Corrosivity Engineering Report Checklist

Texas Commission on Environmental Quality
Water Supply Division
Plan Review Team MC-159
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Public Water System I.D. No._____
TCEQ Log No. P-_____

Approval of new sources or treatments that affect water quality may require public water systems (PWS) to submit a follow-up engineering corrosivity report as a condition of approval. This checklist is to be used as a guide for the contents of such engineering reports submitted by a Texas Professional Engineer (P.E.) on behalf of a PWS.

This checklist is not intended for lead or copper action level exceeders (ALE). A PWS that has had a lead and Copper ALE is required to submit a Source Water Treatment Recommendation, Optimal Corrosion Control Treatment Recommendation and Corrosion Control Study (CCST), please contact a member of the Drinking Water Quality Team for additional guidance at (512) 239-4691.

Please address the following in your corrosivity engineering report submittal:

Historic and Current System Information:

When reviewing the corrosive nature of water at a particular water system, it is necessary to have historical data for review. The following is a general guideline for gathering and presenting the necessary historical baseline data to include within the required engineering report.

1. ☐ Provide known information on the current distribution and service lines, including pipe material, pipe sizes, and age of piping. Include how this information has been obtained such as record drawings, waterline replacement projects from the past, and purchase orders.

2. ☐ Provide a write-up and schematic on the current water treatment process; provide a historical perspective of the major changes to the treatment process with dates and reasons for the process changes.

3. ☐ Include a summary of all historical information and Water Quality Parameter (WQP) data such as lead, copper, conductivity, total dissolved solids, pH, temperature, alkalinity, chloride, sulfate, calcium and sodium. Provide a complete description of when and why the data was collected and provide any context as it relates to system changes such as changes in treatment systems.

4. ☐ Provide information on whether the PWS has a history of lead and/or copper sampling issues and exceedances.

5. ☐ Research analogous system data that use the same sources and use similar treatment process.

6. ☐ Provide any information on the number of known lead service lines.

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WQP Sampling and Results:

The corrosivity engineering report was triggered because the PWS is in the process of making changes such as adding a new source or process treatment changes that can have an effect on the corrosivity of the finished water. The goal of the report is to study the changes in WQP data to see the effect of the change on the system as a whole.

7. ☐ Provide WQP sample data from all entry points and distribution sites as a whole that reflects the change in treatment or source. Provide complete WQPs after the treatment modifications including the date of the process modification.

8. ☐ Provide the analytical lab results for the reported WQP data, including appropriate chain of custody with Quality Assurance/Quality Control data. Please note that pH and temperature should be taken in the field at the time of sampling. Provide the 'field pH and temperature' associated with the WQP sampling.

9. ☐ Provide information on whether the PWS has elevated lead, copper, aluminum, iron or manganese levels at the Entry Point (EP). This data may affect any corrosion control treatment if required.

10. ☐ Perform corrosion indices calculations using the current WQP data after the change was initiated.

11. ☐ If the water is corrosive, provide the type of treatment recommended including type of chemical, dosage, residual and reason for the recommended treatment.

Lead and Copper Sampling:

12. ☐ The system may be required to conduct lead and copper tap sampling as part of the plan submittal. This sampling is part of the LCR program and scheduled by LCR staff. If the system was required to do lead and copper tap sampling, please include the results as part of the corrosivity engineering report with a discussion of the results.

13. ☐ Please note that if a PWS becomes an ALE during this required sampling, they should contact the Plan Review Team at (512) 239- 4691.

14. ☐ For PWSs required to perform LCR tap sampling, the corrosivity engineering corrosivity report is due after the first six-month LCR tap sampling is required. If the system is not required to do LCR tap sampling (such as a wholesaler or Noncommunity – Transient System), the report is normally due six months from the date of the plan approval letter.

15. ☐ Under the LCR rule, PWSs are not considered an ALE unless more than 10% of the samples exceed the threshold set by EPA. (The lead action level is 0.015 milligrams per liter (mg/L) and the copper action level is 1.3 mg/L). However, the corrosivity engineering report should include a discussion of each sample that exceeds the threshold. The discussion should address:
    a. ☐ Whether a retest was done and what the results were;
    b. ☐ History of sampling for the particular site;
    c. ☐ Any special circumstances for the site (e.g. lead service line, copper plumbing with high lead solder); and
    d. ☐ Whether a Point of Use device (such as a lead removal filter) was offered and being used at the site.

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Future Planning:

If the PWS is planning near future projects, those projects may affect water corrosivity and may change the recommendations and conclusions of the current data.

16. ☐ Include a section that discusses future capital improvement planning that the system is considering such as new wells or treatment changes. Discuss how these future changes may affect the corrosivity of the finished water and whether the recommendations and conclusions include consideration of such future projects.

Analysis and Technical Tools:

17. ☐ The corrosivity engineering report must include an analysis of the WQP data. The engineer should calculate the following indices for the WQP data. Formulas for the indices can be found in reference manuals or online. TCEQ uses the Tetra Tech (RTW) Model for Water Chemistry, Process, and Corrosion Control to look at water quality parameters and evaluate treatment processes. The engineer is not required to use the RTW model.

CRITERIA TABLE

CRITERIA TABLE	NC	SC	C	
Langelier Index	NC > -0.25	-1<SC<-0.25	C<-1.0	
Ryznar Index	<7.0	7<SC<8.5	C>8.5	
Aggressiveness Index	>12.0	10>SC<12	C<10.0	TALK= (total Alkalinity) If CSMR greater than 0.5 but TALK is >50 than SC
CCPP	>0.0	-3>SC<0	C<-3.0	
CSMR	<0.2	>0.2SC<0.5	C>.5 (TALK <50)	

The corrosivity of the original water parameters is calculated with assumed temperatures of 10 ˚C and 25 ˚C, giving six grades.

- 3 C's or more= Corrosive;
- 3 SCs under 25 ˚C=Slightly Corrosive
- 4 - C's and SC's Total =Slightly Corrosive;
- Otherwise, the water is considered noncorrosive.

Conclusions and Recommendations:

18. ☐ The corrosivity engineering report must determine if the corrosiveness of the water may or may not be a problem to the particular system. The engineer needs to review all the data and either recommend new corrosion control treatment, adjust existing corrosion control or provide a detailed explanation why no new or changes to existing treatment is required.

19. ☐ For new and existing corrosion control treatment changes, the engineer needs to evaluate the treatment change to ensure that it is in accordance with the EPA OCCT. EPA's current OCCT recommendation document can be accessed from the following EPA web link: https://www.epa.gov/sites/production/files/2016-03/documents/occtmarch2016.pdf.

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20. ☐ EPA OCCT Appendix B and Chapter3 flowcharts can be used to determine the likely corrosion control treatment to work.

21. ☐ For new and existing corrosion control treatment changes, the engineer needs to submit plans and specifications to the Plan Review Team for review and approval.

22. ☐ New and existing corrosion control treatment change approvals may result in the PWS being required to conduct more monitoring and to make updates to the follow-up engineering corrosivity report.