

DOCUMENT MANAGEMENT SYSTEM

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Doc# NSCS-M-P-7093-02-17
 Title: ORP Analysis and Testing
 Issue Dt: 10/06/1999
 Revision Dt: 08/02/2018 Review Interval: 12
 Cat: Quality Doc Type: SOP
 Auth:
 Desc: ORP Analysis and Testing
 Loc: Midwest - Utilities-Midwest - Plant Maintenance-Midwest-Gary Works

STEPS**Process Overview****PROCEDURES**

Oxidation reduction potential (ORP) is measured in the chrome treatment plant to determine if all of the hexavalent chrome has been changed to trivalent chrome. The ORP sensor is actually measuring the residual treatment chemicals and not the state of the chrome. The state of the chrome, hex or tri is inferred by the pH or ORP being in the correct control range.

The chrome used at the Midwest Plant is typically either sodium dichromate or chromium trioxide. When mixed with water they become various forms and types of both trivalent or hexavalent chrome known as chromic acid, or divalent dichromate ions. This material ends up in the treatment plant where sodium bisulfite is used as the treatment chemical.

At this point after treatment, the ORP is measured. The ORP is not chemical specific. It will read the collective ORP of all of the wastewater chemistry. The other important concept is that ORP is pH selective. Just by changing the pH the ORP will change. Hence, when measuring ORP it is important to know the pH of the sample. Before making a process change to the chemical feed, be sure the wastewater is in the proper pH range.

Samples

Secure samples from the Chrome Reduction Tank in the Chrome Treatment Plant. Four times per turn, a sample should be secured from each train.

Run Test

1. Make sure the Chrome Test is selected in each meter's settings
2. Fill a 10 mL sample bottle with the test sample.
3. Wipe the bottle well with a soft clean cloth and place in the test unit.
4. Zero the test machine and remove the test bottle.
5. Add one chrome reagent packet [REDACTED] and lightly mix until no reagent can be seen
6. Return the sample bottle to the test unit and press test button

Records

Log the four regular sample results on the Pretreat Log Sheet 7093-03.

**On Line-vs.-Manual
Manual Cross Check**

Compare the results of the test with the on-line instrumentation. If the variance between the on-line and off-line instruments is greater than [REDACTED] mv then:

- Clean the probes of the on-line meters and the portable meter.
- Verify the pH is in the proper range for both the sample and the wastewater. Remember if the pH is out of spec, the ORP will be different and all of the meters may be reading correctly.

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- After both of the above have been done, secure new samples and retest.
- If greater than ■■■ mv of variance still exists, switch to manual feed and control of the treatment chemical, notify the Manager, the IR Shop and note it on the Pretreat Log Sheet 7093-03.