DDS

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JSW - Discussed with Col Dalzell this date 21July87

DEPARTMENT OF THE NAVY

Memorandum

5200
NREAD

DATE: 21 Jul 87

FROM: Environmental Control Specialist, Natural Resources and Environmental Affairs Division, Marine Corps Base, Camp Lejeune

TO: Director, Natural Resources and Environmental Affairs Division, Marine Corps Base, Camp Lejeune

SUBJ: BOILER WATER TREATMENT PROGRAM

Encl: (1) Boiler Water Analyses

1. This memorandum is submitted as requested by the Supervisory Ecologist, in response to information provided to the Environmental Control Specialist by the Utilities General Foreman, that the subject program had significantly deteriorated in the last few weeks.

2. Even though it had an adverse effect on performing my present duties as an Environmental Control Specialist, I spent one day, every two weeks, assisting steam generation with the subject program during the period of 25 February 1987 through 5 June 1987. When it became obvious that the Base Maintenance Officer was not going to get the Chemist position filled in a timely manner, a decision was made by the Director of Utilities to have the Boiler Plant Operator Leaders assume the duties of the Utilities Chemist regarding boiler water treatment. The leaders would provide quality assurance monitoring. It was agreed that I would train the leaders.

3. Working closely with Mr. Kenneth Shepard, I briefed each leader on how to gather and evaluate data and to make appropriate adjustments to the chemical program. I reviewed enclosure (1) with Mr. Shepard and provided copies to each of the leaders. Steam Generation has a staff of excellent leaders, and I was impressed with how they understood the process.

4. By mutual agreement between the Supervisory Ecologist and the Director of Utilities, I was to serve as a consultant directly to the Utilities Director, if he encountered any problems with the subject program and the new procedures.

5. On 17 July, 1987, I learned that the leaders have not been performing the quality assurance sampling and testing, and have not submitted any reports to the Director of Utilities.

6. The purpose of this memorandum, is to inform you of this situation.

Glenée Smith
GLENÉE SMITH

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BOILER WATER ANALYSES

Enclosure (1)

ALKALINITIES

"P" Alkalinity

(1) Measure 25 ml of water into casserole dish.

(2) Add 2 drops of phenolphthalein indicator. If the water turns red (and boiler water should) titrate with sulfuric acid until the red color just disappears and the natural color of the sample appears.

(3) Take the buret reading and multiply it by 40. This will give you the "P" alkalinity. DO NOT POUR SAMPLE OUT! SAVE IT TO RUN "M" Alkalinity. ALSO, DO NOT REFILL BURET. BEGIN TITRATING FOR THE "M" ALKALINITY WHERE YOU STOPPED TO GET THE "P" ALKALINITY.

"M" Alkalinity

(1) TO THE SAME SAMPLE THAT YOU USED FOR THE "P" ALKALINITY TEST, add 3 or 4 drops of methyl purple indicator. If the water turns green titrate with sulfuric acid until the green color turns to a red-purple color.

(2) Take the buret reading and multiply it by 40.

"OH Alkalinity

(1) The method for hydroxide alkalinity is considered accurate only within 10%. Due to this, the following equation is used to calculate the "OH" Alkalinity: (2 x "P" Alkalinity) - "M" Alkalinity = "OH" Alkalinity.

Example: If your "P" alkalinity is 320 and your "M" alkalinity is 400, you would calculate for your "OH" alkalinity as follows:
(2 x 320) - 400 = OH alkalinity.
640 - 400 = 240
Therefore your OH alkalinity is 240.

BOILER WATER

CHLORIDES (Cl) TEST

1. Pour 25 ml of water into casserole dish.

2. Add 2 drops of Phenolphthalein Indicator. If water turns red (and boiler water should) titrate with N/50 Sulfuric Acid until the red color just disappears and the natural color of the sample appears.

3. Add 2 ml of Hydrogen Peroxide to the sample, if Sulfite (SO_3) is used in boiler water treatment.

4. Add 5 drops of Chromate Indicator to the sample.

5. Titrate with Silver Nitrate slowly until the yellow color turns a light orange-red.

6. Take the burette reading. Multiply this reading by 40 to get the Chloride reading.

PROCEDURE FOR HYDRAZINE TEST KIT

1. Fill both of the viewing tubes to the 5 ml mark with the water to be tested.

2. Add two drops of HydraVer™ II Hydrazine Reagent to one of the viewing tubes and swirl to mix. If hydrazine is present, a yellow color will develop in the first viewing tube. A very slight yellow color will be apparent in the second viewing tube due to the color of the reagent itself. Allow 15 minutes for coloer development.

3. Place the first viewing tube (containing boiler water with HydraVer II drops) in the right opening of the comparator.

4. Place the second viewing tube (containing just boiler water) in the left opening of the comparator.

5. Hold the comparator up to a light such as a window, the sky or a light, and view through the openings of the comparator. Rotate the disc until a color match is obtained.

6. Read the ppm Hydrazine (N_2H_4) through the scale window.

SULFITE (SO_3) TEST

(1) Measure 50 ml of water into casserole dish.

(2) Add 1 or 2 drops of phenolphthalein indicator.

(3) Add 1 scoop of starch at a time, stirring well after each scoop. After the water turns from pink to clear, add 1 extra scoop of starch while stirring.

(4) Titrate with iodide/iodate until a permanent faint blue color appears.

(5) Take the buret reading and multiply by 10 to get the SO_3 reading.

The SO_3 test is run at FC-202, BA-106, and M-230 unmanned plants.

BOILER WATER

PHOSPHATE (PO_4) TEST

(1) Filter sample.

(2) Measure to the 5 ml mark of the Phosphate Tube.

(3) Add Molybdate Reagent to the 15 ml mark of the Phosphate Tube.

(4) Add 2 small scoops of Stannous Chloride Power or 2 drops of Stannous Chloride Reagent.

(5) Shake sample and let stand for 2 to 3 minutes.

(6) Read Phosphate reading in the color slide.

CONDUCTIVITY

TDS

(1) Pour 100 ml of boiler water to be tested into a flask.

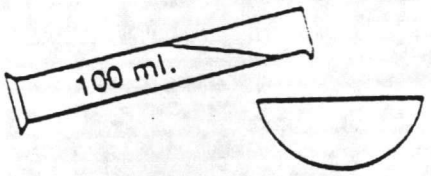
(2) Add conductivity neutralizing solution until sample turns pink. Continue to add conductivity neutralizing solution until the sample turns from pink to clear.

(3) Pour sample into conductivity meter cell. Read conductivity.

Procedure For 705 Test

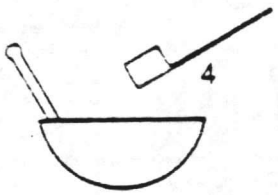
705 ~~ISOQUEST™ HT~~ TEST

1. Measure and transfer a 100 ml water sample to the casserole.

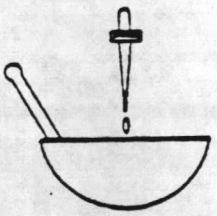


If sample is turbid, it should be filtered before measurement.

2. Add ½ level scoops of Reagent No. 1 to the casserole and stir.



3. If the solution is *yellow*, add 1 drop of Reagent No. 2 and proceed to step 4.



If the solution is *purple*, add Reagent No. 2 dropwise, while stirring, until the solution turns yellow. Then add 1 extra drop of Reagent No. 2 and proceed to step 4.

4. Fill burette to the 0.0 mark with Reagent No. 3

Titrate the sample with Reagent No. 3 slowly, at a rate not to exceed thirty drops per minute.

Color change is from yellow to rose red, the endpoint.

Note the number of ml titrated. When the endpoint is reached, there will be no further color development when excess Reagent No. 3 is added.

Read the number of ml titrated from the burette and refer to the chart below to determine the ISOQUEST HT concentration.

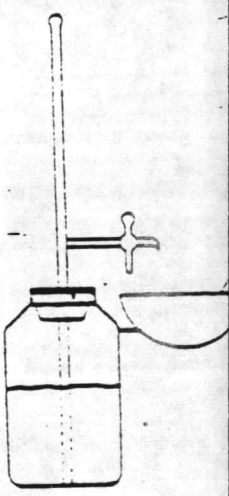


CHART FOR SLUDGE CONDITIONER 702

Burette reading	(ppm) parts per million
.5	13
.6	18
.7	23
.8	28
.9	33
1.0	38
1.1	43
1.2	48
1.3	53
1.4	58
1.5	63
1.6	68
1.7	73
1.8	78
1.9	83
2.0	88
2.1	93
2.2	98
2.3	103
2.4	108
2.5	113
2.6	118
2.7	123
2.8	128
2.9	133
3.0	138
3.1	143
3.2	148
3.3	153
3.4	158
3.5	163
3.6	168
3.7	173
3.8	178
3.9	183
4.0	188
4.1	193
4.2	198
4.3	203
4.4	208
4.5	213
4.6	218
4.7	223
4.8	228
4.9	233
5.0	238
5.1	243
5.2	248
5.3	253
5.4	258
5.5	263
5.6	268
5.7	273
5.8	278
5.9	283
6.0	288
6.1	293
6.2	298
6.3	303
6.4	308
6.5	313
6.6	318
6.7	323
6.8	328
6.9	333
7.0	338

Range

CHART FOR SLUDGE CONDITIONER 705 (High Range)

Burette reading	(ppm) parts per million	Burette reading	(ppm) parts per million
7.1	343	10.1	493
7.2	348	10.2	498
7.3	353	10.3	503
7.4	358	10.4	508
7.5	363	10.5	513
7.6	368	10.6	518
7.7	373	10.7	523
7.8	378	10.8	528
7.9	383	10.9	533
8.0	388	11.0	538
8.1	393	11.1	543
8.2	398	11.2	548
8.3	403	11.3	553
8.4	408	11.4	558
8.5	413	11.5	563
8.6	418	11.6	568
8.7	423	11.7	573
8.8	428	11.8	578
8.9	433	11.9	583
9.0	438	12.0	588
9.1	443	12.1	593
9.2	448	12.2	598
9.3	453	12.3	603
9.4	458	12.4	608
9.5	463	12.5	613
9.6	468		
9.7	473		
9.8	478		
9.9	483		
10.0	488		