: YES

Identify approval entity: SRRTTF will review and comment.

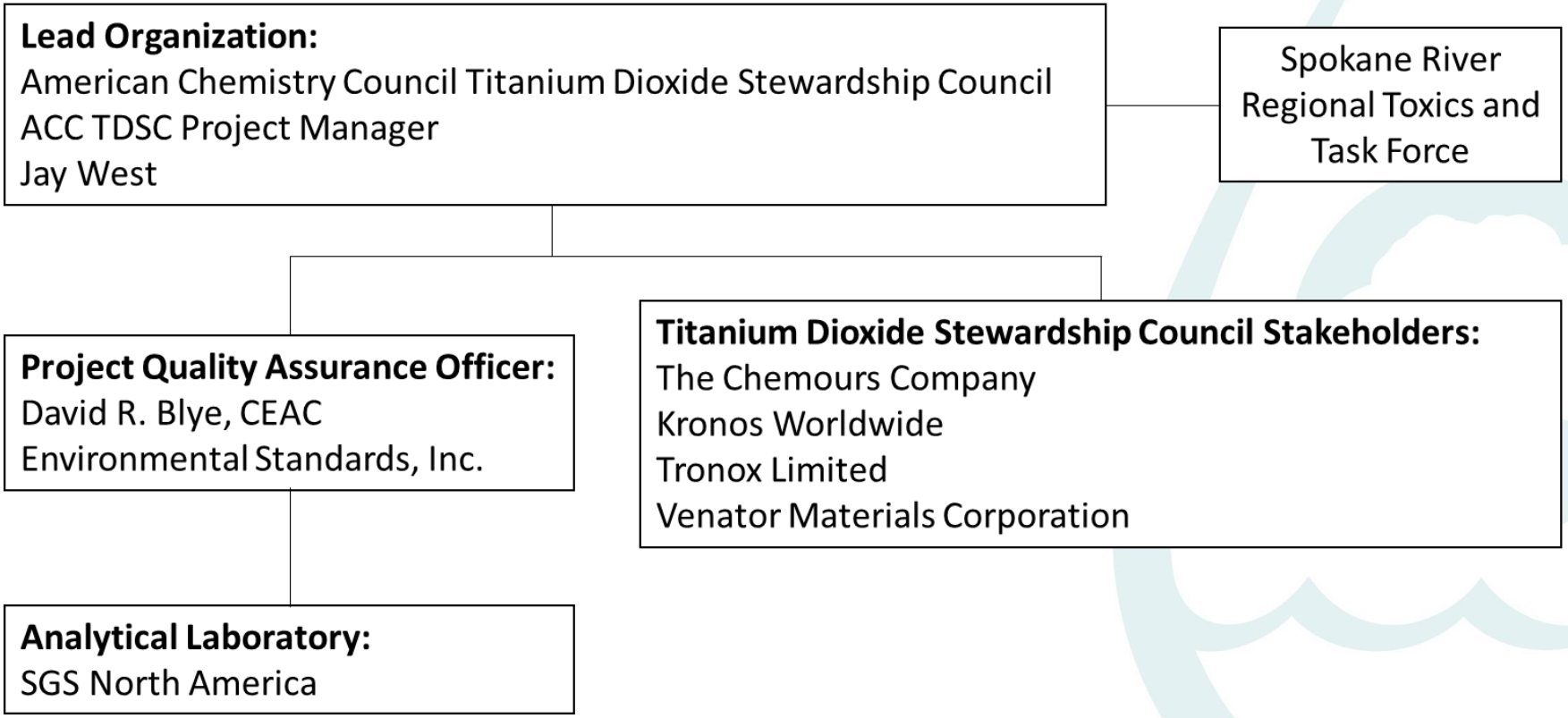
List organization partners (stakeholders) and connection with lead organization:

TDSC Company participants

1. The Chemours Company
2. Kronos Worldwide
3. Tronox Limited
4. Venerator Materials Company

QAPP Worksheet #3 and #5: Current Project Organization and QAPP Distribution

(UFP-QAPP Manual Section 2.3 and 2.4)
(USEPA 2106-G-05 Section 2.2.3 and 2.2.4)



The following people will receive a copy of the final QAPP, subsequent QAPP revisions, addenda, and amendments.

QAPP Recipients	Title/Team	Organization	Telephone Number	E-mail Address
Ben Floyd	Facilitator, Spokane River Regional Toxics and Task Force	White Bluffs Consulting	(509) 539-3366	ben@whitebluffsconsulting.com
Lara Floyd	Facilitator, Spokane River Regional Toxics and Task Force	White Bluffs Consulting	(509) 539-3366	lara@whitebluffsconsulting.com
Doug Krapas	Environmental Manager	Inland Empire Paper and Chair, TSCA Work Group, Spokane River Regional Toxics and Task Force	(509) 924-1911	dougkrapas@iepco.com
Jay West	Lead Organization Project Manager	American Chemistry Council	(202) 249-6407	Jay_West@americanchemistry.com
Michael Ober	Global Product Regulatory Leader	The Chemours Company	(302) 773 4592	MICHAEL.H.OBER@chemours.com
David R. Blye	Project Quality Assurance Officer	Environmental Standards, Inc.	(610) 935-5577 extension 401 (O) (610) 304-9970 (M)	dblye@envstd.com
Amy Boehm	Laboratory Project Manager	SGS North America Wilmington Laboratory	(910) 350-1903 Extension 309	Amy.Boehm@sgs.com

(O) – Office
(M) – Mobile

QAPP Worksheet #4, #7, and #8: Personnel Qualifications and Sign-Off Sheet

(UFP-QAPP Manual Sections 2.3.2 – 2.3.4)
(USEPA 2106-G-05 Sections 2.2.1 and 2.2.7)

Organization: American Chemistry Council

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications	Signature/Date
Jay West	Lead Organization Project Manager	B.S. Biology M.F.S. Forest Science M.B.A. Mr. West has over 10 years of experience leading industry consortia in research projects, test method development, and regulatory compliance.	None	

Organization: Environmental Standards, Inc.

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications	Signature/Date
David Blye	Project Quality Assurance Officer/Principal Chemist	B.S. Environmental Chemistry; A.A.S. Ecology and Environmental Technology Mr. Blye has over 35 years of QA/QC experience. His experience includes the planning, development, and execution of environmental sampling and analytical programs. He has extensive experience with US EPA organic and inorganic analytical methodology and analytical data validation and has overseen the validation efforts for hundreds of projects. He is a PCB subject matter expert.	Certified Environmental Analytical Chemist #2507 National Registry of Certified Chemists; OSHA 40-Hour Hazardous Waste Operations Training	
Various	Quality Assurance Chemists/Data Validators	Various	Internal Training	NA

Organization: SGS North America, Inc.

Name	Project Title/Role	Education/Experience	Specialized Training/Certifications	Signature/Date
Amy Boehm	Laboratory Project Manager The Laboratory Project Manager acts as the primary point of contact at SGS North America Wilmington facility for the Project QA Coordinator to communicate and resolve sampling, receipt, analysis, and storage issues.	B.A., Biology Ms. Boehm has more than 25 years of experience in environmental analytical services with a focus on project/program management and QA/QC review of high-resolution mass spectrometry analyses.	None	
Various	Laboratory Chemists	Various	Internal training program with yearly demonstration of capability	NA

QAPP Worksheet #6: Communication Pathways

(UFP-QAPP Manual Section 2.4.2)
(USEPA 2106-G-05 Section 2.2.4)

Communication Drivers	Responsible Entity	Name	Contact Information	Procedure (Timing, Pathways, *etc*.)
Decisions requiring client input or direction; information to be communicated to TDSC stakeholders or SRRTTF.	Project Manager	Jay West	(202) 249-6407 Jay_West@americanchemistry.com	Maintain project updates as needed with the QA and TDSC stakeholders via phone or email. Communicate and adjust project schedules, QAPP and project deviations/addenda, and potential impacts to project DQOs.
Communication with ACC TDSC	QA Officer	David Blye	(610) 935-5577 x401 dblye@envstd.com	Communicate project updates as needed with the client via phone or email. Communicate project schedules, QAPP and FSP deviations/addenda, and potential impacts to project DQOs.
Issues with sample submission coordination, schedule, data deliverable issues, technical issues; and minor QAPP deviations	QA Officer	David Blye	(610) 935-5577 x401 dblye@envstd.com	Communicate with Project Manager and Laboratory Project Manager as needed via phone or email. Communicate minor QAPP deviations to the Project Manager.
Analytical data validation issues	Data Validation Chemist	To be assigned	To be assigned	Communicate with Project QA Officer as needed via phone or email.

Communication Drivers	Responsible Entity	Name	Contact Information	Procedure (Timing, Pathways, *etc*.)
Laboratory data quality issues, data deliverable issues, reporting issues, and QAPP deviations	Laboratory Project Manager	Amy Boehm	(910) 350-1903 x309 Amy.Boehm@sgs.com	Communicate with the QA Officer as needed via phone or email.

QAPP Worksheet #9: Project Planning Session Summary

(UFP-QAPP Manual Section 2.5.1 and Figures 9 to 12)
(USEPA 2106-G-05 Section 2.2.5)

Planning sessions:

Date	Activity/Purpose	Summary/Action Items	Location
August 20, 2019 September 3, 2019 September 12, 2019 September 30, 2019 November 22, 2019 January 9, 2020 January 30, 2020 February 5, 2020 February 13, 2020	Conference calls between ACC, ACC TDSC stakeholder representatives, and Environmental Standards, Inc.	Summary of Conference Calls: • Discussed project background and analyses. • Determined titanium dioxide use types for sampling – paint, paper, and plastic. Eliminated cosmetics. • Discussed numbers and types of samples. • Discussed sample collection and logistics. • Discussed PCB congener analytical options. • Discussed quality control sample types and frequency. • Discussed sample identification and anonymity. • Discussed sample handling, shipping and archiving.	Conference bridge.

QAPP Worksheet #10: Conceptual Site Model

(UFP-QAPP Manual Section 2.5.2)
(USEPA 2106-G-05 Section 2.2.5)

The problem to be addressed by the project is as follows:

The objective of this study is to determine if PCBs are present as incidental byproducts in TiO_2 products produced by TDSC members via the chloride process and that represent the highest volume sold into the North American market for the following end-uses: paints and coatings; plastics; and paper and paperboard.

The proposed sampling consists of the following:

Samples of TiO_2 will be collected by TDSC stakeholder company personnel or contract personnel at the point where the product is being bagged. Samples will be collected of TiO_2 that will be used in the end-use markets listed in the paragraph above and shown in the table below.

A total of 14 unique samples of TiO_2 will be collected for analysis of PCB congeners by US EPA Method 1668C as in the table shown in Worksheet #18.

QAPP Worksheet #11: Project/Data Quality Objectives

(UFP-QAPP Manual Section 2.6.1)
(USEPA 2106-G-05 Section 2.2.6)

Data quality objectives (DQOs) are qualitative and quantitative statements developed to specify the quality of data from laboratory data collection activities to support the project. The DQOs describe what data are needed, why the data are needed, and how the data will be used to address the problem being investigated. DQOs also establish numeric limits for the data to allow the data user (or reviewers) to determine whether data collected are of sufficient quality for use in their intended application.

This QAPP supports sampling associated with the following activities:

- TiO_2 product sampling.

Who will use the data?

The data generated will be used by the ACC TDSC in assessing the presence or absence of PCBs as incidental byproducts from the chloride process.

Intended use of the data:

The project objectives are to collect sufficient quality and quantity of data to better understand the presence or absence of PCBs as incidental byproducts from the chloride process.

Data use data quality objectives:

The DQOs are intended to provide a known level of confidence to utilize the generated analytical data to support its use for evaluation of presence of absence of PCBs and other evaluations to be performed with the analytical data. Analyte-specific methods are used for the generation of the data. Worksheets #12 and #28 and the laboratory standard operating procedures (SOPs) in Attachment A provide DQOs for analytical methods.

The overall DQO is to generate greater than 90% usable analytical data and to collect greater than 90% of the planned samples.

Type of data that are needed (matrix, target analytes, analytical groups, field screening, on-site analytical, off-site laboratory techniques, sampling techniques):

TiO_2 is anticipated to be collected during the sampling event. No additional matrices are anticipated for the investigative samples. The TiO_2 samples will be collected using uniform and consistent procedures identified in Worksheet #21 of this QAPP.

The TiO_2 samples will be shipped to off-site laboratories for chemical analysis.

Anticipated analytical methods for samples consist of:

- 209 PCB congeners by US EPA Method 1668C EPA Method 1668C

The samples will be shipped or sent via courier service to the off-site analytical laboratory for analysis. Note that the work will not include the generation of field analytical data.

The target analyte lists are provided in QAPP Worksheet #15. QAPP Worksheet #15 also includes the Project Laboratory quantitation limits (QLs) and method detection limits (MDLs), as applicable. Project laboratory analytical SOPs are listed in QAPP Worksheet #23 and provided in Attachment A.

Quality of the data required:

Data of high quality that meets the requirements presented in this QAPP will be needed to support technically sound and defensible assessments of the presence or absence of incidental PCBs in TiO_2 produced by the chloride process Laboratory analyses will be conducted in accordance with the analytical methods and Project Laboratory SOPs. QAPP Worksheets #34 through #37 describe data verification, validation, and usability assessment.

Quantity of data required:

The number of samples needed are described in this QAPP. The frequency of QC samples to be collected is provided in QAPP Worksheet #20. The anticipated sample types, matrices, analytical groups and methods is provided in QAPP Worksheet #18.

Where, when, and how should the data be collected/generated?

Refer to Worksheets #16 and #27.

Data will be collected during normal production cycles at TDSC plant facilities at the point where the product is being bagged (preferred) or soon after the product is bagged. Refer to Worksheet #18 for sampling locations.

Field sampling SOPs are listed on Worksheet #21. Laboratory analytical SOPs for the Project Laboratory are listed in QAPP Worksheet #23 and provided in Attachment A.

Who will collect/generate the data?

Samples of TiO_2 will be collected by TDSC stakeholder company personnel. An off-site laboratory, SGS North America, Wilmington, North Carolina will be used to as the analytical laboratory for this project.

Data reporting:

The Project Laboratory will provide complete data packages and electronic data deliverables (EDDs) to Environmental Standards. Once the data have been validated, Environmental Standards will provide results of sampling tests to the ACC TDSC project manager. Data management and reporting are described in QAPP Worksheets #14.

QAPP WORKSHEET #12: MEASUREMENT PERFORMANCE CRITERIA

(UFP-QAPP Manual Section 2.6.2)
(US EPA 2106-G-05 Section 2.2.6)

The measurement performance criteria (MPC), or acceptance criteria, refer to the degree of uncertainty of analytical measurements concerning precision, accuracy, representativeness, completeness, and comparability (PARCC). Specific objectives for each criterion are typically established to evaluate if the data are acceptable for use in making project decisions. These criteria include the use of laboratory duplicates to assess precision; isotope spikes, laboratory control samples and calibration results to assess accuracy; and blank samples to determine representativeness. The MPC for the project are listed below in this QAPP Worksheet #12.

Precision

Precision is a measure of the agreement between concentrations of samples collected at the same time from the same location. Precision is measured by performing duplicate measurements in the field or laboratory. Precision is expressed in terms of relative percent difference (RPD) using the following equation:

$$RPD = \frac{C1 - C2}{((C1 + C2)/2)} \times 100$$

where,

C1 = Concentration of one analysis.
C2 = Concentration of other analysis.

Acceptable levels of precision will vary according to the sample matrix, the specific analytical methods, and the analyte concentration relative to the MDL. QA objectives for precision will be met using written laboratory SOPs in which data acceptance criteria will be outlined.

Accuracy

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. The difference between the values is generally expressed as a percentage or ratio. Through quality control checks for accuracy, potential bias of reported sample concentrations is identified.

The accuracy of laboratory analytical procedures is measured through a review of calibration, isotope and cleanup spike and laboratory control sample (LCS, also referred to as ongoing and precision recovery (OPR) in Method 1668C) results.

Continuing calibration accuracy checks are assessed by comparing the true value against the reported concentration. The percent difference (%D) between the results is calculated as follows:

Accuracy may be expressed as %D calculated by the following equation:

$$\%D = \frac{Vt - Vm}{Vt} \times 100$$

where,

Vt = the true or real value expected.
Vm = the measured or observed value.

The degree of accuracy demonstrated for laboratory control samples is expressed as a percent recovery (%R). The %R indicates the amount of known concentration of an analyte that has been detected by the associated instrumentation. The %R is calculated as follows:

$$\%R = \frac{(SSR - SR)}{SA} \times 100$$

where,

SSR = the spiked sample result
SR = the unspiked sample result
SA = the value of the spike added

The objective for accuracy of laboratory determinations is to demonstrate that the analytical instrumentation provides consistent measurements, which are within US EPA and statistically derived method-specific accuracy criteria.

Representativeness

Representativeness expresses the degree to which data accurately and precisely represent a characteristic of a population, parameter variation, or environmental condition. Representativeness is controlled by the consistent collection and analysis of samples according to standardized procedures. Representativeness is assessed through the results obtained from field duplicate and blank analyses. Field duplicate results indicate the representativeness of activities related to collection and analysis of samples. Analysis of blank results identifies potential false positive or high biased results for compounds that are detected in these samples.

Representativeness of specific samples will be achieved by the following:

- Collecting samples from a location that represents normal operating conditions.
- Appropriate sampling procedures, sample containers, and equipment.
- Appropriate analytical methodologies for each parameter with detection limits that satisfy project objectives.
- Techniques for homogenizing samples before analysis where appropriate.
- Sample analysis within the appropriate holding times.
- Proper sample preservation and storage.

Comparability

Comparability is a measure of the degree of confidence with which one set of data can be compared to a related set of data. Comparability is a qualitative objective, which indicates the extent to which comparisons among different measurements of the same quantity will yield valid conclusions. This project will use standard US EPA analytical methods, which are commonly used for environmental investigations and will allow for comparison to historical data reported by NGC.

Completeness

Completeness is a measure (percentage) of the amount of valid data obtained from a measurement system relative to the total amount that would be expected to be obtained under correct, normal conditions. Valid data is defined by the successful attainment of the DQOs as specified in this QAPP.

$$Completeness\ \% = \frac{Number\ of\ valid\ values\ reported}{Number\ of\ total\ values\ reported} \times 100$$

The QA objective for completeness can be optimized by employing and evaluating frequent quality control checks throughout the analytical process so that sample data can be assessed for validity of results and to allow for reanalysis within the hold time when problems are indicated by the QC results. The goal for analytical completeness is >90% overall usable data.

Sensitivity

Sensitivity is the ability of the method or instrument to detect the constituent of concern and other target analytes at the levels of interest. Method and instrument sensitivity may be evaluated through instrument DL studies, MDL studies, and analysis of low-level calibration standards. A laboratory control sample is a blank matrix that is spiked at approximately the midpoint of the calibration with the analytes of interest. Sensitivity may be measured by calculating the percent recovery of the analytes at the QL.

QLs or reporting limits (RLs) represent the minimum concentration that can be routinely identified and reliably quantified above the MDL by the laboratory. Sample QLs will be calculated and reported for all parameters and will include the effect of dilutions and sample aliquot size and final concentrated volume.

MEASUREMENT PERFORMANCE CRITERIA TABLE – PCB CONGENERS (US EPA METHOD 1668C)

Matrix: TiO_2 for use in paints and coatings, plastic, and paper and paperboard
Analytical Group or Method: 209 PCB Congeners and Homolog Groups
Concentration Level: Trace
Sampling Procedure(1): TDSC-01
Analytical Method(2): US EPA Method 1668C

Data Quality Indicators (DQIs)	Measurement Performance Criteria	QC Sample and/or Activity Used to Assess Measurement Performance	Activity Assessed by Results
Precision	RPD ≤ 50%, if both results are >5x QL Difference ≤2x QL, if results are ≤5x QL	Field Duplicate	Sampling and Analysis
Precision	RPD ≤ 35%, if both results are >5x QL Difference ≤2x QL, if results are ≤5x QL	Laboratory Duplicate	Analysis
Accuracy/Bias	50% -150% or laboratory SOP, if more restrictive	Ongoing Precision and Recovery (OPR) Sample	Analysis
Accuracy/Bias	See laboratory SOP	Labeled Isotope Dilution Internal Standards	Analysis
Accuracy/Bias	See laboratory SOP	Clean-up Standards	Analysis
Representativeness (Contamination/Bias)	Target analyte concentration < QL	Method Blank	Analysis
Representativeness (Contamination/Bias)	Target analyte concentration < QL	Field Blank	Sampling and Analysis
Representativeness (Accuracy/Bias)	Prepare and analyze within holding times, see Worksheet #19 and #30	Evaluation of holding times for target analytes	Sampling and Analysis
Representativeness (Accuracy/Bias)	Qualitative evaluation of compliance with method, see Laboratory SOP	Review of analytical methods used for analysis	Analysis
Sensitivity	See QAPP Worksheet #15	EDLs/QLs meet requirements.	Analysis
Data Completeness	> 90% Overall usable data	Data Completeness Check	Sampling and Analysis

(1) Reference number from QAPP Worksheet #21.
(2) Analytical method reference number from Worksheet #11.

QAPP Worksheet #13: Secondary Data Uses and Limitations

(UFP-QAPP Manual Section 2.7)
(USEPA 2106-G-05 Chapter 3: QAPP Elements for Evaluating Existing Data)

Data Type	Source	Data Uses Relative to Current Project	Factors Affecting the Reliability of Data and Limitations on Data Use
TiO_2 from paint and coatings, plastic, and paper and paperboard.	This QAPP.	Determine presence or absence of incidental PCBs in TiO_2 product from the chloride process.	Potential for contamination of samples with PCBs from ambient background in plant facility.

QAPP Worksheet #14 and #16: Project Tasks and Schedule

(UFP-QAPP Manual Sections 2.8.1 and 2.8.2)
(USEPA 2106-G-05 Section 2.2.4)

TiO_2 Sampling Event:

Activity	Responsible Party	Planned Start Date	Planned Completion Date	Deliverable(s)	Deliverable Due Date
Mobilization logistics	ACC TDSC and Environmental Standards.	Within 10 days of approval of QAPP by SRRTTF.	20 days from start date.	None	None
Sample collection	TDSC member company personnel.	Within ≤45 days from completion of Mobilization logistics.	30 days from start date.	Field notes	14 days from completion of activity
Analysis	SGS North America.	Upon sample receipt.	30 business days from sample receipt.	Analytical results, data packages and EDDs	30 business days from sample receipt
Data validation	Environmental Standards.	Upon data package receipt.	30 business days from data package receipt.	Data validation report	30 business days from data package receipt.
Summarize data	Environmental Standards.	Upon completion of data validation.	10 days from receipt of comments from ACC TDSC on draft report.	Text narrative report and data summary spreadsheet.	10 days from receipt of comments from ACC TDSC on draft report.

QAPP Worksheet #15: Laboratory-Specific Detection/Quantitation Limits

(UFP-QAPP Manual Section 2.6.2.3 and Figure 15)
(US EPA 2106-G-05 Section 2.2.6)

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
32598-13-3	PCB-77	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
70362-50-4	PCB-81	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
32598-14-4	PCB-105	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-37-0	PCB-114	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
31508-00-6	PCB-118	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
65510-44-3	PCB-123	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
57465-28-8	PCB-126	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38380-08-4/69782-90-7	PCB-156/157	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
52663-72-6	PCB-167	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
32774-16-6	PCB-169	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
39635-31-9	PCB-189	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
2051-24-3	PCB-209	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
2051-60-7	PCB-1	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
2051-61-8	PCB-2	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
2051-62-9	PCB-3	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
13029-08-8	PCB-4	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
33146-45-1	PCB-10	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
34883-39-1	PCB-9	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
33284-50-3	PCB-7	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
25569-80-6	PCB-6	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
16605-91-7	PCB-5	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
34883-43-7	PCB-8	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
34883-41-5	PCB-14	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
2050-67-1	PCB-11	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
2974-90-5/2974-92-7	PCB-13/PCB-12	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
2050-68-2	PCB-15	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38444-73-4	PCB-19	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
35693-92-6/37680-65-2	PCB-30/PCB-18	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
37680-66-3	PCB-17	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38444-76-7	PCB-27	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
55702-45-9	PCB-24	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38444-78-9	PCB-16	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38444-77-8	PCB-32	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
37680-68-5	PCB-34	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
55720-44-0	PCB-23	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
38444-81-4/15862-07-4	PCB-26/ PCB-29	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
55712-37-3	PCB-25	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
16606-02-3	PCB-31	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
7012-37-5/38444-84-7	PCB-28/PCB-20	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
38444-86-9/55702-46-0	PCB-33/PCB-21	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
38444-85-8	PCB-22	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38444-87-0	PCB-36	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38444-88-1	PCB-39	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
53555-66-1	PCB-38	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
37680-69-6	PCB-35	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38444-90-5	PCB-37	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
15968-05-5	PCB-54	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41464-41-9/62796-65-0	PCB-53/PCB-50	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
70362-45-7	PCB-45	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-04-7	PCB-51	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41464-47-5	PCB-46	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
35693-99-3	PCB-52	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74338-23-1	PCB-73	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
70362-46-8	PCB-43	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
60233-24-1/41464-40-8	PCB-69/PCB-49	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
70362-47-9	PCB-48	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41464-39-5/2437-79-8/ 33284-54-7	PCB-44/ PCB-47/ PCB-65	US EPA Method 1668C/SGSW-04	3	*	SGS North America - Wilmington
74472-33-6/54230-22-7 /32598-12-2	PCB-59/ PCB-62/ PCB-75	US EPA Method 1668C/SGSW-04	3	*	SGS North America - Wilmington
36559-22-5	PCB-42	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-59-9	PCB-41	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41464-46-4/38444-93-8	PCB-71/PCB-40	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
52663-58-8	PCB-64	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41464-42-0	PCB-72	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
73575-52-7	PCB-68	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
70424-67-8	PCB-57	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41464-49-7	PCB-58	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
73575-53-8	PCB-67	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-34-7	PCB-63	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
33284-53-6/32598-11-1/32690-93-0/70362-48-0	PCB-61/ PCB-70/ PCB-74/ PCB-76	US EPA Method 1668C/SGSW-04	4	*	SGS North America - Wilmington
32598-10-0	PCB-66	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74338-24-2	PCB-55	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41464-43-1	PCB-56	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
33025-41-1	PCB-60	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
33284-52-5	PCB-80	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41464-48-6	PCB-79	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
70362-49-1	PCB-78	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
56558-16-8	PCB-104	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
73575-54-9	PCB-96	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
60145-21-3	PCB-103	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
73575-55-0	PCB-94	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38379-99-6	PCB-95	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
39485-83-1/73575-56-1	PCB-100/PCB-93	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
68194-06-9	PCB-102	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
60233-25-2	PCB-98	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
55215-17-3	PCB-88	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-05-8	PCB-91	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-60-2	PCB-84	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
73575-57-2	PCB-89	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
56558-18-0	PCB-121	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-61-3	PCB-92	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-10-5/68194-07-0/ 37680-73-2	PCB-113/PCB-90/ PCB-101	US EPA Method 1668C/SGSW-04	3	*	SGS North America - Wilmington
60145-20-2	PCB-83	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
38380-01-7	PCB-99	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-36-9	PCB-112	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
70362-41-3/56558-17-9/55312-69-1/ 41464-51-1/74472-39-2/38380-02-8	PCB-108/PCB-119/PCB-86/ PCB-97/ PCB-125/ PCB-87	US EPA Method 1668C/SGSW-04	6	*	SGS North America - Wilmington
68194-11-6	PCB-117	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
18259-05-7/65510-45-4	PCB-116/PCB-85	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
38380-03-9	PCB-110	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-38-1	PCB-115	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-62-4	PCB-82	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
39635-32-0	PCB-111	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-12-7	PCB-120	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
70424-68-9/70424-70-3	PCB-107/ PCB-124	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
74472-35-8	PCB-109	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
70424-69-0	PCB-106	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
76842-07-4	PCB-122	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
39635-33-1	PCB-127	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
33979-03-2	PCB-155	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-09-2	PCB-152	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-08-1	PCB-150	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
38411-22-2	PCB-136	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-40-5	PCB-145	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-41-6	PCB-148	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-63-5/52744-13-5	PCB-151/PCB-135	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
60145-22-4	PCB-154	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-14-9	PCB-144	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-13-8/38380-04-0	PCB-147/ PCB-149	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
52704-70-8	PCB-134	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-15-0	PCB-143	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
56030-56-9/59291-64-4	PCB-139/ PCB-140	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
61798-70-7	PCB-131	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41411-61-4	PCB-142	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38380-05-1	PCB-132	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
35694-04-3	PCB-133	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-46-1	PCB-165	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
51908-16-8	PCB-146	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-43-8	PCB-161	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
35065-27-1/ 59291-65-5	PCB-153/ PCB-168	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
52712-04-6	PCB-141	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
52663-66-8	PCB-130	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
35694-06-5	PCB-137	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-45-0	PCB-164	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-44-9/35065-28-2/ 55215-18-4	PCB-163/PCB-138/ PCB-129	US EPA Method 1668C/SGSW-04	3	*	SGS North America - Wilmington
41411-62-5	PCB-160	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-42-7	PCB-158	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38380-07-3/41411-63-6	PCB-128/ PCB-166	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
39635-35-3	PCB-159	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
39635-34-2	PCB-162	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74487-85-7	PCB-188	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-64-6	PCB-179	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-48-3	PCB-184	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-65-7	PCB-176	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-49-4	PCB-186	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-67-9	PCB-178	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
40186-70-7	PCB-175	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-68-0	PCB-187	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
60145-23-5	PCB-182	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-69-1	PCB-183	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
52712-05-7	PCB-185	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
38411-25-5	PCB-174	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-70-4	PCB-177	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-47-2	PCB-181	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-71-5/ 68194-16-1	PCB-171/ PCB-173	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
52663-74-8	PCB-172	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-51-8	PCB-192	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
35065-29-3/ 69782-91-8	PCB-180/ PCB-193	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
74472-50-7	PCB-191	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
35065-30-6	PCB-170	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
41411-64-7	PCB-190	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
2136-99-4	PCB-202	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
40186-71-8	PCB-201	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-52-9	PCB-204	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
33091-17-7	PCB-197	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-73-7	PCB-200	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
68194-17-2/ 52663-75-9	PCB-198/ PCB-199	US EPA Method 1668C/SGSW-04	2	*	SGS North America - Wilmington
42740-50-1	PCB-196	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

PCB Congeners in TiO_2 or solid field blank					
CAS Number	**Analyte****	**Method/SOP**	**Laboratory-Specific Quantitation Limit (pg/g)**	**Laboratory-Specific EDL (pg/g)**	**Laboratory Conducting Analysis**
52663-76-0	PCB-203	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-78-2	PCB-195	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
35694-08-7	PCB-194	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
74472-53-0	PCB-205	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-77-1	PCB-208	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
52663-79-3	PCB-207	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington
40186-72-9	PCB-206	US EPA Method 1668C/SGSW-04	1	*	SGS North America - Wilmington

*EDL – Estimated detection limit will be calculated for each sample and analyte based on signal to noise.
** Several PCB Congener analytes will co-elute and the reporting will be in accordance with the following:

1. If a congener coelutes with another congener, qualify the result with CXXX (where XXX is the lowest numbered target in the coelution). No value will be entered into the concentration field for CXXX.
2. The CXXX designation will be identified in the data qualifier flag column.
3. If the congener is the lowest numbered congener in a coelution, then it will be identified with a C in the data qualifier flag column.

QAPP WORKSHEET #17 – SAMPLING DESIGN AND RATIONALE

(UFP-QAPP Manual Section 3.1.1)
(USEPA 2106-G-05 Section 2.3.1)

Sampling

- TiO_2 samples will be collected as grab samples during normal production cycles at TDSC plant facilities at the point where the product is being bagged.
- Samples will be collected to represent TiO_2 to be used in paints and coatings, plastic, and paper and paperboard.
- Matrix: TiO_2
- Analytical Group: 209 PCB congeners.
- Refer to Worksheet #20 for number of field samples and QC samples; refer to Worksheet #18 for sampling locations.

Sampling Supply Inspection and Acceptance Procedures:

It will be the responsibility of the TDSC company personnel to inspect supplies to be used as part of the field sampling before use. Environmental Standards will coordinate and arrange with the project laboratory to have all supplies necessary to collect samples sent in a sampling kit to the sampling personnel. Supplies to be inspected consist of sampling supplies and sample bottles. Samples will be placed directly into the sample bottles using a stainless-steel spatula or spoon, so a minimal amount of field equipment is expected to be used.

If the sampling personnel encounter problems with supplies and/or sample containers and is uncertain how to proceed, the samplers should consult the Quality Assurance Officer for instructions. The Quality Assurance Officer will instruct the samplers of corrective actions that should be implemented.

QAPP WORKSHEET #18 – SAMPLING LOCATIONS AND METHODS/SOP REQUIREMENTS TABLE

(UFP-QAPP Manual Sections 3.1.1 and 3.1.2)
(USEPA 2106-G-05 Sections 2.3.1 and 2.3.2)

Sampling Location/ Designation	Matrix	Sample Type	Use Type	Analytical Group	Number of Samples*	Number of Quality Control Samples	Sampling SOP Reference	Rationale for Sampling Location
1APAINT	TiO_2	Grab	Paint	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
1BPLASTIC	TiO_2	Grab	Plastic	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
2CPAINT	TiO_2	Grab	Paint	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
2CPLASTIC	TiO_2	Grab	Plastic	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
2CPAPER	TiO_2	Grab	Paper	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
2DPAINT	TiO_2	Grab	Paint	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
2DPLASTIC	TiO_2	Grab	Plastic	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.

Sampling Location/ Designation	Matrix	Sample Type	Use Type	Analytical Group	Number of Samples*	Number of Quality Control Samples	Sampling SOP Reference	Rationale for Sampling Location
2DPAPER	TiO_2	Grab	Paper	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
3EPAINTPAPER	TiO_2	Grab	Paint and Paper	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
3EPLASTIC	TiO_2	Grab	Plastic	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
3FPAINT	TiO_2	Grab	Paint	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
3FPAPER	TiO_2	Grab	Paper	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
4GPAINTPAPER	TiO_2	Grab	Paint and Paper	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.
4GPLASTIC	TiO_2	Grab	Plastic	PCB Congeners See Worksheet #15	1	See Worksheet #20	See Worksheet #21	Presence/Absence postproduction at point of bagging product.

QAPP Worksheet #19 and #30 – Sample Containers, Preservation and Holding Times

(UFP-QAPP Manual Sections 3.1.2.2)
(USEPA 2106-G-05 Sections 2.3.2)

Matrix	Analytical Group[1]	Concentration Level	Analytical and Preparation Method Reference[2]	Sample Size/ Volume	Containers (number, size, and type)	Preservation Requirements (chemical, temperature, light protected)	Maximum Holding Time[3] (preparation/ analysis)
TiO_2 and solid field blank	PCBs	All	US EPA 1668C	10 - 20 grams minimum, fill jar to ¾ full	2 × 4-ounce amber wide mouth glass	0 – 6 °C; store in the dark	None; method recommends 1 year to extraction/1 year from extraction to analysis

NA = not applicable

1 Target analyte lists are provided in QAPP Worksheet #15

2 Laboratory SOP referenced in QAPP Worksheet #23

3 Technical holding times are calculated from the date and time of sample collection

QAPP WORKSHEET #20 – FIELD QUALITY CONTROL SAMPLE SUMMARY TABLE

(UFP-QAPP Manual Section 3.1.1 and 3.1.2)
(USEPA 2106-G-05 Section 2.3.5)

Field QC samples will be collected at the frequency summarized below on the field QC sample summary table:

Matrix	Analytical Group[2]	Analytical and Preparation SOP Reference	No. of Field Samples	No. of Field Duplicate Pairs	No. of Trip Blanks	No. of Field Blanks[1]	No. of Laboratory QC Samples[3]	Total Number of Samples
TiO_2	PCB Congeners	SGSW-01; SGSW-04	14	_	_	14	2	30

1 Field blanks collected on dedicated equipment (stainless steel spatula or spoon) that comes into contact with sample medium and at the location of sample collection to capture influence of ambient background. Collect one field blank for each sample collection location.
2 Refer to QAPP Worksheet #15 for analyte lists.
3 Laboratory QC samples include laboratory duplicate sample analysis for PCB congeners. Matrix spike samples are not required for Method 1668C.

QAPP Worksheet #21: Field Standard Operating Procedures

(UFP-QAPP Manual Section 3.1.2)
(USEPA 2106-G-05 Section 2.3.2)

The Field SOPs are included in the FSP or as an Appendix to the FSP.

Reference Number	Title, Revision Date and/or Number	Originating Organization	Equipment Type	Modified for Project Work? (Yes/No)
TDSC-01	Field Documentation Sample Custody	Environmental Standards	• Chain-of-custody (COC) forms • Custody tape or seals • Field record • Ballpoint black ink pens or permanent markers • Sample labels • Waterproof bags for COCs • Clear-plastic sealing tape • Camera (optional)	Yes, Project Specific
TDSC-01	Sample Labelling, Packaging and Shipping	Environmental Standards	• Ballpoint black ink pens or permanent markers • Personal protective equipment • Inert packing material • Laboratory-provided sample bottleware • Sample labels • Insulated coolers • Custody seals • Shipping tape • Re-sealable, clear-plastic bags • Temperature blanks (if not provided by the laboratory) • Ice • Overnight courier air bills or shipping forms • Shipping labels, including “this side up,” and “fragile – glass” • Clear-plastic sealing tape • Plastic wrap	Yes, Project Specific
TDSC-01	TiO_2 Sample Collection	Environmental Standards		Yes, Project Specific

QAPP Worksheet #22: Field Equipment Calibration, Maintenance, Testing, and Inspection

(UFP-QAPP Manual Section 3.1.2.4)
(USEPA 2106-G-05 Section 2.3.6)

Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Person Responsible for Corrective Action	SOP Reference*
No Field Equipment is planned to be used during sample collection.	NA	NA	NA	NA	NA	NA	NA	NA	NA

QAPP WORKSHEET #23 – ANALYTICAL SOP REFERENCES TABLE

(UFP-QAPP Manual Section 3.2.1)
(USEPA 2106-G-05 Section 2.3.4)

Copies of the listed Project Laboratory's SOPs are provided in Attachment A.

Reference Number	Title, Revision Date, and/or Number	Definitive or Screening Data	Analytical Group	Instrument	Organization Performing Analysis	Modified for Project Work? (Y/N)
SGSW-01	Standard Operating Procedure for Extraction of Various Matrices; SOP No. DC_441, Revision 4 December 5, 2018.	Definitive	PCB Congeners (sample prep)	Extraction	SGS North America - Wilmington	N
SGSW-02	Standard Operating Procedure Fortification; SOP No. DC_353, Revision 2 March 15, 2019.	Definitive	PCB Congeners (sample prep)	Extraction	SGS North America - Wilmington	N
SGSW-03	Standard Operating Procedure for Fractionation; SOP No. DC_365, Revision 8.	Definitive	PCB Congeners (sample prep)	Extraction	SGS North America - Wilmington	N
SGSW-04	Standard Operating Procedure for the Analysis of Polychlorinated Biphenyl; SOP No. DC-367, Revision 16 March 27, 2019.	Definitive	PCB Congeners	HRMS	SGS North America - Wilmington	N
SGSW-05	Standard Operating Procedure for Login and Storage of Samples; SOP No. MI_3, Revision 23 April 9, 2018	NA	NA	Computer	SGS North America - Wilmington	N

QAPP Worksheet #24: Analytical Instrument Calibration

(UFP-QAPP Manual Section 3.2.2)
(USEPA 2106-G-05 Section 2.3.6)

Instrument	Calibration Procedure	Calibration Range	Frequency of Calibration	Acceptance Criteria	Corrective Action (CA)	Person Responsible for CA	SOP Reference
HRGC/HRMS (PCB congeners)	Perfluorokerosene tune, initial and continuing calibration as required in SOP	See SOP	ICAL after instrument set up, after major instrument changes, and when continuing calibration criteria are not met; calibration verification minimum every 12 hours	• ICAL %RSD ≤20% for target analytes; ≤30% for extraction standards • ICV and CCV %D ± 30% for target analytes; ± 50% for extraction standards; ± 30% for cleanup standards; and ± 50% for sampling standard	Inspect system, correct problem, rerun calibration and affected samples	Analyst	SGSW-04

QAPP Worksheet #25: Analytical Instrument and Equipment Maintenance, Testing, and Inspection

(UFP-QAPP Manual Section 3.2.2)
(USEPA 2106-G-05 Section 2.3.6)

Instrument/ Equipment	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	Corrective Action	Responsible Person	SOP Reference
HRGC/HRMS	Change septa; clean injectors; change or trim columns; install new liners; clean sources and quadruple rods; maintain vacuum pumps	Tuning and calibration verification	Instrument performance and sensitivity	Daily as needed	ICAL or CCV passes criteria	Inspect injector port, cut column, run calibration See SOP	Analyst/ Supervisor	SGSW-04

QAPP Worksheet #26 and #27: Sample Handling, Custody, and Disposal

(UFP-QAPP Manual Section 3.3)
(USEPA 2106-G-05 Section 2.3.3)

Sampling Collection Organization:
Personnel from TDSC stakeholder companies

1. The Chemours Company
2. Kronos Worldwide
3. Tronox Limited
4. Venerator Materials Company

Laboratory:
SGS North America
5500 Business Drive
Wilmington, North Carolina 28405
(910) 350-1903

Method of sample delivery (shipping/carrier): laboratory courier and/or commercial shipping.

Number of days from reporting until sample disposal: Laboratory will archive any remaining sample (<6ºC) until given authority to discard.

Activity	Organization and Title or Position of Person Responsible for the Activity	SOP Reference
Sample labeling	TDSC company personnel or subcontract personnel	TDSC-01
Chain-of-custody form completion	TDSC company personnel or subcontract personnel	TDSC-01
Packaging	TDSC company personnel or subcontract personnel	TDSC-01
Shipping Coordination	Environmental Standards, Inc.	NA
Sample receipt, inspection, and log-in	Receiving laboratory staff	SGSW-05
Sample custody and storage	Receiving laboratory staff	SGSW-05
Sample disposal	Receiving laboratory staff	SGSW-05

QAPP Worksheet #28: Quality Control and Corrective Action

(UFP-QAPP Manual Section 3.4 and Tables 4, 5, and 6)
(US EPA 2106-G-05 section 2.3.5)

Matrix:	TiO_2 and solid field blank
Analytical Group or Method:	209 PCB Congeners and Homolog Groups
Concentration Level:	Trace
Sampling Procedure:	TDSC-01
Analytical Method:	US EPA Method 1668C

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for CA	Measurement Performance Criteria
Method Blank	1 per batch	See laboratory SOP	Identify source of contamination and eliminate. Re-extract and analyze samples with positive results < 10× the method blank concentration.	Laboratory Personnel	Target analyte concentration < QL
Field Blank	1 per unique sample	Not applicable	Evaluate impacts on data on a case by case basis.	Data Validator	Target analyte concentration < QL
OPR Sample	1 per batch	50% -150% or laboratory SOP, if more restrictive	Re-extract and analyze associated samples. Qualify data as needed.	Laboratory Personnel	Same as QC acceptance criteria
Laboratory Duplicate	1 per batch	See laboratory SOP	Qualify data as needed.	Laboratory Personnel	RPD ≤ 35%, if both results are >5x QL Difference ≤2x QL, if results are ≤5x QL
Labeled Isotope Dilution Internal Standards	Every analysis	See laboratory SOP	Evaluate calculation and instrument performance for error. Re-extract and analyze associated samples as needed. Qualify the data as needed.	Laboratory Personnel	See laboratory SOP

Matrix:	TiO_2 and solid field blank
Analytical Group or Method:	209 PCB Congeners and Homolog Groups
Concentration Level:	Trace
Sampling Procedure:	TDSC-01
Analytical Method:	US EPA Method 1668C

QC Sample	Frequency/ Number	Method/SOP QC Acceptance Limits	Corrective Action (CA)	Person(s) Responsible for CA	Measurement Performance Criteria
Clean-up Standards	Every analysis	See laboratory SOP	Evaluate calculation and instrument performance for error. Re-extract and analyze associated samples as needed. Qualify the data as needed.	Laboratory Personnel	See laboratory SOP

QAPP Worksheet #29: Project Documents and Records

(UFP-QAPP Manual Section 3.5.1)
(US EPA 2106-G-05 Section 2.2.8)

Sample Collection Documents and Records	On-site Analysis Documents and Records*	Off-site Analysis Documents and Records	Data Assessment Documents and Records	Other
• Field Logbooks • COCs • Site photographs, if taken	• NA	• Sample Receipt, Custody and Tracking Records • Standard Traceability Logs • Equipment Calibration Logs • Sample Prep Logs • Run Logs • Corrective Action Forms • Reports on Field Sample Results • Reported Results for Standards, QC Checks, and QC Samples • Instrument Printouts (raw data) for Field Samples, Standards, QC Checks and QC Samples • Case Narrative	• Analytical Data Packages • Electronic Analytical Data Files • Data Package Completeness Checklists • Data validation worksheets	• none

All files will be maintained at the office of Environmental Standards.

QAPP Worksheet #31, #32, & #33: Assessments and Corrective Action

(UFP-QAPP Manual Sections 4.1.1, 4.1.2, and 4.2)
(US EPA 2106-G-05 Sections 2.4 and 2.5.5)

Assessments:

Assessment Type	Responsible Party & Organization	Number/Frequency	Estimated Dates	Assessment Deliverable	Deliverable Due Date
Review of field sampling procedures	TDSC sample collection personnel and Environmental Standards	Once/Prior to sample collection	At least one week prior to sampling	Documentation of review	Prior to sample collection event
Review of field documentation	TDSC sample collection personnel and Environmental Standards	After every day of collection	As warranted	Verbal/Documentation of review	On-going
Chain-of-Custody Record review	TDSC sample collection personnel and Environmental Standards	Prior to submission of samples	As warranted	Verbal/Documentation of review	On-going
Review of laboratory sample receipt document	Project QA Officer	24 hours from receipt of documentation	As warranted	Documentation of review	On-going
Internal laboratory performance audits	Laboratory QA Officer/ Laboratory	Per laboratory QA manual; at least annually	As warranted	Documentation as required by laboratory QA manual	As required by the laboratory QA manual
Sample collection program review	ACC TDSC Project Manager/ Environmental Standards	Ongoing during sample collection program	As warranted	Documentation of review	On-going
Review/validation of analytical reports	Data Validator/ Environmental Standards	Each data package	Within 21 days of receipt	Documentation of review	On-going

Assessment Response and Corrective Action:

Assessment Type	Responsibility for responding to assessment findings	Assessment Response Documentation	Timeframe for Response	Responsibility for implementing Corrective Action	Responsible for monitoring Corrective Action implementation
Review of field sampling procedures	TDSC company management	Memorandum	30 days	Sample collection personnel	ACC TDSC Project Manager
Review of field documentation	TDSC company management	Note in field logbook and retained in correspondence	Within 7 days of identification	Sample collection personnel	ACC TDSC Project Manager
Chain-of-Custody Record review	TDSC company management	Correction of documentation	Prior to submission of samples	Sample collection personnel	ACC TDSC Project Manager
Review of laboratory sample receipt document	Laboratory Personnel	Revision of sample information	24 hours from receipt of documentation	Laboratory Personnel	Project QA Officer
Internal laboratory performance audits	Laboratory Personnel	As required by the laboratory QA manual	As required by the laboratory QA manual	Laboratory QA Officer	Project QA Officer
Sample collection program review	ACC TDSC Project Manager	Memorandum	Within 7 days of identification	ACC TDSC Project Manager	ACC TDSC Project Manager
Review/validation of analytical reports	Laboratory Manager	Revision of analytical report, as needed	Within 7 days of identification	Laboratory Manager	Project QA Officer

Notes:
SGS North America is required to take part in regularly scheduled audits required by the state and federal agencies as part of ongoing accreditation. For those audits conducted within 6 months of the start of, or during, this program, the laboratories must provide copies of the results of these third-party audits to the Project QA Officer. Any change to laboratory ownership, management, or certification status must also be immediately reported to the Project QA Officer. The Project QA Officer, under the direction of the ACC TDSC Project Manager, will review the third-party audit reports. Any significant deficiencies will require follow-up and resolution with the laboratory. The Project QA Officer will prepare a written summary of the findings and corrective actions for the ACC TDSC Project Manager.

QAPP Worksheet #34: Data Verification and Validation Inputs

(UFP-QAPP Manual Section 5.2.1 and Table 9)
(US EPA 2106-G-05 Section 2.5.1)

Item	Description	Verification (Completeness)	Validation (Conformance to specifications)
Planning Documents/Records			
1	Approved QAPP	X	
2	Field SOPs	X	
3	Laboratory SOPs	X	
4	Field logbooks	X	X
5	Chain-of-Custody Records	X	X
6	Sample diagrams	X	X
7	Relevant correspondence (progress reports)	X	X
8	Field audit reports	X	X
9	Field corrective action reports	X	X
10	Photographs	X	X
11	Field program review	X	X
12	Cover sheet (laboratory identifying information)	X	X
13	Case narrative	X	X
14	Sample receipt records	X	X
15	Field COC Records		
16	Sample chronology (*i.e.*, dates and times of receipt, preparation, and analysis)	X	X
17	Communication records	X	X
18	MDL/RL establishment and verification	X	X
19	Standards traceability	X	X
20	Instrument calibration records	X	X
21	Definition of laboratory qualifiers	X	X
22	Results reporting forms	X	X
23	QC sample results	X	X

Item	Description	Verification (Completeness)	Validation (Conformance to specifications)
24	Corrective action reports	X	X
25	Raw data, including instrument outputs	X	X
26	Sample preparation records	X	X
27	Electronic data deliverable	X	X

QAPP Worksheet #35: Data Verification Procedures

(UFP-QAPP Manual Section 5.2.2)
(US EPA 2106-G-05 Section 2.5.1)

Records Reviewed	Requirement Document	Process Description	Responsible for Person
Field logbook	QAPP, Field Sampling SOP	Verify that records are present and complete for each day of field activities. Verify that all planned samples including field QC samples were collected and that sample collection locations are documented. Verify that changes/exceptions are documented and were reported in accordance with requirements. Verify that any required field monitoring was performed, and results are documented.	Daily – sample collection personnel At conclusion of field activities – Project Manager
Chain-of-Custody Records	QAPP, Field Sampling SOP	Verify the completeness of COC Records. Examine entries for consistency with the field logbook. Check that appropriate methods and sample preservation have been recorded. Verify that the required volume of sample has been collected and that enough sample volume is available for QC samples (*e.g.*, laboratory duplicates). Verify that all required signatures and dates are present. Check for transcription errors.	Daily – sample collection personnel At conclusion of field activities – Data Validator
Laboratory Deliverable	QAPP	Verify that the laboratory deliverable contains all records specified in the QAPP. Check sample receipt records to ensure sample condition upon receipt was noted, and any missing/broken sample containers were noted and reported according to plan. Compare the data package with the COCs to verify that results were provided for all collected samples. Review the narrative to ensure all QC exceptions are described. Check for evidence that any required notifications were provided to project personnel as specified in the QAPP. Verify that necessary signatures and dates are present.	Before reporting – Laboratory Project Manager Upon release – Project QA Officer, or Data Validator
Audit Reports, Corrective Action Reports	QAPP	Verify that all planned audits were conducted. Examine audit reports. For any deficiencies noted, verify that corrective action was implemented according to plan.	Project QA Officer

QAPP Worksheet #36: Data Validation Procedures

(UFP-QAPP Manual Section 5.2.2)
(USEPA 2106-G-05 Section 2.5.1)

Data validation will be performed on all laboratory analytical data.

Data Validator: Environmental Standards, Inc.

Analytical Group/Method	The data validated will be the data generated by the fixed based laboratory and will not include field generated data.
Data deliverable requirements:	Full Level 4 data package (fully documented)
Analytical specifications:	Will be defined by the project and specified in the QAPP
Measurement of performance criteria:	Worksheets #12 and #28
Percent of data packages to be validated:	100%
Percent of raw data to be validated:	Minimum of 10%
Percent of results to be recalculated:	Minimum of 10%
Validation Procedure:	National Functional Guidelines (most recent version)
Electronic validation program/version:	None

The following data qualifiers will be applied during data validation. Potential impacts on project specific DQOs will be discussed in the data validation report.

Qualifier	Description
U	This result should be considered “not-detected” because it was detected in a laboratory and/or field-generated blank at a similar level.
R	The data are unusable (note: The analyte may or may not be present in the sample).
J	The associated value is an estimated quantity. (no direction of bias assigned)
UJ	This analyte was analyzed for, but was not detected. The associated reporting limit is an estimate and may be inaccurate or imprecise.
J+	The analyte is present. The reported value may be biased high. The actual value is expected to be lower than reported.
J-	The analyte is present. The reported value may be biased low. The actual value is expected to be higher than reported.
N	The analyte has been “tentatively identified” or “presumptively” as present.

Qualifier	Description
EMPC	The analyte does not meet all identification criteria. The value reported is an estimated maximum potential concentration.

QAPP Worksheet #37: Usability Assessment

(UFP-QAPP Manual Section 5.2.3)
(USEPA 2106-G-05 Sections 2.5.2, 2.5.3, and 2.5.4)

The personnel responsible for participating in the data usability assessment are as follows (the specific personnel will vary based on the use of the data):

- ACC TDSC Project Manager, Jay West – American Chemistry Council
- Project QA Officer, David Blye – Environmental Standards

The data usability assessment process includes the following steps:

Step 1	**Review the project's objectives and sampling design:** Review the key outputs defined during planning (*e.g.*, DQOs) to make sure they are still applicable. Review the sampling design for consistency with the stated objectives.
Step 2	**Review the data verification and data validation outputs:** Review available QA reports, including the data verification and data validation reports. Perform basic calculations and summarize the data (*e.g.*, graphs, maps, or tables). Review deviations from planned activities (*e.g.*, location of samples, holding time exceedances, or method deviations) and determine their impacts on the data usability. Evaluate implications of unacceptable QC sample results.
Step 3	**Verify the assumptions of the selected statistical method:** Statistical evaluation, if any, is expected to be limited for this project. The firms utilizing the data generated will be responsible for Step 3. Verify whether underlying assumptions for selected statistical method are applicable for the project data set. Items to review are the assumptions including the distributional form of the data, independence of the data, dispersion characteristics, homogeneity, and other factors. If serious deviations from assumptions are discovered, then another statistical method will need to be selected.
Step 4	**Implement the statistical method:** The firms utilizing the data generated will be responsible for Step 4. The firms will utilize statistical procedures or methods tailored to their specific data usages and assessments.
Step 5	**Document data usability and draw conclusions:** The firms utilizing the data generated will be responsible for Step 5. Determine if the data can be used as intended, considering implications of deviations and corrective actions. Discuss data quality indicators. Assess the performance of the sampling design and Identify limitations on data use. Update the conceptual Site model and document conclusions. Prepare the data usability summary report which can be in the form of text and/or a table.

ATTACHMENT A

ANALYTICAL STANDARD OPERATING PROCEDURES

ATTACHMENT B

FIELD STANDARD OPERATING PROCEDURE

ATTACHMENT C

LABORATORY CERTIFICATIONS