NC DEQ/DWR WASTEWATER/GROUNDWATER LABORATORY CERTIFICATION BRANCH

LABORATORY NAME:		CERT #:	
PRIMARY ANALYST:		DATE:	
NAME OF PERSON COMPLETING CHECKLIST (PRINT):			
SIGNATURE OF PERSON COMPLETING CHECKLIST:			

Parameter: **Color (PC)**
Method: **Standard Methods 2120 B-2021 (Aqueous)**

Color is considered a method-defined parameter per the definition in the Code of Federal Regulations, Part 136.6, Section (a) (5). This means that the method may not be modified per Part 136.6, Section (b) (3).

EQUIPMENT:

	Nessler tubes		pH meter
	0.45 µm cellulose membrane or glass fiber filter and filter assembly		Plastic bottles or Acid-washed amber glass bottles

: ANALYSIS REAGENTS:

	Organic-free water		Potassium chloroplatinate, K_2PtCl_6, analytical grade
	Hydrochloric acid, HCl, analytical grade		Cobaltous chloride, $CoCl_2 \cdot 6H_2O$, analytical grade
	Sodium Hydroxide, NaOH, analytical grade		Purchased Stock Standard

PLEASE COMPLETE CHECKLIST IN INDELIBLE INK
Please mark Y, N or NA in the column labeled LAB to indicate the common lab practice and in the column labeled SOP to indicate whether it is addressed in the SOP.

	GENERAL	LAB	SOP	EXPLANATION
1	Is the SOP reviewed at least every 2 years? What is the most recent review/revision date of the SOP? [15A NCAC 02H .0805 (a) (7)] **Answer:**			Quality assurance, quality control, and Standard Operating Procedure documentation shall indicate the effective date of the document and be reviewed every two years and updated if changes in procedures are made. Verify proper method reference. During review notate deviations from the approved method and SOP.
2	Are all review/revision dates and procedural edits tracked and documented? [15A NCAC 02H .0805 (a) (7)]			Each laboratory shall have a formal process to track and document review dates and any revisions made in all quality assurance, quality control and SOP documents.
3	Is there North Carolina data available for review?			If not, review PT data
	PRESERVATION and STORAGE	**LAB**	**SOP**	**EXPLANATION**
4	Are samples collected in plastic bottles protected from light or acid-washed amber glass bottles? [SM 2120 B -2021 (5)(a)]			Collect samples in acid-washed amber glass bottles or plastic bottles covered to keep out light.
5	Are bottles rinsed once with sample before filling bottle with sample? [SM 2120 B -2021 (5)(a)]			Rinse bottles once with sample before filling bottle with sample.
6	Are samples iced to above freezing but ≤ 6 ºC during shipment? [40 CFR 136.3 Table II]			40 CFR footnote 2 allows 15 minutes for sample preservation, including thermal. This means that if a sample is received in the lab within 15 minutes it is not required to be on ice. Document temperature downward trend for short transport samples.
7	Are samples refrigerated to above freezing but ≤ 6 ºC during storage? [40 CFR 136.3 Table II]			
8	Are samples analyzed within 48 hours of collection? [40 CFR 136.3 Table II]			

	PROCEDURE	LAB	SOP	EXPLANATION
9	What is your laboratory's reporting limit? [15A NCAC 02H .0805 (a) (7) (H)] **Answer:**			
10	**List the concentration of prepared standards:** [15A NCAC 02H .0805 (a) (7) (H)] [SM 2120 B -2021 (4)]			Prepare standards having CU of 5, 10, 15, 20, 25, 30, 40, 50, and 100. **Note:** Per guidance from EPA, the standard range can be modified based on 40 CFR method modification 136.6 (4) (C) (ix) provided all corresponding QC/Performance criteria and regulatory limits are met.
11	Are prepared standards protected from evaporation, contamination and light and kept only one month? [SM 2120 B-2021 (4)]			Protect standards against evaporation and contamination when not in use. Keep in dark when not in use, and keep only for 1 month.
12	Are samples allowed to come to room temperature before analysis? [SM 2120 B-2021 (5) (a)]			Keep samples cold until analysis, and warm them up to room temperature before measurements.
13	Is pH meter calibrated on a daily basis according to manufacturer's instructions? [SM 4500 H^+ B-2021 (4) (a)]			
14	Is the pH meter calibrated using a two-point or three-point calibration? [SM 4500 H^+ B-2021 (4) (a)] **Indicate value of calibration buffers:**			One-point calibration is not allowed.
15	Is the meter calibration process documented? [15A NCAC 02H .0805 (a) (7) (E)]			
16	Is sample pH adjusted to 7 S.U. if outside the range of 4 to 10 S.U.? [SM 2120 B-2021 (5) (b)]			If outside the range of 4 to 10 S.U. preferably adjust sample to pH 7 S.U. and note the adjustment. Certification interprets this to mean that the pH must be adjusted if outside the range of 4 to 10 S.U. but does not necessarily have to be adjusted to exactly 7 S.U.
17	Is the pH adjustment documented, if performed? [SM 2120 B-2021 (5) (b)]			
18	What sample volume is analyzed? [SM 2120 B-2021 (5) (c)] **Answer:**			Observe sample color by filling a matched Nessler tube to the 50-mL mark with sample and comparing it with standards.
19	Are samples analyzed by comparing with standards looking vertically downward through the tubes toward a white or specular surface placed at such an angle that light is reflected upward through the columns of liquid? [SM 2120 B-2021 (5) (c)]			
20	What type of color is measured? **(circle one)** **True** **Apparent** **Both**			Most permits will specify the type of color required to be measured.
21	If Apparent Color is to be measured, are unfiltered samples analyzed? [SM 2120 B-2021 (5) (c)]			
22	If True Color is to be measured, are samples filtered prior to analysis using the proper procedure? [SM 2120 B-2021 (5) (b)]			If true color is to be measured, wash membrane filter and filter assembly by passing at least 50 mL reagent water through filter. Filter about 25 mL sample and discard filtrate. Filter a further portion about 50 mL through the same filter and retain for analysis.
23	For true color measurement, are the filtered samples split and measured in replicate? [SM 2120 B-2021 (7) (a)]			
24	Are results reported in whole numbers? [SM 2120 B-2021 (6) (b)]			Report color results in whole numbers

25	Are samples that exceed the highest standards diluted to within the range of the standards? [SM 2120 B-2021 (5) (c)]			If the color exceeds the highest standard, dilute sample in known proportions until the color is within the range of the standards.
26	What equation is used to calculate the Color results of diluted samples? [SM 2120 B-2021 (6) (a)]			$\text{Color (CU)} = \frac{A \times 50^*}{B}$ where: A= estimated color of a diluted sample and B= mL sample taken for dilution. *assuming 50mL total volume
27	When reporting a color value, is the pH at which color is determined documented? [SM 2120 B-2021 (1) (c) and (6) (c)]			Color value of water is extremely pH dependent and invariably increases as the pH of the water is raised. When reporting a color value, specify the pH at which color is determined.
	QUALITY ASSURANCE	**LAB**	**SOP**	**EXPLANATION**
28	Is a pH check standard buffer analyzed after pH meter calibration, before sample analysis? [NC WW/GW LCB Approved Procedure for the Analysis of pH]			
29	What is the true value of the pH check standard buffer? [NC WW/GW LCB Approved Procedure for the Analysis of pH] **Answer:**			
30	Is the acceptance criterion for the pH check standard buffer ±0.1 S.U. of true value? [NC WW/GW LCB Approved Procedure for the Analysis of pH]			
31	Is the evaluation of the pH check standard buffer(s) clearly documented? [NC WW/GW LCB Approved Procedure for the Analysis of pH]			This may be accomplished with documenting the check buffer acceptance range (i.e., 6.9 – 7.1 S.U. or ±0.1 S.U.) and measured value. A check box or Y/N (circle one) option may also be added for clarity. Bottom line: is the benchsheet documentation clear whether the check buffer passed? Results must be within ±0.1 S.U. of the true value to be acceptable.
32	What corrective action is taken if the pH check buffer does not meet the acceptance criterion? [NC WW/GW LCB Approved Procedure for the Analysis of pH] **Answer:**			Check again with a freshly poured buffer. If the buffer still does not meet the criterion, recalibrate the instrument.
33	Are filter blanks monitored when measuring true color? [SM 2120 B-2021 (2) (c)]			Monitor each lot of filters. Analyze one blank with each lot of filters.
34	Are filter fibers visible in the blank? [15A NCAC 02H .0805 (a) (7) (A)]			
35	What corrective action is taken if filter fibers are visible in the blank? [15A NCAC 02H .0805 (a) (7) (B)]			If quality control results fall outside established limits or show an analytical problem, the laboratory shall identify the Root Cause of the failure. The problem shall be resolved through corrective action, the corrective action process documented, and any samples involved shall be reanalyzed, if possible. If the sample cannot be reanalyzed, or if the quality control results continue to fall outside established limits or show an analytical problem, the results shall be qualified as such.
36	Is every 10th sample analyzed in duplicate (i.e., duplicating the entire procedure)? [SM 2120 B-2021 (7) (b)]			
37	What is the acceptance criterion for the duplicates? [15A NCAC 02H .0805 (a) (7) (A)]			Calculate control limits for duplicates when method-specific limits are not provided.
38	What corrective action does the laboratory take if duplicates do not meet the acceptance criterion? [15A NCAC			Our Rule requires corrective action any time quality control results indicate a problem.

	02H .0805 (a) (7) (B)]			
39	Is the data qualified on the electronic Discharge Monitoring Report (eDMR) or client report if Quality Control (QC) requirements are not met? [15A NCAC 02H .0805 (a) (7) (B)]			If quality control results fall outside established limits or show an analytical problem, the laboratory shall identify the Root Cause of the failure. The problem shall be resolved through corrective action, the corrective action process documented, and any samples involved shall be reanalyzed, if possible. If the sample cannot be reanalyzed, or if the quality control results continue to fall outside established limits or show an analytical problem, the results shall be qualified as such.

Additional Comments:

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Inspector: _____Date: _____