

FROM: HQ AFCESA/CES  
139 Barnes Drive  
Tyndall AFB FL 32403-5319

SUBJECT: **Engineering Technical Letter (ETL) 97-1: National Primary Drinking Water Regulations: Lead and Copper Rule(LCR) Corrosion Control Desk-Top Report Statement of Work(SOW)**

**1. Purpose.** This ETL provides guidance to help the Base Civil Engineer (BCE) and other users to obtain assistance in complying with the National Primary Drinking Water Regulations: Lead and Copper Rule (LCR). The SOW has been prepared to help in the preparation of local contracts, however, both AFCESA and Armstrong Laboratory have consulting firms available that are capable of performing LCR work for Air Force installations with installation funding. These instructions are to be used in developing a site-specific SOW, from the generic SOW, by any USAF installation.

## **2. Application.**

**2.1. Authority.** This ETL complies with AFI 32-70, *Environmental Quality*; AFI 32-1067, *Water Systems*; and AFI 32-7047, *Compliance Tracking and Reporting*.

**2.2. Effective Date:** Immediately. Expires five years from date of issue.

## **3. Referenced Publications.**

**3.1.** 40 CFR 141, *National Primary Drinking Water Regulations*.

**3.2.** AFI 32-70, *Environmental Quality*.

**3.3.** AFI 32-1067, *Water Systems*.

**3.4.** AFI 32-7047, *Compliance Reporting and Tracking*.

## **4. Requirements.**

**4.1.** Air Force installations must comply with the requirements of the LCR. Whenever point of use monitoring for lead or copper exceed action levels established by the LCR, public notification and corrosion control are required. The Desk-Top Corrosion Control Report and the implementation of the recommended corrosion control procedures determined necessary by the report within two years will generally satisfy the requirements of local regulators and the Environmental Protection Agency.

**4.2.** A generic SOW with instructions, suggested forms, and a sample estimate is provided (Attachment 1) to assist in preparing contracts to meet the requirements of the LCR when corrosion control studies are necessary.

**5. Point of Contact:** Mr. Robert Wahlgren, P.E., HQ AFCESA/CESC, DSN 523-6338, commercial (904) 283-6338, or INTERNET wahlgreb@afcesa.af.mil.

William G. Schauz, Colonel, USAF  
Director of Technical Support

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1. Sample SOW for Corrosion Control Report
2. Distribution List

## STATEMENT OF WORK INSTRUCTIONS

### INTRODUCTION

This generic Statement of Work (SOW) was prepared for use by United States Air Force (USAF) installations to obtain assistance in complying with the National Primary Drinking Water Regulations: Lead and Copper Rule (LCR). The SOW has been prepared to help in the preparation of local contracts, however, both AFCESA and Armstrong Laboratory have consulting firms available that are capable of performing LCR work for Air Force installations with installation funding. These instructions are to be used in developing a site-specific SOW, from the generic SOW, by any USAF installation.

In developing the LCR, the US Environmental Protection Agency (USEPA) has categorized public water supplies (PWSs) into three categories:

- Large PWSs serve populations of more than 50,000 people.
- Medium PWSs serve populations of 3,301 to 50,000 people.
- Small PWSs serve populations of 3,300 people or less.

All USAF installations are either small or medium PWSs; this SOW covers these conditions. The methodology to determine the category of any USAF installation is provided as section 1.1.2 of these Instructions.

The following specific instructions correspond to the sections identified in the attached SOW. These Instructions provide general guidance to develop the necessary SOW for each installation. No specific explanations are provided for those sections that are self explanatory.

The Lead and Copper Rule Guidance Manuals are referred to throughout these instructions and the generic SOW. Detailed information on monitoring and corrosion control treatment is found in the manuals. A set of the two (2) volumes can be ordered from one of two sources: (1) The American Water Works Association (AWWA); or (2) The National Technical Information Service (NTIS). For ordering information see Attachment A following these instructions.

Guidance for determining the cost for an LCR study is found in Attachment B titled, "Estimated Costs For Contractor Performance of An LCR Study." This guidance provides a general outline of considerations for contractor performance which must be matched to the installation's specific requirements.

## **SPECIFIC SOW INSTRUCTIONS**

### **1.0. GENERAL INFORMATION.**

#### **1.1. Introduction.**

1.1.1. Monitoring must comply with the requirements in Volume I of the LCR Guidance Manual. Lead and copper testing must be performed by a certified laboratory using approved USEPA methods.

Insert the name of the Air Force installation that the SOW applies to.

1.1.2. Population includes all military and their dependents residing on the Base, including TDY personnel. Military and civilians present on the Base during their working day but residing off Base must also be included. However, day workers will generally be counted as a fraction of a population equivalent depending on the specific state requirements. Each USAF installation should check with their appropriate state regulatory authorities for the specific approach used in each state to count day workers.

1.1.3. USAF installations within the U.S. must conform to the LCR requirements of the state in which the installation is located. A few states do not administer the LCR. In these states the regional USEPA office will administer the LCR. USAF installations outside of the U.S. shall conform to the requirements of their Major Command. For purposes of the SOW, "state" means the applicable regulatory agency administering the LCR for the USAF installation.

1.1.4. This paragraph may include the specific state or Major Command administering the LCR, and any other applicable conditions affecting the work to be performed under this SOW, such as information on Consent Orders or any other mandated actions. Guidance on implementing optimal corrosion control treatment and lead service line replacement is found in Volume II of the LCR Guidance Manual.

#### **1.2. Scope.**

1.2.1. Phases I and II may be combined for USAF installations that have completed a materials survey and collected all required information on water quality. This is especially appropriate for small installations which are difficult to travel to and not under any state Consent Order or similar administrative action.

Phase III includes mandated demonstration testing when the state determines that desk-top study is not sufficient. Demonstration testing uses flow-through or static testing methods to illustrate the effectiveness of a particular corrosion control treatment.

The intent of Phase IV is to provide start-up operational assistance for implementing the optimal recommended treatment that the state approves. The complexity of the optimal treatment and the technical capabilities of the installation's personnel must be considered in implementing this Phase.

In some cases, Phase I may be completed by the Base. In this case, no contractor assistance will be required and the contractor's efforts will begin with Phase II.

### 1.3. Background.

1.3.1. State Drinking Water Regulations. The Base should reference the specific sections of state law and/or regulations applicable to this project.

### 1.4. Tasks.

1.4.1. When the Base completes Phase I, delete this paragraph and proceed to paragraph 1.4.2 Phase II.

1.4.1.2. Insert this paragraph for USAF installations that purchase their water from an off-Base PWS. If the Base does not purchase water from another PWS, and produces its own water use 1.4.1.2 (OPTIONAL).

1.4.1.3. Use this paragraph only when a detailed site investigation of different buildings is necessary. List the number of buildings requiring the detailed investigation and details of the contractor's responsibilities for the investigation. These responsibilities could include: check fitting materials; cut/examine pieces of interior piping; and, under extreme conditions, excavation of actual service piping may be required.

1.4.2. Alter Steps 1 and 2 as necessary to collect water quality data not already available for the Base distribution system and/or source water. Specify the number of samples required for analysis. This sampling may be accomplished by installation personnel with analysis performed at Armstrong Laboratories - Brooks AFB, Texas. If this is not possible, the contractor shall be required to do this work using a state-certified laboratory to perform water supply analyses for lead, copper, and other parameters.

Volume I, Chapter 4 of the LCR Guidance Manual sets requirements for monitoring of water quality parameters in Step 1. These requirements are based on the population. For each population category (i.e. 101 to 500 persons, 501 to 3,300 persons, 3,301 to 10,000, etc.), the Guidance Manual determines the number of samples, the collection points, and how often they should be collected. As an example, for a medium sized system of 3,301 to 10,000 population that initially exceeds an AL, collect two sets of samples at each point-of- entry to the distribution system and at three (3) sites throughout the distribution system. Test for lead

and/or copper after each step of treatment if the source water is provided by an Air Force owned water treatment facility.

Collect each set of samples at different times during the monitoring period to reflect seasonal changes.

If corrosion inhibitors are used, determine if the inhibitor is phosphate based or silicate based. Then test for orthophosphate or silica as appropriate.

In addition to the listed water quality parameters, a complete water analysis is useful in the selection of an optimal corrosion control treatment. The analysis should include the determination of; chloride, sulfate, nitrate, silica, dissolved oxygen, carbon dioxide, total dissolved solids, and total hardness.

1.5. Arrange the location and number of meetings as best suited for the particular project. Suggested wording is provided.

## 2.0. SITE LOCATION AND DATES.

Insert the name of the installation when on-site work is included in this SOW.

## 3.0. BASE SUPPORT.

Expand this item as necessary to specifically include all anticipated support that the installation will provide to the contractor. Include lodging and transportation for contractor personnel when not otherwise available off of the Base.

## 4.0. GOVERNMENT FURNISHED PROPERTY.

List any anticipated property that will be furnished by the USAF to support the LCR study.

## 5.0. GOVERNMENT TECHNICAL POINTS OF CONTACT.

List personnel including Contracting Officer, Contracting Officer's Representative Primary point of contact at the base, Major Command and organization contracting the study, if applicable. Include title, address, commercial telephone number, DSN and commercial FAX number.

## 6.0. DELIVERABLES.

Modify this paragraph as necessary to reflect details of delivery including dates, special binding, photographic inserts, computer disc submittals (include format) and any other pertinent information.

**\*\* END OF INSTRUCTIONS \*\***

STATEMENT OF WORK  
CORROSION CONTROL TREATMENT VALIDATION  
(Name and Location of USAF Installation)  
(Date)

1.0. GENERAL INFORMATION.

1.1. Introduction.

1.1.1. Lead and Copper Rule. On June 7, 1991, the United States Environmental Protection Agency (USEPA) promulgated National Primary Drinking Water Regulations (NPDWRs) for lead and copper (referred to here as the lead and copper rule-- LCR). The LCR required public water systems (PWSs) to either demonstrate that optimal treatment has been installed to control lead and copper levels or that the existing lead and copper levels in consumers' tap water are below acceptable levels (the action level-AL). This statement of work (SOW) provides for the evaluation of alternatives to implement optimal corrosion control at \_\_\_\_\_ Air Force Base where monitoring has shown that lead and/or copper exceed(s) acceptable levels.

1.1.2. Population. Medium size PWSs serve populations of 3,301-50,000 people. Small PWSs serve populations of 3,300 people or less. The \_\_\_\_\_ AFB water system is a (SMALL)(MEDIUM) PWS.

1.1.3. Optimal Treatment. If the PWS exceeds the AL for either lead or copper or both, it must submit recommendations for optimal treatment to the state within six months of exceeding the AL. The recommendations may be based on well-documented desk-top evaluations and need not be determined by demonstration testing of alternative treatment approaches. However, states may require a system to perform such testing, in which case an additional 18 months would be provided to complete the corrosion control study.

1.1.4. Specific Conditions. (SEE SOW INSTRUCTIONS FOR GUIDANCE.)

1.2. Scope.

1.2.1. Phases. Work to comply with the LCR has been organized into four phases. Only Phases I and II will be completed as part of this SOW. Phases III and IV, as generally described herein, may be expanded to address specific Base conditions and be funded separately as follow-on efforts, depending upon the results of Phases I and II. Phase III, demonstration testing, will be initiated only when required by the specific state. In Phase III, the contractor will conduct corrosion testing to verify study treatment recommendations. Phase IV, full-scale operation and implementation of optimal corrosion control treatment, will be initiated only when required and includes contractor assistance in operating full-scale treatment.

1.2.2. Contacts. It may be necessary to contact local PWS or state agencies or other regulatory agencies during the course of the study. The contractor shall do this only when accompanied by AF representatives or with their permission. Letter reports are required by paragraph 1.4.3 of this SOW.

### 1.3. Background.

#### 1.3.1. References:

- 40 CFR 141, National Primary Drinking Water Regulations
- State Drinking Water Regulations
- State Compliance Order (or equivalent)
- USEPA Lead and Copper Rule Guidance Manual, Volume I: Monitoring and, Volume II: Corrosion Control Treatment.
- American Water Works Association Research Foundation (AWWARF) Lead Control Strategies Manual, 1990

### 1.4. Tasks.

1.4.1. Task 1 (Phase I). The contractor shall write a Baseline Report summarizing the distribution system materials, availability within the PWS of Tier 1, Tier 2 and Tier 3 sites, and lead, copper and water quality data that are relevant to the installation's failure to meet the AL. The report will outline the NPDWR actions required by the installation for compliance with the LCR at the time of the report and for the future.

1.4.1.1. The contractor shall review applicable documentation, including historical and current lead and copper water quality data, other relevant water quality data, corrosion control studies, material surveys on distribution system construction materials, documentation on site tier selection and documentation with the state. The contractor shall technically review the classification of the PWS that the Base is using, i.e., large, medium, or small, and provide an independent opinion as to the serviced population.

1.4.1.2. Thoroughly investigate the off-Base PWS as to water quality parameters, sources of water, treatment facilities, distribution system boundaries, LCR monitoring results in other communities served by the PWS, corrosion control studies, inhibitors used, target pH/alkalinity/calcium adjustment goals, and all other relevant information. Determine consecutive system status. Discuss viable methods and responsibilities for corrosion control treatment with the PWS personnel with AF representatives present.

1.4.1.2. (OPTIONAL) Thoroughly investigate the Base PWS as to water quality parameters, sources of water, treatment facilities, distribution boundaries, corrosion control studies, inhibitors used, (if any), and all other relevant information.

1.4.1.3. The contractor shall identify sources of lead or copper contamination in the following specific locations: 1) ..., 2) ..., etc. The contractor shall conduct a detailed site investigation for the causes of high lead and/or copper contamination in the above facilities, including the following steps: 1) ..., 2) ..., 3) ..., etc. (SEE SOW INSTRUCTIONS.)

1.4.2. Task 2(Phase II). The contractor shall write a Desk-Top Report. This report shall contain a summary of background information and the seven steps the contractor took to develop a recommendation for optimal treatment. The contractor shall follow the seven-step process as described in the LCR Guidance Manual to select an optimal treatment. These steps include the following:

Step 1. Define Existing Conditions. The contractor shall be required to take up a maximum of (SEE SOW INSTRUCTIONS) sets of water quality parameter data -- including pH, alkalinity, calcium, conductivity, temperature, and corrosion inhibitor (if any) -- to augment existing Base information.

Step 2. Monitor Source Water. The contractor shall be required to take up to a maximum of (SEE SOW INSTRUCTIONS) samples of source water to be analyzed for lead and copper.

Step 3. Define Constraints

Step 4. Identify Corrosion Control Priorities

Step 5. Eliminate Unsuitable Approaches

Step 6. Evaluate Viable Approaches

Step 7. Recommend Optimal Treatment - Final Evaluation of Alternatives based on performance, feasibility, reliability and cost.

1.4.2.1. The contractor shall complete a checklist and desktop evaluation short form for small and medium PWS treatment recommendations (ATTACHMENT C TO THIS SOW). This documentation shall be included in the Task 2, Desk Top Report (DTR). The contractor shall also comment on the need to modify operating procedures in the Base water distribution system and the need to remove/replace lead sources.

1.4.3. The contractor shall provide, in the form of a letter report, a record of all conferences, informal meetings, discussions, verbal direction, telephone conversations, etc., in which the contractor or the contractor's subcontractor (s) participate. The letter reports (IN EITHER LETTER OR MEMO-FOR-RECORD FORM) shall be numbered sequentially. The letters shall identify participation personnel, subject(s) discussed, and summarize guidance conclusions.

1.4.4. All documents shall be printed on two sides on recycled paper.

1.5. Meetings and Conferences.

1.5.1. Kick-off Meeting. A kick-off meeting will be held at the installation within 15 days after award of the contract.

1.5.2. (SEE SOW INSTRUCTIONS.) Additional meetings will be required for two contractor personnel.

1.6. Ozone Depleting Substances (AFAC 5310, 002-71 (90)).

1.6.1. This acquisition does not include any specification, standard, drawing or other document that requires the use of a Class 1 ODS in the design, manufacture, test, operation, or maintenance of any system, subsystem, item, component or process.

1.6.2. This acquisition does not include any specification, standard, drawing or other document that establishes a requirement that can only be met by the use of a Class 1 ODS.

1.6.3. This acquisition does not require the delivery of any item of supply that contains a Class 1 ODS or any service that includes the use a Class 1 ODS.

2.0. SITE LOCATION AND DATES. On-site work, sampling, and testing shall take place at (NAME OF AF INSTALLATION). Specific dates shall be determined at the kick off meeting.

3.0. BASE SUPPORT. The installation will provide historical distribution system, access to buildings, lead, copper and water quality data.

4.0. GOVERNMENT FURNISHED PROPERTY.

(SEE SOW INSTRUCTIONS.)

5.0. GOVERNMENT TECHNICAL POINTS OF CONTACT.

(SEE SOW INSTRUCTIONS.)

6.0. DELIVERABLES.

6.1. The following delivery schedule is based on the calendar days from the date that the Notice To Proceed (NTP) is issued. The contractor shall submit the indicated item on the required submittal date. (SEE SOW INSTRUCTIONS.)

6.1.1. Submittal 1. Four printed copies and one electronic(WORD 6.0) copy of the Draft Baseline Report(Task 1, Phase I) shall be provided to the Contracting Officer's Representative within 45 days of NTP.

6.1.2. Submittal 2. Six printed copies and one electronic(WORD 6.0) copy of the Final Baseline Report(Task 1, Phase I) shall be provided to the Contracting Officer's Representative within 90 days of NTP.

6.1.3. Submittal 3. Four printed copies and one electronic(WORD 6.0) copy of the Draft Desktop Report(Task 2, Phase II) shall be provided to the Contracting Officer's Representative within 75 days of NTP.

6.1.4. Submittal 4. Six printed copies and one electronic(WORD 6.0) copy of the Draft Desktop Report(Task 2, Phase II) shall be provided to the Contracting Officer's Representative within 115 days of NTP.

6.1.5. Letter reports submittals are due within ten workdays of the particular event being documented.

6.2. All material gathered and/or developed in the performance of the tasks listed in the contracts shall be the property of the U.S. Air Force and shall not be used or distributed by the contractor without specific permission of the appropriate Air Force Command.

6.3. Reports, excluding letter reports, shall have the following statement printed on the inside cover and on the reverse of the title sheet:

Notice

(NAME OF CONTRACTOR) has prepared this report of the U.S. Air Force for the purpose of aiding in the implementation of the Safe Drinking Water Act. It is not an endorsement of any product. The views expressed herein are those of the contractor and do not necessarily reflect the official views of the publishing agency, the United States Air Force, or the Department of Defense.

\*\* END OF SOW \*\*

## ATTACHMENT A

### AWWA Ordering Information

- LCR Guidance Manual, Vol. 1: Monitoring, ask for AWWA #20282
- LCR Guidance Manual, Vol. 2: Corrosion Control Treatment, ask for AWWA #20299

Order by calling 1-800-926-7337 or writing:

American Water Works Association  
6666 West Quincy Avenue  
Denver, Colorado 80235

### NTIS Ordering Information

- LCR Guidance Manual, Vol. 1: Monitoring, as for NTIS #PB 92-112101-AS
- LCR Guidance Manual, Vol. 2: Corrosion Control Treatment, ask for NTIS #PB 93-101533-AS

Order by calling 1-703-487-4650 or writing:

National Technical Information Service  
5285 Port Royal Road  
Springfield, Virginia 22161

**ATTACHMENT B**

**ESTIMATED COSTS  
FOR  
CONTRACTOR PERFORMANCE OF A BASIC LCR STUDY**

ASSUMPTIONS: Base has performed a materials survey of the distribution system and the interior plumbing conditions. Base has selected sample sites using the criteria specified in the LCR and completed the initial monitoring program. Action levels for lead and/or copper were exceeded in the initial monitoring program. Source water was tested for lead and/or copper. Water quality parameters (as per LCR Guidance Manual) were analyzed.

Contractor performance costs include initial (kickoff) meeting with AF personnel involved with the LCR, information gathering, report preparation, and recommendation for optimal corrosion control. Basic cost:

**LABOR**

|                        |       |   |          |   |              |
|------------------------|-------|---|----------|---|--------------|
| Senior professional    | 80 mh | @ | \$105/mh | = | \$8,400*     |
| Mid-Level professional | 20 mh | @ | \$80/mh  | = | 9,600        |
| Typist/Support         | 45 mh | @ | \$40/mh  | = | <u>1,800</u> |
|                        |       |   |          |   | \$19,800     |

**OTHER COSTS**

|                                   |         |
|-----------------------------------|---------|
| Telephone, reproduction, delivery | \$1,000 |
|-----------------------------------|---------|

**TOTAL BASIC COST**

|  |                 |
|--|-----------------|
| Does not include travel, additional analyses, detailed inspection, additional meetings, etc. | <u>\$20,800</u> |
|--|-----------------|

- Travel costs vary considerably depending on Base location, number of contractor visits, proximity of contractor to Base, and related conditions. Travel costs include transportation (air fare, car rental, etc.), food, lodging, and travel time.
- State LCR requirements can vary. States with requirements more stringent than the LCR Guidance Manual may necessitate greater contractor efforts.
- Complexity of the Base water system will also affect contractor effort. Multiple water sources, varying water quality, off-base supply, adequacy of existing treatment, etc. are factors to consider.
- Additional meetings with Base, state, local public water system, or any other entity will increase contractor costs.

\* mh denotes manhours. Manhour cost includes overhead and profit. Labor rates will vary depending on location in the U.S.

**COSTS FOR LABORATORY ANALYSES**

**WATER QUALITY PARAMETERS**

|                     |             |      |
|---------------------|-------------|------|
| Conductivity.....   | \$10        |      |
| pH.....             | \$10        |      |
| Temperature.....    | \$10        |      |
| Calcium.....        | \$13        |      |
| Orthophosphate..... | \$16        |      |
| Silica.....         | \$16        |      |
| Alkalinity.....     | <u>\$20</u> |      |
|                     |             | \$95 |
| Lead.....           | \$16        |      |
| Copper.....         | <u>\$16</u> |      |
|                     |             | \$32 |

**OTHER WATER ANALYSES**

|                             |             |              |
|-----------------------------|-------------|--------------|
| Hardness.....               | \$18        |              |
| Total Dissolved Solids..... | \$10        |              |
| Chloride.....               | \$16        |              |
| Sulfate.....                | \$16        |              |
| Nitrate.....                | \$16        |              |
| Silica.....                 | \$16        |              |
| Dissolved Oxygen.....       | \$10        |              |
| Carbon dioxide.....         | <u>\$25</u> |              |
|                             |             | <u>\$126</u> |

Add costs for sample collection, handling, delivery to lab, containers, etc.

**ATTACHMENT C**  
**DESKTOP EVALUATION SHORT FORM**  
**FOR**  
**SMALL AND MEDIUM PWS TREATMENT RECOMMENDATIONS**

**A. PWS General Information:**

|   |                 |
|---|-----------------|
| <b>1. PWS Identification No.</b>                      | _____           |
| <b>2. Contact Person:</b>                             |                 |
| Name  | _____           |
| Mailing Address                                       | _____           |
|   | _____           |
| Telephone   | _____ Fax _____ |
| <b>3. Population served</b>                           | _____           |
| <b>4. Person responsible for preparing this form:</b> |                 |
| Name  | _____           |
| Signature   | _____           |
| Telephone   | _____           |

**B. PWS Technical Information:**

|   |          |                        |          |          |          |
|---|----------|------------------------|----------|----------|----------|
| <b>1. Monitoring Results:</b>                 |          |                        |          |          |          |
| Sampling dates: From _____ To _____           |          |                        |          |          |          |
| <b>First Flush Tap Monitoring Results:</b>    |          |                        |          |          |          |
| Lead:   |          |                        |          |          |          |
| Minimum Concentration                         | =        | _____                  | mg/L     |          |          |
| Maximum Concentration                         | =        | _____                  | mg/L     |          |          |
| 90th percentile                               | =        | _____                  | mg/L     |          |          |
| Copper:                                       |          |                        |          |          |          |
| Minimum Concentration                         | =        | _____                  | mg/L     |          |          |
| Maximum Concentration                         | =        | _____                  | mg/L     |          |          |
| 90th percentile                               | =        | _____                  | mg/L     |          |          |
| <b>Point-of-Entry Tap Monitoring Results:</b> |          |                        |          |          |          |
|   |          | <b>Points of Entry</b> |          |          |          |
|   | <b>1</b> | <b>2</b>               | <b>3</b> | <b>4</b> | <b>5</b> |
| Lead Concentration in mg/L:                   | _____    | _____                  | _____    | _____    | _____    |
| Copper Concentration in mg/L:                 | _____    | _____                  | _____    | _____    | _____    |
| pH:   | _____    | _____                  | _____    | _____    | _____    |
| Temperature, °C:                              | _____    | _____                  | _____    | _____    | _____    |
| Alkalinity, mg/L as CaCO <sub>3</sub> :       | _____    | _____                  | _____    | _____    | _____    |
| Calcium, mg/L as Ca:                          | _____    | _____                  | _____    | _____    | _____    |
| Conductivity, µmho/cm@25°C:                   | _____    | _____                  | _____    | _____    | _____    |
| Phosphate, mg/L as P:                         | _____    | _____                  | _____    | _____    | _____    |
| Silicate, mg/L as SiO <sub>2</sub> :          | _____    | _____                  | _____    | _____    | _____    |

**1. Monitoring Results (continued):**

**Water Quality Parameter Distribution System Monitoring Results:**

Indicate whether field or laboratory measurement.

|   | <b>Field</b> | <b>Lab</b> |
|---|--------------|------------|
| pH: minimum = _____ maximum = _____       | _____        | _____      |
| alkalinity:                               | _____        | _____      |
| minimum = _____ mg/L as CaCO <sub>3</sub> |              |            |
| maximum = _____ mg/L as CaCO <sub>3</sub> |              |            |
| temperature:                              | _____        | _____      |
| minimum = _____ °C                        |              |            |
| maximum = _____ °C                        |              |            |
| calcium:                                  | _____        | _____      |
| minimum = _____ mg/L as Ca                |              |            |
| maximum = _____ mg/L as Ca                |              |            |
| conductivity:                             | _____        | _____      |
| minimum = _____ µmho/cm @ 25°C            |              |            |
| maximum = _____ µmho/cm @ 25°C            |              |            |
| orthophosphate:                           | _____        | _____      |
| (if phosphate-based inhibitor is used)    |              |            |
| minimum = _____ mg/L as P                 |              |            |
| maximum = _____ mg/L as P                 |              |            |
| silica:                                   | _____        | _____      |
| (if silica-based inhibitor is used)       |              |            |
| minimum = _____ mg/L as SiO <sub>2</sub>  |              |            |
| maximum = _____ mg/L as SiO <sub>2</sub>  |              |            |

**2. Existing Conditions:**

Is treatment used? yes \_\_\_\_\_ no \_\_\_\_\_

Identify water source(s):

Source No. 1 \_\_\_\_\_  
 Source No. 2 \_\_\_\_\_  
 Source No. 3 \_\_\_\_\_

If treatment is used, is more than one source used at a time?

yes \_\_\_\_\_ no \_\_\_\_\_

Identify treatment processes used for each source:

| <b>Process</b>   | <b>No. 1</b> | <b>No. 2</b> | <b>No. 3</b> |
|------------------|--------------|--------------|--------------|
| Presedimentation | _____        | _____        | _____        |
| Aeration         | _____        | _____        | _____        |
| Chemical mixing  | _____        | _____        | _____        |
| Flocculation     | _____        | _____        | _____        |
| Sedimentation    | _____        | _____        | _____        |
| Recarbonation    | _____        | _____        | _____        |

**2. Existing Conditions (continued):**

Identify treatment processes used for each source:

| Process                   | No. 1 | No. 2 | No. 3 |
|---------------------------|-------|-------|-------|
| 2nd Stage mixing          | _____ | _____ | _____ |
| 2nd Stage flocculation    | _____ | _____ | _____ |
| 2nd Stage sedimentation   | _____ | _____ | _____ |
| Filtration:               |       |       |       |
| Single medium             | _____ | _____ | _____ |
| Dual media                | _____ | _____ | _____ |
| Multi-media               | _____ | _____ | _____ |
| GAC cap on filters        | _____ | _____ | _____ |
| Disinfection:             |       |       |       |
| Chlorine                  | _____ | _____ | _____ |
| Chlorine dioxide          | _____ | _____ | _____ |
| Chloramines               | _____ | _____ | _____ |
| Ozone                     | _____ | _____ | _____ |
| Granular Activated Carbon | _____ | _____ | _____ |

List chemicals normally fed:

List chemicals sometimes fed:

**3. Present Corrosion Control Treatment:**

None \_\_\_\_\_  
Inhibitor \_\_\_\_\_  
Date initiated \_\_\_\_\_  
Present dose \_\_\_\_\_  
Range in Residual in Distribution System:  
    Maximum \_\_\_\_\_ mg/L   Minimum \_\_\_\_\_ mg/L  
Brand name \_\_\_\_\_  
Type \_\_\_\_\_  
Has it been effective? Please comment on your experience.

pH/alkalinity adjustment \_\_\_\_\_  
pH Target \_\_\_\_\_  
Alkalinity Target \_\_\_\_\_ mg/L CaCO<sub>3</sub>  
Calcium adjustment \_\_\_\_\_  
Calcium Target \_\_\_\_\_ mg/L CaCO<sub>3</sub>

#### 4. Water Quality

Complete the table below for typical untreated and treated water quality data. Copy this form as necessary for additional sources. Include data for each raw water source, if surface supplies are used, and finished water quality information (point of entry) from each treatment plant. If wells are used, water quality information from each well is acceptable but not necessary if several wells have similar data. For groundwater supplies, include a water quality summary from each wellfield or grouping of wells with similar quality.

Include available data for the following:

| Parameter                             | Untreated Supply | Treated Water (point of entry) |
|---------------------------------------|------------------|--------------------------------|
| pH, units                             |                  |                                |
| Alkalinity, mg/L as CaCO <sub>3</sub> |                  |                                |
| Conductivity, µmho/cm @ 25°C          |                  |                                |
| Total dissolved solids, mg/L          |                  |                                |
| Calcium, mg/L Ca                      |                  |                                |
| Hardness, mg/L as CaCO <sub>3</sub>   |                  |                                |
| Temperature, °C                       |                  |                                |
| Chloride, mg/L                        |                  |                                |
| Sulfate, mg/L                         |                  |                                |

#### 5. Distribution System:

Does the distribution system contain lead service lines?

Yes \_\_\_\_\_ No \_\_\_\_\_

If your system has lead service lines, mark below the approximate number of lines which can be located from existing records.

None \_\_\_\_\_ Some \_\_\_\_\_ Most \_\_\_\_\_ All \_\_\_\_\_

Is the distribution system flushed?

None \_\_\_\_\_ Some \_\_\_\_\_ Most \_\_\_\_\_ All \_\_\_\_\_

**6. Historical Information**

Is there a history of water quality complaints?

yes\_\_\_\_\_ no\_\_\_\_\_

If yes, then answer the following:

Are the complaints documented? yes\_\_\_\_\_ no\_\_\_\_\_

Mark the general category of complaints below. Use:

- 1 for some complaints in this category
- 2 for several complaints in this category
- 3 for severe complaints in this category

Categories of complaints:

Taste and odor \_\_\_\_\_  
Color \_\_\_\_\_  
Sediment \_\_\_\_\_  
Other (specify) \_\_\_\_\_

Have there been any corrosion control studies?

yes\_\_\_\_\_ no\_\_\_\_\_

If yes, please indicate:

Date(s) of study From\_\_\_\_\_ To\_\_\_\_\_

Study conducted by PWS personnel? yes\_\_\_\_\_ no\_\_\_\_\_

Brief results of study were:

(Optional) Study results attached yes\_\_\_\_\_ no\_\_\_\_\_

Were treatment changes recommended? yes\_\_\_\_\_ no\_\_\_\_\_

If yes:

Were treatment changes implemented? yes\_\_\_\_\_ no\_\_\_\_\_

Have corrosion characteristics of the treated water changed? yes\_\_\_\_\_ no\_\_\_\_\_

If yes, how has change been measured?

General observation \_\_\_\_\_  
Coupons \_\_\_\_\_  
Frequency of complaints \_\_\_\_\_  
Other \_\_\_\_\_

Briefly indicate, if other:

**7. Treatment Constraints:**

Optimal corrosion control treatment means the corrosion control treatment that minimizes the lead and copper concentrations at users' taps while insuring that the treatment does not cause the water system to violate any national primary drinking water regulations. Please indicate below which constraints to treatment will apply to your PWS. Use the following code:

- 1 Some constraint = Potential Impact but Extent is Uncertain
- 2 Significant constraint = Other Treatment Modifications Required to Operate Option
- 3 Severe constraint = Additional Capital Improvements Required to Operate Option
- 4 Very severe constraint = Renders Option Infeasible

| Constraint              | Treatments               |                    |                 |    |
|-------------------------|--------------------------|--------------------|-----------------|----|
|                         | pH/Alkalinity Adjustment | Calcium Adjustment | Inhibitor       |    |
|                         |                          |                    | PO <sub>4</sub> | Si |
| <b>A. Regulatory</b>    |                          |                    |                 |    |
| SOCs/IOCs               |                          |                    |                 |    |
| SWTR: Turbidity         |                          |                    |                 |    |
| Total Coliforms         |                          |                    |                 |    |
| SWTR/GWDR: Disinfection |                          |                    |                 |    |
| Disinfection Byproducts |                          |                    |                 |    |
| Lead and Copper Rule    |                          |                    |                 |    |
| Radionuclides           |                          |                    |                 |    |
| <b>B. Functional</b>    |                          |                    |                 |    |
| Taste & Odor            |                          |                    |                 |    |
| Wastewater Permit       |                          |                    |                 |    |
| Aesthetics              |                          |                    |                 |    |
| Operational             |                          |                    |                 |    |
| Other                   |                          |                    |                 |    |

**8. Desktop Evaluation**

Briefly summarize the review of the corrosion control literature that pertains to your PWS. A report or summary can be appended to this form if preferred.

Were other similar facilities located which are experiencing successful corrosion control?

yes\_\_\_\_\_ no\_\_\_\_\_

If yes, identify their corrosion control treatment method.

- None \_\_\_\_\_
- pH/Alkalinity adjustment \_\_\_\_\_
- Calcium adjustment \_\_\_\_\_
- Inhibitor \_\_\_\_\_
- Phosphate based \_\_\_\_\_
- Silica based \_\_\_\_\_

**9. Recommendations**

The corrosion control treatment method being proposed is:

pH/Alkalinity adjustment \_\_\_\_\_

Target pH is \_\_\_\_\_ units

Target alkalinity is \_\_\_\_\_ mg/L as CaCO<sub>3</sub>

Calcium adjustment \_\_\_\_\_

Target calcium concentration is \_\_\_\_\_ mg/L Ca

Inhibitor \_\_\_\_\_

Phosphate based \_\_\_\_\_

Brand Name \_\_\_\_\_

Target Dose \_\_\_\_\_ mg/L

Target residual \_\_\_\_\_ mg/L orthophosphate as p

Silica based \_\_\_\_\_

Brand Name \_\_\_\_\_

Target Dose \_\_\_\_\_ mg/L

Target residual \_\_\_\_\_ mg/L as SiO<sub>2</sub>

Rationale for the proposed corrosion control treatment is:

Discussed in the enclosed report \_\_\_\_\_

Briefly explained below \_\_\_\_\_

List your proposed operating guidelines:

**Parameter**

**Operating Range**

Briefly explain why these guidelines were selected.

**10. Please provide any additional comments that will assist in determining optimal corrosion control treatment for your PWS.**

## DISTRIBUTION LIST

### DEPARTMENT OF DEFENSE

|   |     |   |     |
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