

EXAMPLE TEMPLATE

Example Template SOP

Sodium Bicarbonate Feed Adjustment

Effective Date: 03/14/03

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I. Scope

Purpose:

The increase or decrease of the addition or dosage of sodium bicarbonate prior to the filter unit treatment process is for the purpose of increasing coagulation thereby increasing filtration efficiency and always maintaining an alkalinity of 30 mg/l or greater in the finished water. An alkalinity of 30 mg/l or greater in the finished water provides a sufficient buffering capacity to decrease and prevent corrosivity of the water in the distribution system.

Location:

Chemical Feed Pumps - Along the east wall of the ground floor of the Main Control Building.

Filters and Filter Sampling Points - In the center floor area of the ground floor of the Main Control Building

Finished Water Sampling Point - A sink located along the east wall of the ground floor of the Main Control Building, immediately north of the chemical feed pumps.

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Normal Operating Ranges:

Filter Sampling Points - Alkalinity has ranged from a low of 15 to a high of 35 mg/l. The ideal value to be maintained at these points is 25 mg/l.

Finished Water Sampling Point - Alkalinity should never drop below 30 mg/l.

II. Applicability

Personnel with six (6) months or more experience as a Water Operator I or personnel having completed the in-house operator training program - "Water Operator I Training".

III. Summary

First take samples at the Filter Influent Sampling Points and the Finished Water Sampling Point and analyze for alkalinity according to Alkalinity Lab Procedure SOP #4. If the filter influent sample alkalinity is above or below the range of 23 to 27 mg/l of alkalinity then decrease or increase, respectively, the chemical feed pump for sodium bicarbonate by 4%. Wait eight (8) minutes and then re-sample and re-analyze for alkalinity. If the Finished Water Sample is below 30 mg/l then check the finished water pH to ensure between 7.4 and 7.6. If outside pH range then adjust per Sodium Hydroxide SOP #10. Re-verify the filter influent water alkalinity.

IV. Definitions

Alkalinity - The capacity of water to neutralize acids. This capacity is caused by the waters content of carbonate, bicarbonate, hydroxide, and occasionally borate, silicate and phosphate. Alkalinity is expressed in milligrams per liter of equivalent calcium carbonate. Alkalinity is not the same as pH because water does not have to be strongly basic (high pH) to have a high alkalinity. Alkalinity is a measure of how much acid must be added to a liquid to lower the pH to 4.5.

Coagulation - The clumping together of very fine particles into larger particles (floc) caused by the use of chemicals (coagulants). The chemicals neutralize the electrical charges of the fine particles, allowing them to come closer and form larger clumps. This clumping together makes it easier to separate the solids from the water by settling, skimming, draining or filtering.

Corrosivity - An indication of the corrosiveness (decomposition or destruction of a material by chemical action) of water. The corrosiveness of water is described by the waters pH, alkalinity, hardness temperature, total dissolved solids, dissolved oxygen concentration and the Langelier index.

Hardness - A characteristic of water caused mainly by the salts of calcium and magnesium such as bicarbonate, carbonate, sulfate, chloride and nitrate. Excessive hardness in water is undesirable because it causes the formation of soap curds, increased use of soap, deposition of scale in boilers, damage in some industrial processes and sometimes causes objectionable taste in drinking water.

NaHCO₃ - Sodium Bicarbonate

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V. Triggering Mechanisms

The total alkalinity at the Filter Influent Sampling point must be maintained between 23 and 27 mg/l with the target being 25 mg/l.

The total alkalinity at the Finished Water Sampling Point must always be greater than 30 mg/l.

VI. Cautions

Sodium bicarbonate is an irritant.

VII. Interferences

N/A

VIII. Health and Safety

Sodium bicarbonate is considered to be relatively safe. As part of good industrial and personal hygiene and safety procedure, avoid all unnecessary exposure to the chemical substance and ensure prompt removal from skin, eyes and clothing. See MSDS for further information.

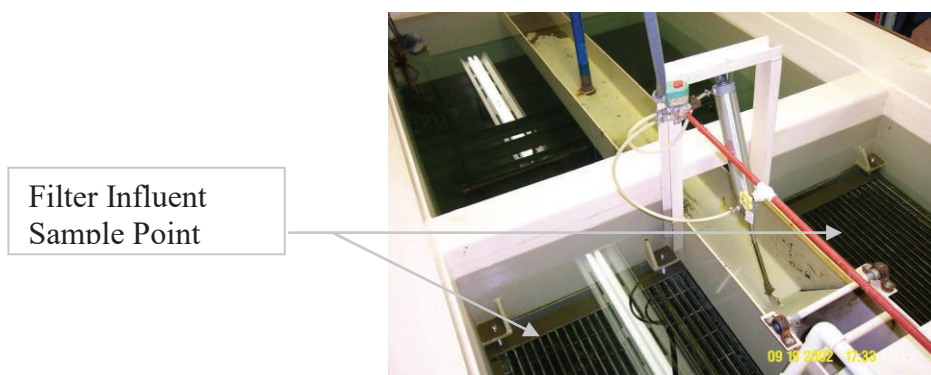
IX. Equipment and Supplies

250 ml plastic sampling bottles for alkalinity samples

X. Procedures

Proper NaHCO_3 dosage shall be conducted by the following:

- ◆ Measurement of total alkalinity shall be conducted at the filter influent sample point



- ◆ The total alkalinity at this point must be maintained between 23 and 27 mg/L with the target being 25 mg/L
- ◆ If the measured total alkalinity at the filter influent sample point is less than 23 mg/L:
 1. Increase chemical feed pump setting by 4%

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2. Wait 8 minutes and re-measure total alkalinity
 3. If the total alkalinity falls within the 23-27 mg/L range the goal has been achieved, if not;
 4. Repeat steps 1 and 2 until proper alkalinity level has been reached
- ◆ If the measured total alkalinity at the filter influent sample point is greater than 27 mg/L:
1. Decrease chemical feed pump setting by 4%
 2. Wait 8 minutes and re-measure total alkalinity
 3. If the total alkalinity falls within the 23-27 mg/L range the goal has been achieved, if not;
 4. Repeat steps 1 and 2 until proper alkalinity level has been reached
- ◆ The total alkalinity shall also be measured at the finished water sample point

Finished Water
Sample Point



- ◆ The total alkalinity at this point must always be greater than 30 mg/L
- ◆ If the measured total alkalinity at the finished water sample point is less than 30 mg/L
- ◆ Verify that finished water pH is between 7.4 and 7.6; if not adjust as per Sodium Hydroxide SOP
- ◆ Verify that filter influent water alkalinity is between 23 and 27 mg/L

XI. Quality Control

After any adjustment to the sodium bicarbonate chemical feed pumps samples should be taken and alkalinity analyzed at both the Filter Influent Sampling Points and the Finished Water Sampling Point utilizing the procedures outlined in Alkalinity Lab Procedure SOP #4.

XII. References

Alkalinity Lab Procedure SOP #4, SOP Binder.
Sodium Hydroxide SOP #10, SOP Binder.
Sodium Bicarbonate Dry Tank Mixture Strength. See attached Mixture Ratio Sheet.