NTRD Program Disclaimers

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New Technology Research & Development Program
Grant Contract 582-5-70807-0010

Task 4 Deliverables
Part 2 – Test Plan

The preparation of this report is based on work funded in part
by the State of Texas through a Grant from the
Texas Commission on Environmental Quality.

TEST MATRIX FOR WOW ENERGY PILOT UNIT
WOW-Energies.

1. The Start- up of the Pilot Unit should be done according to the Procedure described in the Operating Manual.

2. For First Test should per done per the design Operating Parameters:
   Inlet Gas Flow Rate – 2,500 ACFM @ 354 F (or temperature existing in plant duct). *

3. Measure Inlet Gas Temperature (Test Port #1),
   Measure outlet temperature of WESP 1 (Test Port #2 - High Temperature T/C)
   Outlet Gas Temperature (Port #7) and Outlet Gas Flow Rate (Port # 7)

4. Measure Chemical Gas composition:
   4.1. Inlet Gas Test port #1 (before WESP #1) : NO, NO_2, SO_2
   4.2. Outlet Gas Test Port # 7 (after WESP # 2): NO, NO_2, SO_2.
5. Atomizing Spray water make up – 1.8 gpm* *

6. Record Scrubber Operating Parameters.

7. High Voltage Settings on both WESPs should be at maximum possible operating power.

8. Efficiency of particulate and droplet removal will be verified visually in the observation tube.

PARAMETERS SCRUBBER #1	PARAMETERS SCRUBBER #2
Recycle Liquid Spray #1 1st 90 gpm 2nd 80 gpm 3rd 80 gpm 4th Intermittent 20 gpm for demister	Recycle Liquid Spray #2 1st 20 GPM Packing Face spray 2nd 100 gpm Top Spray 3rd 100 gpm Top Spray
Sodium Chlorite (NaClO2) injection. (10%) ORP: 1,200 - 1,700 mV Sodium Hydroxide (NaOH) injection (25%) PH 4.5 - 6.5	 Sodium Hydroxide (NaOH) injection (25%) PH 6.5 - 10
Chemical Consumption* - Sodium Chlorite (10%) approx. 0.83 gpm – Sodium Hydroxide (25%) -0.5 gpm***	
Bleed Rate 2.0 gpm (approx) Na2SO4 – 10.9% Other Nitrite and Cl salts – 4.1% Solids 0.02%	Bleed Rate 0.3 gpm (approx)*** NaNO3 – 1.7%*** NaNO2 - 1.3% Na2SO4 – 6.2%
Total Unit Bleed * *2.3 gpm Na2SO4 – 10% NaNO3 – 0.4% NaCl – 2.5% Solids – 0.02%	

NOTES:

* - Testing at different gas flows will be performed after the evaluation of the test results at 2,500 ACFM with the similar procedures and prorated chemical injection amounts.

* * - Data depends on the actual Inlet Gas conditions and gas composition

** * - Data depends on the actual First Scrubber SO_2, NOx Removal Efficiency

WOW - FFGC TEST PROTOCOL

INSPECTION PROCEDURE FOR THE WESP PILOT IN THE FABRICATION SHOP BEFORE THE SHIPPING TO THE SITE.

(Changes by Isaac Ray, Boris Altshuler & Eberhard Veit 09-14-05)

1. The Workmanship

1.1. All tack welds, spatter, arc strikes, slag and alignment clips should be removed on outside walls of the WESP and Scrubber housing.

1.2. All welds starts and stops should be smooth and blended in.

1.3. All openings should have no sharp edges (manways, insulator compartments, inspection ports, nozzle service ports, etc.)

1.4. All stainless steel bolting should have never-seize applied.

1.5. All Markings and discolorations should be removed.

1.6. Unit should be washed with alloy cleaner on outside and power washed on the inside with preliminary vacuuming out all dirt.
Only Alloy steel surface shall be cleaned, before installing the unit on the painted skid, paint shall not be affected by Alloy cleaner.

2. FABRICATION VISUAL INSPECTION

2.1. Material condition and thickness.
As specified by DWG: A80-100-GA (sub DWGs as applicable)

2.2. Dimensions and shape per drawings
As specified by DWG: A80-100-GA (sub DWGs as applicable)

2.3. Orientation and elevation.
As specified by DWG: A80-100-GA (sub DWGs as applicable)

2.4. Position of the spray headers and nozzles.
As specified by DWG: A80-100-GA (sub DWGs as applicable)

2.5. Interconnecting piping.
As specified by DWG: A80-100-001-V1

2.6. Bolting and gaskets.

2.7. Nameplate bracket and nameplate.

3. TESTING THE WESP AND THE SCRUBBER MAIN COMPONENTS

3.1. Quench, Wash and spray nozzles should be tested for performance and spray pattern insuring the required coverage.
- 3.1.1. Airflow rate 0 - 3,000 SCFM.
- 3.1.2. Water flow rates: Scrubbers 250 GPM ea. (20 GPM - 115 GPM - 115 GPM)
- 3.1.3. Atomizing spray rate: 0 - 2 GPM.

3.2. Pump, interconnecting piping and scrubber sump should be tested for leaks. Check for visual leaks under normal operating pressure. Max. pressure is 80 PSI.

3.3. Inspect Ionizing electrodes to make sure all are centered in the collecting tubes (1/8 " tolerance) at the top and at the bottom using the template provided by the fabricator.

3.4. Check the position of the Support beams on the top in relation to the collector according to the assembly drawing. DWG A84-100-ILS.

3.5. Hangers for the support frame should be in the center of their tubes. DWG A84-100-ILS.

3.6. All measurements on the ionizing frame and electrodes should be performed with porcelain insulators installed as required. Centered to within +/- 0.125".

3.7. **Before shipping the porcelain insulators should be replaced by the temporary supports fabricated from steel and resembling the mounting dimensions of the porcelain insulators.**

3.8. The Porcelain insulators must be checked before and after installation. The surface should have no scratches and must be free from the dust.

3.9. Inspect the Bus Bar and Bus Duct and make sure they are clean and concentric (Tolerance is ¼ ")

3.10. Air purge Units should be checked for the blower motor direction of rotation and voltage and current on the electrical heaters.
Purge Blower 120 V - 1.6 A, Heaters 480V 2x 725 W. (See electrical equipment list).

3.11. All access doors should be inspected and have hardware and gaskets and all Key interlocks with chains are installed and the interlock system is working properly.

3.12. Metering pumps should be checked for mechanical performance with water. PH and ORP Sensor should remain in protective covers until installed on site with liquid. Sensor wiring and controller can be checked with buffer solution cap in place.
Design Flow Rates: Oxidizing Solution 0.83 GPM, NaOH (50% solution) 0.25 GPM.

4. INSPECTION OF THE INTERCONNECTING ELECTRICAL WIRING.

4.1. Check all Ground wiring from the system components to the frame of the skid. Less than 4 Ω required.

4.2. Check functionality of all the components operating from the panel according to the system logic. Per A82-100-000-W-01Function.doc.

4.3. Check the operation and performance of the liquid level control system
Visually check operation against level of water in still well for low and high. (Clear PVC)
For high-high and low-low remove sensor from well and check in water bucket.

4.4. Check the operation and performance of the VFD unit for the blower.
Program VFD to current limit at FLA of motor and manually adjust VFD speed from 10 - 60 Hz or up to max. current. Flow max. 4,000 CFM.

4.5. Inspect the wiring and performance of the light bulb for the observation

4.6. Tube, specifically to insure the watertight installation of the bulb.
After 1 day of operation with scrubber system on, open light bulb compartment and check for water or condensate.

5. HIGH VOLTAGE TEST PROCEDURE AND OZONE PRODUCTION TEST.

5.1. Run V-I test for each of the WESP's at the best possible alignment position of the ionizing electrodes with and without air flow from the blower and controller adjusted for conventional WESP operation (minimum sparking rate and maximum Corona Power).
Expected high voltage for system is about 35 kV.
Optimum voltage is at 5-8 sparks / min.
Max. current is 400 mADC, operational current is expected in the 150 - 400 mA range for WESP 1 and 50-150 mA for WESP 2 depending on operating conditions..

5.2. Measure airflow rates and record pressure drop along unit.
Design Pressure drop through WESP A – 0.5" W.C., First scrubber – 1" W.C., Second packed scrubber – 2.5" W.C., WESP B – 1.0" W.C.
Total system pressure drop is 5" W.C. (approx.) for 2000 cfm gas flow rate

5.3. Same as above with and without introduction of water fog in the gas stream at three different gas flow rates and nominal water flow rate.
Water flow will depend on ambient conditions and water needed for saturation of gas stream and film build. Hot streams will require more water. Nominal flow on atomizing nozzle is 1.8 GPM. Optimize water flow for spark rate and Ozone production with atomizing nozzle and wash nozzles as needed. This will not represent water flows on hot system.

5.4. Repeat 5.1 and 5.2 ONLY FOR THE FIRST (INLET) WESP with high voltage controller's settings as follows:

5.4.1. with intermediate energisation **(IE)** PULSES WITH THREE DIFFERENT SETTINGS.
Increase spark rate until arcs develop, then reduce voltage to max. spark rate without arcs. Test 3 different spark rates below arc development.

5.4.2. Same as above with three standard NWL SPARK RECOVERY SETTINGS (Linear. 3-slope, 4-slope)

5.4.3. Same as above with increased sparking rate by introduction of the more intensive spray concurrently with the air flow.

5.5. During each of the above tests (5.1, 5.2, 5.3) the Ozone level should be measured. The feasibility and cost do to so is still under investigation.
The gas tests should be done by WOW on site according to the Contract and the only reason to do this test in the shop is to have a base line and initial data for plasma generation ability of the pilot unit.
Ozone generation is a proxy for the plasma generation and can be tested best at clean ambient air in the shop at Crystal Lake. Eisenmann has purchased Draeger tube equipment to perform these test.

The goal of this test is to determine the electrical conditions at the nominal air flow rate that corresponds to the maximum level of Ozone production for a given tube-electrode configuration.

6. TESTING PARAMETERS

6.1. The air flow will be tested at 1000, 2000, 3000,4000 ACFM at ambient temperature in the test building.

6.2. Atomizing spray will be held constant at 1.8 GPM of tap water.
Adjustments to atomizing spray if needed will be done as described above.

6.3. Recycling water in both scrubbers will at 250 GPM.
Water flow to scrubbers is constant for best spray pattern.

6.4. For spark and arc inducement during plasma tests for Ozone generation the top (wash) spray in the WESP #1 will be tested from 5 to 25 GPM.

6.5. Secondary Voltage will be at the maximum operating levels.
For estimates refer to 5.1. The purpose of the shop test is to establish optimum parameters.

6.6. During the tests the following parameters will be recorded:

6.6.1. Pressure drop in the scrubbing sections and total pressure drop in the system.

6.6.2. Ozone concentration at the outlet of the WESP #1.

6.6.3. Visual inspection of the water droplets penetration after the WESP #2

6.6.4. Secondary Voltage and Corona Current at each WESP

MATERIAL SAFETY DATA SHEET

24 Hour Emergency Phone 800-835-2030

SECTION 1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Akta Klor 25
CHEMICAL NAME
SYNONYMS
Sodium Chlorite Solution
25% Active Sodium Chlorite Solution
MANUFACTURER
Vulcan Chemicals, P O Box 385015, Birmingham, AL 35238-5015

SECTION 2 COMPOSITION INFORMATION ON INGREDIENTS

CHEMICAL NAME
CAS NUMBER
% RANGE
Sodium chlorite
7758-19-2
24.3-25.7%
* Denotes chemical subject to reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372

SECTION 3 HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Clear, water white to slightly yellow liquid, slight chlorine odor
DANGER! Corrosive. Causes skin and eye irritation or burns.
Harmful if swallowed. Causes digestive tract burns.

POTENTIAL HEALTH EFFECTS

INHALATION
Breathing of vapor or mist is possible if this material is heated or sprayed. Breathing this material causes irritation of the throat and lungs with cough and difficult breathing.
SKIN
Causes severe skin irritation with redness, an itching or burning feeling, and/or swelling of the skin. May cause skin damage. Note: May cause skin burns and permanent skin damage.
EYE
Causes severe eye irritation with tearing, redness, or a stinging or burning feeling. May cause swelling of the eyes with blurred vision. Can injure eye tissue. Effects may become more serious with repeated or prolonged contact. Note: May cause burns and permanent injury to eye tissue.
INGESTION
Swallowing this material may be harmful or cause death. Harmful effects include burns and permanent damage to the digestive tract, including the mouth, throat, stomach and intestines. Symptoms may include severe abdominal pain and vomiting of blood. Blood loss through damaged tissue can lead to low blood pressure and shock.
SIGNS AND SYMPTOMS OF EXPOSURE
Depending upon level and duration of exposure, other possible signs and symptoms from breathing, swallowing, and/or entry of this material through the skin may include nosebleeds, hoarseness, sore throat, wheezing, cough with phlegm, bronchitis, tightness of the chest, pulmonary edema (high levels) irritation of the nose, throat, airways, and lungs with cough and difficult breathing, burns or ulceration of the gastrointestinal tract, including stridor, drooling, and vomiting.

MATERIAL SAFETY DATA SHEET

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Preexisting disorders of the following organs or systems, which may be aggravated by exposure to this material include: respiratory system (including asthma and other breathing disorders), gastrointestinal system, skin and blood (anemia, G6PD deficiency).
EFFECTS FOLLOWING REPEATED EXPOSURE
This material may cause the following effects: respiratory tract damage (nose, throat, airways), lung damage, gastrointestinal damage, skin damage. Observations in animal studies include: blood disorders and male reproductive effects. The relevance of these observations to humans is not clear at this time.

SECTION 4 FIRST AID MEASURES

INHALATION
Remove individual to fresh air and get immediate medical attention. If breathing is difficult, give oxygen. If breathing stops, give artificial respiration.
SKIN
Wash exposed skin well with plenty of soap and water. Remove contaminated clothing and shoes. Wash clothing and thoroughly clean shoes before reuse. If symptoms develop, get medical attention.
EYES
Hold the eyelids apart and flush the eye gently with a large amount of water for at least 15 minutes. Get immediate medical attention.
INGESTION
Have person drink a glass of water immediately if able to swallow. Get immediate medical attention. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person.
NOTES TO PHYSICIAN
Chlorine dioxide vapors are emitted when this product contacts acids or chlorine. If these vapors are inhaled, monitor patient closely for delayed development of pulmonary edema which may occur up to 48-72 hours post-inhalation.
Following ingestion, neutralization and use of activated charcoal is not indicated.

See Section 11 for Toxicological Information

SECTION 5 FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES

FLASH POINT
AUTOIGNITION TEMPERATURE
Not Applicable
Not Applicable
FLAMMABLE LIMITS IN AIR (PERCENT BY VOLUME)
Not Applicable
EXTINGUISHING MEDIA
Not Applicable-Choose extinguishing media suitable for surrounding materials.
FIRE FIGHTING INSTRUCTIONS
Approach fire from upwind to avoid hazardous vapors and toxic decomposition products. Use flooding quantities of water as fog or spray. This product becomes a fire or explosion hazard if allowed to dry, so use water spray to keep fire-exposed containers cool. Extinguish fire-using agent suitable for surrounding fire.
Firefighters should wear full protective clothing and positive pressure self-contained breathing apparatus. This product becomes a fire or explosive hazard if allowed to dry; see Section 10.

MATERIAL SAFETY DATA SHEET

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SECTION 6 ACCIDENTAL RELEASE MEASURES

Isolate spill area and deny entry to unnecessary or unprotected personnel. Remove all sources of ignition, such as flames, hot glowing surfaces or electric arcs. Stop source of spill as soon as possible and notify appropriate personnel. Cleanup personnel must wear proper protective equipment (refer to Section 8). Notify all downstream water users of possible contamination.
Create a dike or trench to contain all liquid material. Spill materials may be absorbed using clay, soil or non-flammable commercial absorbents. Continue to keep damp. If allowed to dry, dried material can ignite in contact with combustible materials.
This product may represent an explosion hazard if it contacts acids or chlorine. If such contact is possible, evacuation procedures must be placed into effect. Evacuate all non-essential personnel. Hazardous concentrations in air may be found in local spill area and immediately downwind.
Do not place spill materials back in their original container. Containerize and label all spill materials properly. Decontaminate all clothing and, if permitted, the spill area using strong detergent and flush with large amounts of water.
For all transportation accidents, call CHEMTREC at 800/424-9300.

SECTION 7 HANDLING AND STORAGE

HANDLING

Do not get in eyes or on skin, or clothing. Do not taste or swallow. Avoid breathing mists or fumes. Do not handle with bare hands. This product becomes a fire hazard if allowed to dry. Remove and wash contaminated clothing to avoid fire.
Carefully monitor handling, use and storage to avoid spills and leaks. Follow protective controls set forth in Section 8 when handling this product. Do not eat, drink, or smoke in work area. Wash hands prior to eating, drinking, or using restroom.
This solution contains sodium chlorite. Dry sodium chlorite is a strong oxidizing agent. Mix only into water. Contamination may start a chemical reaction with generation of heat, liberation of hazardous gases (chlorine dioxide a poisonous, explosive gas), and possible fire and explosion. Do not contaminate with garbage, dirt, organic matter, household products, chemicals, soap products, paint products, solvents, acids, vinegar, beverages, oils, pine oil, dirty rags, or any other foreign matter.

STORAGE

STORAGE CONDITIONS
Store in closed, properly labeled tanks or containers. Do not store at temperatures above 100°C (212°F). Do not remove or deface labels or tags. Do not expose to direct sunlight or ultraviolet light. Do not drop, roll or skid drums. Keep drums upright.
Avoid contact with combustible or readily oxidizable materials; sulfur-containing rubber.
INCOMPATIBLE MATERIALS FOR STORAGE OR TRANSPORT
Acids, reducing agents, combustible material, oxidizers (such as hypochlorites), paints, sulfur and solvents.

MATERIAL SAFETY DATA SHEET

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SECTION 8 EXPOSURE CONTROLS, PERSONAL PROTECTION

ENGINEERING CONTROLS

VENTILATION
Local exhaust ventilation is recommended if vapors, mists or aerosols are generated. Otherwise, use general exhaust ventilation.

PERSONAL PROTECTIVE EQUIPMENT

EYE AND FACE PROTECTION
Wear chemical goggles. A face shield should be worn in addition to goggles where splashing or spraying is possible.
SKIN PROTECTION
Wear Neoprene gloves, boots and apron.
RESPIRATORY PROTECTION
Wear a NIOSH/MSHA approved acid gas respirator plus dust/mist pre-filters if any exposure to dust or mist is possible.

GENERAL
Safety shower and eye wash station must be provided in the immediate work area. Protective equipment and clothing should be selected, used, and maintained according to applicable standards and regulations. For further information, contact the clothing or equipment manufacturer.

EXPOSURE GUIDELINES
None Established

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

CHEMICAL FORMULA
MOLECULAR WEIGHT
$NaClO_2$
90.45
APPEARANCE AND ODOR
SPECIFIC GRAVITY
Clear, water white to slightly
1.21 @ 25/25°C
yellow liquid, slight chlorine odor
VAPOR PRESSURE
DENSITY
No Available Data
10.1 lbs/gal @25°C
pH @ 25°C
VOLATILES, PERCENT BY VOLUME
>12
59-74%
CRYSTALLIZATION POINT
SOLUBILITY IN WATER
-7°C for 25% Solution
Complete

SECTION 10 STABILITY AND REACTIVITY

CHEMICAL STABILITY
Stable
CONDITIONS TO AVOID
Temperatures above 175°C (347°F) (dry material)
Evaporation to dryness; dried material can ignite upon contact with combustibles.
Exposure to sunlight or ultraviolet light can reduce product strength.

MATERIAL SAFETY DATA SHEET

INCOMPATIBILITY WITH OTHER MATERIALS
Acids, reducing agents, combustible materials, oxidizers (such as hypochlorites), sulfur-containing rubber, dirt, soap, solvents, paints.
Contamination with acids, chlorine or organic materials. Avoid contact with heat or flame source.
HAZARDOUS DECOMPOSITION PRODUCTS
Explosive and toxic chlorine dioxide gas will be generated on contact with acids or chlorine.
HAZARDOUS POLYMERIZATION
Will not occur

SECTION 11 TOXICOLOGICAL INFORMATION

ANIMAL TOXICOLOGY
Inhalation LC_{50}:
No available data
Dermal LD_{50}:
> 2 g/kg (rabbit)
Oral LD_{50}:
165 mg/kg (rat)
Oral LD_{50}:
350 mg/kg (mouse)
EFFECTS FOLLOWING PROLONGED OR REPEATED EXPOSURE
The chronic ingestion of sodium chlorite in drinking water has been studied in laboratory animals and to a limited extent in humans. Concentrations of 100 ppm and higher have been shown to cause mild anemia and other blood red blood cell effects in laboratory animals, including G6PD deficiency. In a reproduction study, decreased serum levels of the thyroid hormones, T3 and T4, were observed on days 21 and 40 in both male and female pups exposed to 100 ppm of sodium chlorite. In a more recent study, methemoglobin levels were increased with high doses of sodium chlorite (70 ppm), as well as decreased liver weights. In general, clinical studies of communities using sodium chlorite, as a disinfectant found no adverse effects in the human population studied.
CARCINOGENICITY
Sodium chlorite is not listed by NTP, IARC, OSHA, EPA, or any other authority as a carcinogen. Dermal and oral carcinogenicity studies conducted in mice and rats did not result in a significant carcinogenic effect. According to the USEPA and IARC sodium chlorite is not classifiable because of inadequate animal and human data.
MUTAGENICITY
Sodium chlorite has been evaluated for possible mutagenic effects in several laboratory tests. It has tested positive in the Ames Salmonella reverse mutation assay without metabolic activators and caused chromosomal aberrations in an in vitro Chinese hamster fibroblast cell line without metabolic activators. Sodium chlorite also tested positive in the mouse micronucleus assay when administered intraperitoneally (directly into the body cavity), but was not mutagenic when administered orally. The significance of these test results for human health is unclear because the

oxidizing effects of the chlorite or salting effects of sodium may significantly affect the ability of the tests to accurately detect mutagens.

REPRODUCTIVE/DEVELOPMENTAL TOXICITY

Groups of male rats exposed to 100 or 500 ppm sodium chlorite in drinking water ad libitum showed a significant increase in the percentage of morphologically abnormal sperm as well as a significant decrease in sperm motility. No effects on reproduction were reported. Sodium chlorite has not been found to be teratogenic in studies in which animals have been exposed up to 100 ppm in the drinking water.

The CMA conducted a two-generation reproductive rat study with developmental neurotoxicity to evaluate the effects of sodium chlorite on reproduction and pre- and post-natal development when administered orally via drinking water for two successive generations. Sodium chlorite was administered at 0, 35, 70, and 300 ppm in drinking water to male and female rats for ten weeks prior to mating. Dosing continued during the mating period, pregnancy and lactation. The final report concluded that there were no meaningful treatment related effects at any dose level for systemic, reproductive/ developmental, and developmental neurological end points. Hematological effects and reduced body weight gains were observed in some treatment groups.

MATERIAL SAFETY DATA SHEET

SECTION 12 ECOLOGICAL INFORMATION

This product is toxic to fish and aquatic organisms. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans or other waters unless in accordance with the requirements of a National Pollutant Discharge Elimination System (NPDES) permit and the permitting authority has been notified in writing prior to the discharge. Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority.

ENVIRONMENTAL FATE

Water:

Sodium chlorite in water will eventually degrade to sodium chloride.

Soil:

Sodium chlorite in contact with acidic soil could generate chlorine dioxide.

ECOTOXICITY

Acute TL_{50} for Rainbow Trout: 50.6 mg/l (as 80% $NaClO_2$)

Acute LC_{50} (96 Hours) for Rainbow Trout: 290 mg/l (as 80% $NaClO_2$)

Acute TL_{50} for Bluegill: 208 mg/l (as 80% $NaClO_2$)

Acute LC_{50} (96 Hours) for Bluegill: 265-310 mg/l (as 80% $NaClO_2$)

Acute LD_{50} Mallard Ducks: 0.49-1.00 g/kg (gavage) (as 80% $NaClO_2$)

Acute LD_{50} Bobwhite Quail: 0.66 g/kg (gavage) (as 80% $NaClO_2$)

Acute LC_{50} (48 Hours) for Daphnia Magna: 0.29 mg/l (as 80% $NaClO_2$)

Sodium chlorite in the diet of birds was not acutely toxic. Eight-day dietary LC_{50}'s in mallard ducks and bobwhite quail were both greater than 10,000 ppm in the diet.

SECTION 13 DISPOSAL CONSIDERATIONS

All disposals of this material must be done in accordance with local, state and Federal regulations. Waste characterization and compliance with disposal regulations are the responsibilities of the waste generator.

SPILL RESIDUES

If this product becomes a waste it meets the criteria of a hazardous waste as defined under 40 CFR 261 and would have the following EPA hazardous waste designation: D002. Also, it will be subject to the Land Disposal Restrictions under 40 CFR 268 and must be managed accordingly.

As a hazardous liquid waste, it must be disposed of in accordance with local, state and Federal regulations in a permitted hazardous waste treatment, storage and disposal facility.

SECTION 14 TRANSPORT INFORMATION

DOT IDENTIFICATION NO.

UN 1908

DOT SHIPPING DESCRIPTION (49 CFR 172.101)

Chlorite solution, 8, UN 1908, II

PLACARD REQUIRED

Corrosive, 1908, Class 8

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LABEL REQUIRED

Corrosive, Class 8
Label as required by EPA and by OSHA Hazard Communication Standard, and any applicable state and local regulations.

IMO REQUIREMENTS

EmS No.: 8.06

SECTION 15 REGULATORY INFORMATION

U S FEDERAL REGULATIONS

REPORTABLE QUANTITY (RQ)

Not Applicable

TOXIC SUBSTANCES CONTROL ACT

Listed on TSCA Inventory

SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT (SARA) TITLE III

Components identified with an asterisk (*) in Section 2 are subject to the reporting requirements of Section 313 of Title III of the 1986 Superfund Amendments and Reauthorization Act (SARA) and 40 CFR Part 372.

SARA HAZARD CATEGORIES (40 CFR 370.2)

HEALTH: Immediate (Acute), Delayed (Chronic)
PHYSICAL: Fire

INTERNATIONAL REGULATIONS

CANADA

WORKPLACE HAZARDOUS MATERIALS INFORMATION SYSTEM (WHMIS) CLASSIFICATION

WHMIS Classifications applicable to this product:
E (Corrosive Material) based on assignment to TDG Class 8

CANADIAN ENVIRONMENTAL PROTECTION ACT (CEPA)

All components of this product are on the Domestic Substances List (DSL).

HAZARDOUS PRODUCTS ACT

This product has been classified in accordance with the hazard criteria of the Canadian Controlled Products Regulations (CPR).

EUROPE

EINECS No.: 231-836-6

STATE REGULATIONS

CALIFORNIA PROPOSITION 65

Sodium Chlorite does not appear on the California Proposition 65 list.

MATERIAL SAFETY DATA SHEET

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SECTION 16 OTHER INFORMATION

NFPA RATINGS

Health 3, Flammability 0, Instability 1
Date of Preparation: April 15, 2004
FORM 3239-646

Emergency Information:

For any other information contact:

Call toll-free 24 hours a day:
Vulcan Chemicals, Technical Service Department
800-835-2030
P O Box 385015, Birmingham, AL 35238-5015
Outside USA, call:
Phone: 800-873-4898
316-524-5751
8 AM - 5 PM, Central Time, Monday through Friday

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NO WARRANTY IS MADE, EXPRESS OR IMPLIED, OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR OTHERWISE.

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pH-meter Setup Log Scrubber 1

FFGC WOW Energies

D:\X-Manuals\SetupSheets&OperationLogs\[A84-100-WESP-InstrumentSetup-WOW.xls]Scrubber 1 PH

Actual Readings:									
Date:									
Time:									
pH									
Temperature (°F)									

Setup Parameter:									
Choose right arrow button to select values to be changed after changing save by hitting enter button again .									
Parameter									
Date:	9/26/2005								
Time:	18:00								
Set Temp. (°F) input actual	70 °F								
Standard	8.90 pH/-108mv								
Slope	8.90 pH/-108mv								
Loop Rang (pH)	0.00 pH-14.00								
Relay 1 Source	pH								
Relay 1 Mode	Low								
Relay 1 Setpnt	4.50 pH								
Relay 1 Hys.	2.00 pH								
Relay 1 Range	n/a								
Relay 1 Pls Rate	n/a								
Relay 2 Source	pH								
Relay 2 Mode	Low								
Relay 2 Setpnt	4.00 pH								
Relay 2 Hys.	0.20 pH								
Relay 2 Range	n/a								
Relay 2 Pls Rate	n/a								
Last Cal.	1/6/1999								
Comments:									
Comments:									
Comments:									

Setup Options:									
Choose right arrow button to select values to be changed after changing save by hitting enter button again .									
Parameter									
Contrast	3								
Averaging	OFF								
Temp Display	°F								
Loop adjust	4.00mA								
Loop adjust	20.00mA								
Test Loop	13.53 mA								
Test Relay 1	OFF								
Test Relay 2	ON								

pH-meter Setup Log Scrubber 2

FFGC WOW Energies

D:\X-Manuals\SetupSheets&OperationLogs\[A84-100-WESP-InstrumentSetup-WOW.xls]Scrubber 2 PH

Actual Readings:										
Date:										
Time:										
pH										
Temperature (°F)										

Setup Parameter:										
Choose right arrow button to select values to be changed after changing save by hitting enter button again .										
Parameter										
Date:	9/26/2005									
Time:	18:00									
Set Temp. (°F) input actual	70 °F									
Standard	8.90 pH/-108mv									
Slope	8.90 pH/-108mv									
Loop Rang (pH)	0.00 pH-14.00									
Relay 1 Source	pH									
Relay 1 Mode	Low									
Relay 1 Setpnt	6.50 pH									
Relay 1 Hys.	2.50 pH									
Relay 1 Range	n/a									
Relay 1 Pls Rate	n/a									
Relay 2 Source	pH									
Relay 2 Mode	Low									
Relay 2 Setpnt	6.00 pH									
Relay 2 Hys.	0.20 pH									
Relay 2 Range	n/a									
Relay 2 Pls Rate	n/a									
Last Cal.	1/6/1999									
Comments:										
Comments:										
Comments:										

Setup Options:										
Choose right arrow button to select values to be changed after changing save by hitting enter button again .										
Parameter										
Contrast	3									
Averaging	OFF									
Temp Display	°F									
Loop adjust	4.00mA									
Loop adjust	20.00mA									
Test Loop	13.53 mA									
Test Relay 1	OFF									
Test Relay 2	ON									

ORP-meter Setup Log Scrubber 2

FFGC WOW Energies

D:\X-Manuals\SetupSheets&OperationLogs\[A84-100-WESP-InstrumentSetup-WOW.xls]Scrubber 2 ORP

Actual Readings:									
Date:									
Time:									
mV									
Temperature (°F)									

Setup Parameter:									
Choose right arrow button to select values to be changed after changing save by hitting enter button again .									
Parameter									
Date:	9/26/2005								
Time:	18:00								
Standard									
Slope									
Loop Rang (pH)	0-2000 mV								
Relay 1 Mode	Low								
Relay 1 Setpnt	1200 mV								
Relay 1 Hys.	500 mV								
Relay 1 Range	n/a								
Relay 1 Pls Rate	n/a								
Relay 2 Mode	Low								
Relay 2 Setpnt	1000 mV								
Relay 2 Hys.	10 mV								
Relay 2 Range	n/a								
Relay 2 Pls Rate	n/a								
Last Cal.	1/6/1999								
Comments:									
Comments:									
Comments:									

Setup Options:									
Choose right arrow button to select values to be changed after changing save by hitting enter button again .									
Parameter									
Contrast	3								
Averaging	OFF								
Loop adjust	4.00mA								
Loop adjust	20.00mA								
Test Loop	13.53 mA								
Test Relay 1	OFF								
Test Relay 2	ON								

High Temperature Limit WESP 1

FFGC WOW Energies

D:\X-Manuals\SetupSheets&OperationLogs\[A84-100-WESP-InstrumentSetup-WOW.xls]High Temp Limit

Actual Readings:									
Date:									
Time:									
Temperature (°F)									
Set Points									
Parameter									
Date:	9/26/2005								
Set Point 1	180 °F								
Set Point 2	-40 °F								
Setup Parameter:									
Parameter									
Date:	9/26/2005								
Time:	18:00								
InP	A								
dSP									
SCAL									
InP1	4.00								
dSP1	0.0								
InP2	20.00								
dSP2	250.0								
SEt									
CnF 1	01								
HYS 1	1.0								
CnF 2	11								
HYS 2	1.0								
LC 0	0								
Comments:									
Comments:									

Transformer Rectifiers WESP 1 & 2

FFGC WOW Energies

D:\X-Manuals\SetupSheets&OperationLogs\[A84-100-WESP-InstrumentSetup-WOW.xls]TransformerRectifier

Actual Readings: (Meter)	WESP 1	WESP 2							
Date:									
Time:									
Primary Voltage (V)									
Primary Current (A)									
Secondary Voltage (kV)									
Secondary Current (mA)									
Power (kW)									
Spark Rate (SPM)									
Duty Cycle (%)									
Temperature (°F)									
Set Points									
Parameter	WESP 1	WESP 2							
Date:	#######	10/4/2005							
Performed by:	Veit	Veit							
Spark Setback (%)	5%	5%							
Quench (mSec)	0	0							
Sparks/min	3	6							
Fast Ramp (mSec)	6	8							
Spark Ramp	3-Slope	Linear							
Current Limit (%)	110%	110%							
Voltage Limit (%)	100%	100%							
U.V. Trip (kV)	5	5							
U.V. Delay (sec)	30	30							
Config									
Max. Duty Cycle (%)	100%	100%							
Max. Cur. Limit (%)	110%	110%							
Setback Offset	Man.	Man.							
Setback Offset (%)	10%	80%							
Fan Pwr Save	Off	On							
kV Spk Sen.	Hi	Low							
Level 2 Code	11	11							
Level 3 Code	51	51							
Count									
Undervoltage	18	18							
Overvoltage	0	0							
OvrCur Line/Sec	0/0	0/0							
Over Temp	0	0							
Open Circuit	0	0							
Aux Alarm 1	0	0							
Aux Alarm 2	0	0							
Aux Alarm 3	0	0							
Aux Alarm 4	0	0							
On/Off Start	96	96							
Network									
Must be in Network Port	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Help									
Interface Use Parameter Edit About NWL		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Trend									
See trends for various parameters		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
V/I									
Generate V-I curve automatically		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Transformer Rectifiers WESP 1 & 2 — FFGC WOW Energies

Parameter	WESP 1	WESP 2
Date:	#######	10/4/2005
Performed by:	Veit	Veit
Mode		
Control Mode	DC Mode	DC Mode
Manual Power Level	0	0
FaxRec	Off	Off
B.C Values		
IncDec (%)	6%	6%
Time (sec)	60	60
Delay (sec)	1	1
Physbak	0%	0%
I.E. Values		
mSec On	10.0	10.0
mSec Off	10.0	10.0
HV Pwr Up:	Prev	Prev
Rating		
VAC Rate	480	480
AAC Rate	39	39
KVDC Rate	70	70
mADC Rate	400	400
VAC Gain	+/-	+/-
AAC Gain	+/-	+/-
KV Gain	+/-	+/-
mADC Gain	+/-	+/-
Alarm		
Alarm Aux Alarm 1	<[1]	<[1]
Logic	N.C.	N.C.
Type	Disabled	Disabled
Count	0	0
Hammer		
ID	Hammr 1	Hammr 1
Mode	Off	Off
Feedback	No Feedb	No Feedback
Init. Wait	0:00:00	0:00:00
Duration	0:00	0:00
Wait	0:00:00	0:00:00
Clean	0:00:00	0:00:00
Setup		
Comm status		
T/R Address		
TR ID		
Sign OFF	used to si	used to sig
GVC Address	3	3
Code Timeout (min)	5	5
Light Timeout (min)	15	15
Keypad Beep	On	On
Network Rng	10 to 11	10 to 11

used to sig used to sig used to sig used to sig used to sig used to sig used to sign off

Fan - VFD Parameter Setup Sheet — FFGC WOW Energies

D:\X-Manuals\SetupSheets&OperationLogs\[A84-100-WESP-InstrumentSetup-WOW.xls]VFD-ExhaustFan

File:

Drive Data: **Powerflex 70**

Please note that only prameters that were changed from default are shown

Project Data: WOW
A84-100

NOTES
if no value is shown under setting, then that value is dependent on running conditions.

Comm Data: DISCRETE I/0

Parameter Table Data:	**Parameter #**	**Units**	**Parameter Name**	**Value**	
		Vlts	Output Voltage		
		%	% Output Curr		
		%	% Output Power		
			Last Fault		
	90		Speed Ref A Sel	DPI-Port 1	
		Secs	Accel Time 1	30	sec
		Secs	Decel Time 1	30	sec
			Stop Select 1	Coast	
	81	Hz	Minimum Freq	5	Hz
	82	Hz	Maximum Freq	60	Hz
		Hz	Base Frequency	60	Hz
		Vlts	Base Voltage	460	V
		Vlts	Maximum Voltage	460	V
			Anlg Out 0 Sel	FREQUENCY	
	92	Hz	Speed Ref. Min	5	Hz
	155		Stop Mode Used	Coast	
	148	Amps	Current Limit	23	A
	190		Direction	Reverse	
		Vlts	Rated Volts	480	V
		HP	Rated CT HP	20	Hp
	46		Power Units	HP	
	45	Hp	Motor NP Power	20	Hp
	44	RPM	Motor NP RPM	3540	RPM
	43	Hz	Motor NP Hertz	60	Hz
	41	Vlts	Motor NP Volts	460	V
	42	Amps	Motor NP Amps	23	A
	163		Restart	None	

MotorOverload Settings

FFGC WOW Energies

D:\X-Manuals\SetupSheets&OperationLogs\[A84-100-WESP-InstrumentSetup-WOW.xls]Overload&Timer-Settings

Panel #	Overload #	Motor #	Amp Setting
E1	2MS-OL	Srubber A Pump	17.0
	3MS-OL	Srubber B Pump	17.0
	4MS-OL	ORP Dosing Pump	1.6
	5MS-OL	pH Dosing Pump	1.6
	see VFD	Exhaust Fan	See VFD settings

Panel #	Timer #	Description	Setting
E1	1-TDR	Atomizing Water pressure fault delay	10 sec
	2-TDR	Low Pressure Recycle Pump A delay	10 sec
	3-TDR	Low Pressure Recycle Pump B delay	10 sec
	4-TDR	Power Start Fill Scrubber timer	0.5 min
	5-TDR	High Voltage on Delay WESP 1	0.3 hrs
	6-TDR	High Voltage Start Signal Pulse WESP 1	10 sec
	7-TDR	High Voltage on Delay WESP 2	0.3 hrs
	8-TDR	High Voltage Start Signal Pulse WESP 2	10 sec

WOW FFGC - Test WESP Control Logic

1. **Makeup water**.
   1.1. Open when level less then low level
   1.2. Close when level above high level
   1.3. Open for start-up or after power interruption and level less then high level.
   1.4. High-High level alarm shuts off WESP High Voltage
   1.5. Stop ID FAN if atomizing water pressure less then 40 PSI

2. **Recycle pumps**.
   2.1. Start when level above or equal to low level.
   On High-high alarm, pumps keep running.
   2.2. Stop when level less then low low.
   2.3. Stop when recycle pipe pressure lower then 20 PSI,
   (can be restarted after pushing reset PB)
   2.4. Stop ID FAN when pump off.

3. **pH line**.
   3.1. **FIRST SCRUBBER**:
      3.1.1. Recycle pump scrubber 1 must be on.
      3.1.2. Open when pH less then 4.5 pH (Adjustable)
      3.1.3. Close when pH above 6.5 pH (Adjustable)
      3.1.4. Chemical pump ON when at least one pH line is open
      3.1.5. Chemical pump OFF when both pH lines are closed.

   3.2. **SECOND SCRUBBER**:
      3.2.1. Recycle pump scrubber 2 must be on.
      3.2.2. Open when pH less then 6.5 pH (Adjustable)
      3.2.3. Close when pH above 10.0 pH (Adjustable)
      3.2.4. Chemical pump ON when at least one pH line is open
      3.2.5. Chemical pump OFF when both pH lines are closed.

4. **ORP line**
   4.1. Recycle pump scrubber 1 must be on.
   4.2. Open when ORP less then 1,200 mV (Adjustable)
   4.3. Close when ORP above 1,700 mV (Adjustable)
   4.4. Chemical pump on when ORP line is open.
   4.5. Chemical pump off when ORP line is closed

5. **High Voltage WESP**
   5.1. Purge blower and heater starts as soon as power is ON or system is in auto mode.
   5.2. WESP starts after 15 min.
   5.3. Stop WESP HV if Water above high high level
        (can be restarted after pushing reset PB)
   5.4. Stop ID FAN if WESPA temperature above 180 degree F.
        (can be restarted after pushing reset PB)
   5.5. Stop ID FAN if WESPA or WESPB High Voltage OFF.

6. **ID FAN**
   6.1. Fan ON if:
      6.1.1. The WESPA outlet temperature less then 180 degree F,
      6.1.2. The WESPA and WESPB High Voltage ON
      6.1.3. Recycle pumpA and Recycle pumpB is ON
      6.1.4. Atomizing water pressure above 40 PSI
   6.2. If one of above conditions is NOT true stop ID FAN
        (can be restarted after pushing reset PB)

Electrical Equipment List

Customer:	WOW-Engineering	Flow Schematic: A84-100-000-V-01
Title:	WESP-System	Block Schematic: / Function Description "A82-100-000-W-01Function.doc"
Job No.	A84-100	Software: Hard Wired
No. of units	Downflow WESP 1 - Scrubber A - B - WESP 2	PLC: None
Proj. Engineer:	Shannon Hays 2114 (Eberhard Veit 2140)	Video Screen: None
Date:	9/13/2005	Chart Recorder: None
Last Update:	9/7/2005 By: Eberhard Veit	

DONE
PARTIAL
OPEN

Note: When designing electrical control cabinet consider also Block Schematic start-up conditions, interface contacts, manual functions and fault conditions !!!!

Tag	#	Qty	Equipment	Type/Model	V/ph/Hz	Hp	Function	Remarks	Vendor Info
									-
T/R	1	1	Transformer Rectifier for WESP	NWL Power+ 28 kW - 70 kVDC - 400 mADC	480/3/60	39 AAC	Provides DC voltage for Wet-ESP		DONE
		1	Graphical Display Module GVC	GVC			Data Display & Programming unit		DONE
		1	Remote Power Supply for GVC	Power Supply for GVC	120/1/60	50 VA	Power supply for GVC		DONE
T/R	2	1	Transformer Rectifier for WESP	NWL Power+ 28 kW - 70 kVDC - 400 mADC	480/3/60	39 AAC	Provides DC voltage for Wet-ESP		DONE
		1	Graphical Display Module GVC	GVC			Data Display & Programming unit		DONE
		1	Remote Power Supply for GVC	Power Supply for GVC	120/1/60	50 VA	Power supply for GVC		DONE
									-
M	1	1	WESP-Exhaust Fan	Twin City 911 RBA	480/3/60	20 HP	Provides Exhaust Flow for WESP		DONE
			VFD for Exhaust Fan	A/B Power Flex 70 - PART # 20AD027A2AYYANNN	480/3/60	VFD	Manual Speed adjustment for Exhaust fan		DONE
M	2A	1	Scrubber A liquid recycle pump	SETHCO MODEL 2X3-6	480/3/60	15 HP	Scrubber liquid recirculation pump		DONE
M	2B	1	Scrubber B liquid recycle pump	SETHCO MODEL 2X3-6	480/3/60	15 HP	Scrubber liquid recirculation pump		DONE
M	4A	1	Purge Blower WESP 1	Dayton 4C006 Blower (Grainger 4C006)	120/1/60	1.6 AAC	Provides purge air for High-Voltage insulators		DONE
HTR	6A	2	Purge Air heater WESP 1	Vulcan Strip Heater 0SF1510-725B (Grainger 4E285)	480(2x240)/1/60	2x 725 W	Provides heat to purge air		DONE
M	4B	1	Purge Blower WESP 2	Dayton 4C006 Blower (Grainger 4C006)	120/1/60	1.6 AAC	Provides purge air for High-Voltage insulators		DONE
HTR	6B	2	Purge Air heater WESP 2	Vulcan Strip Heater 0SF1510-725B (Grainger 4E285)	480(2x240)/1/60	2x 725 W	Provides heat to purge air		DONE
M	3A	1	Dosing Pump for Caustic	Milton Roy SG-63-88P + WEG MOTOR P/N 00118ES3ED56CFL	480/3/60	1 HP	Caustic dosing turns on with pH demand		DONE
M	3B	1	Dosing Pump for oxidizing solution	Milton Roy SG-63-88P + WEG MOTOR P/N 00118ES3ED56CFL	480/3/60	1 HP	Oxidizer dosing turns on with ORP demand		DONE
									-
PS	1	1	Atomizing water pressure switch	ARCO # J120-191 (10-100 PSI)	120/1/60	contact	Normally open closes if pressure is present		DONE
PS	2A	1	Recycle pump 2A pressure switch	ARCO # J120-191 (10-100 PSI)	120/1/60	contact	Normally open closes if pressure is present		DONE
PS	2B	1	Recycle pump 2B pressure switch	ARCO # J120-191 (10-100 PSI)	120/1/60	contact	Normally open closes if pressure is present		DONE
									-
PHI-C	1A	1	pH controller	GF-Signet 3-8750-2P	12-24 VDC	relays	2 Relays, 1x control, 1x Low Alarm		DONE
		1	pH electrode & amplifier	Electrode 2714 pH - Amplifier 2710	from controller		Measures pH		DONE
ORP-C	1	1	ORP controller	GF-Signet 3-8750-2P	12-24 VDC	relays	2 Relays, 1x control, 1x Low Alarm		DONE
		1	ORP electrode & amplifier	Electrode 2715 ORP - Amplifier 2720	from controller				DONE
PHI-C	1B	1	pH controller	GF-Signet 3-8750-2P	12-24 VDC	relays	2 Relays, 1x control, 1x Low Alarm		DONE
		1	pH electrode & amplifier	Electrode 2714 pH - Amplifier 2710	from controller		Measures pH		DONE
									-
MV	1A	1	Motorized Valve for caustic Scrubber A	#5061H-410 CO. RYAN HERCO, Hayward Model EADAD	120/1/60	.5 A locke	Open if pH Scrubber A is low		DONE
MV	1B	1	Motorized Valve for caustic Scrubber B	#5061H-410 CO. RYAN HERCO, Hayward Model EADAD	120/1/60	.5 A locke	Open if pH Scrubber B is low		DONE
MV	2	1	Motorized Valve for oxidizing solution Scrubber A	#5061H-410 CO. RYAN HERCO, Hayward Model EADAD	120/1/60	.5 A locke	Open if Redox Potential Scrubber A is low		DONE
SV	3A	1	Solenoid Valve make up water Scrubber A	#7944K24 CO. MCM 115vac, PN 21WN5KV190P	120/1/60	0.07 A	Open if Water level Scrubber A low		DONE
SV	3B	1	Solenoid Valve make up water Scrubber B	#7944K24 CO. MCM 115vac, PN 21WN5KV190P	120/1/60	0.07 A	Open if Water level Scrubber A low		DONE
									-
LICS	1A	1	Level control Scrubber	5 Rod assy + Ametek level control relay #5200-LF1-OC	120/1/60	contacts	Switching of make-up water valve & H/L alarms		DONE
LICS	1B	1	Level control Scrubber	5 Rod assy + Ametek level control relay #5200-LF1-OC	120/1/60	contacts	Switching of make-up water valve & H/L alarms		DONE
									-
TIS	1	1	Thermocouple for Temperature Indicator	Watlow Type-K Thermocouple with 4-20 mA transmitter	T/C-K	4-20 mA	High temperature limit control Sensor		DONE
		1	Temperature Indicator and switch	Dwyer/Love Temp Indicator 120 V - 4-20 mA input signal	120/1/60	contact	High temperature limit control, opens if Temp high		DONE
Light & Sw	1	1	Light Bulb Observation tube	Light Bulb	120/1/60	100 W	Light for Observation port with Manual Switch.		-
									-
									-

Test List
FG Blank Test
FG Water Only Test
FG Chemical-Voltage Test
FG Adjusted settings Test
FG Optimized Settings Test
FG Optimized with UV
FG Continuous Run with UV
FG 3rd Party Test
FG Final Test
HOH Test

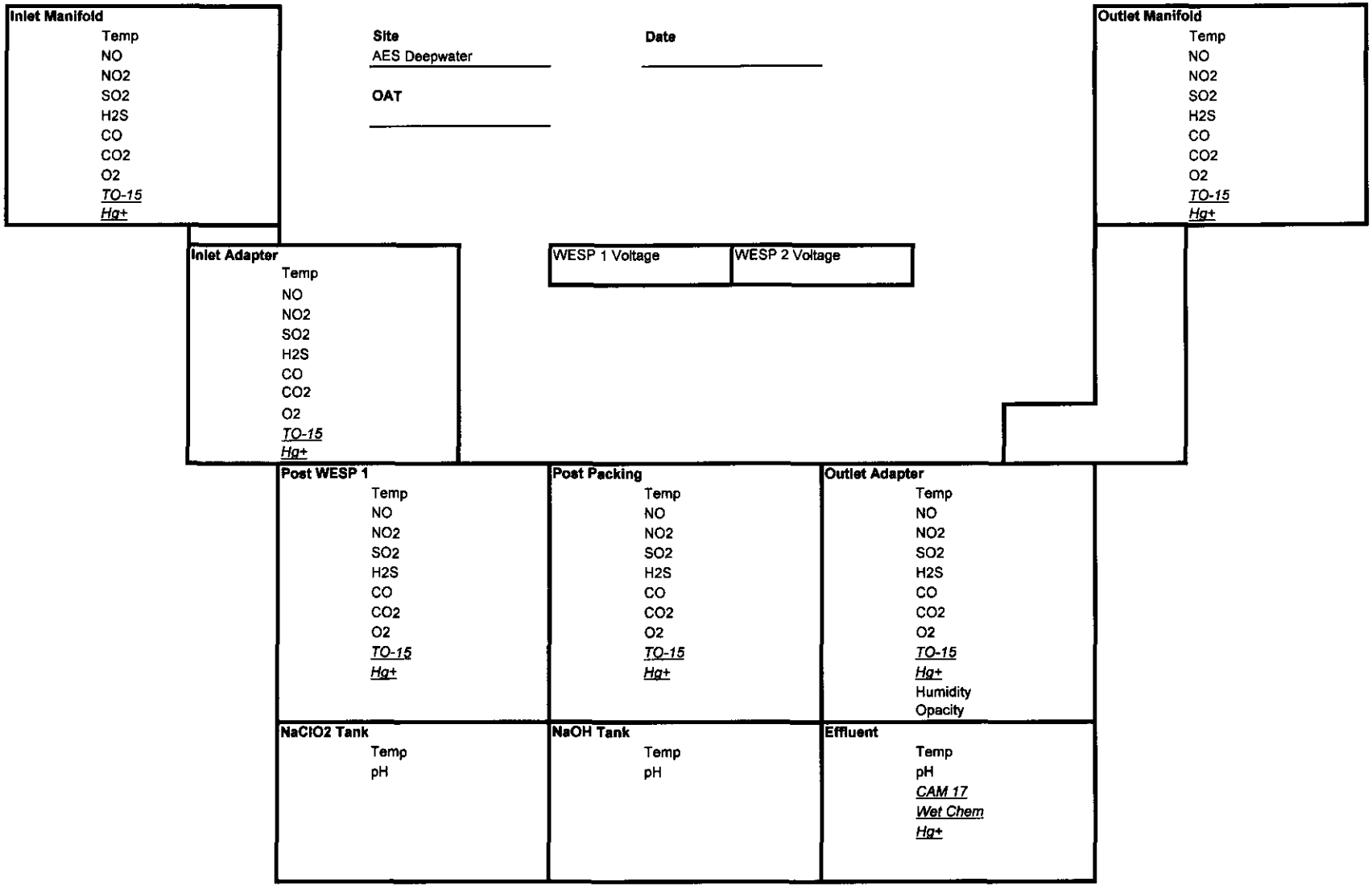
FG Chemical-Voltage Test Key

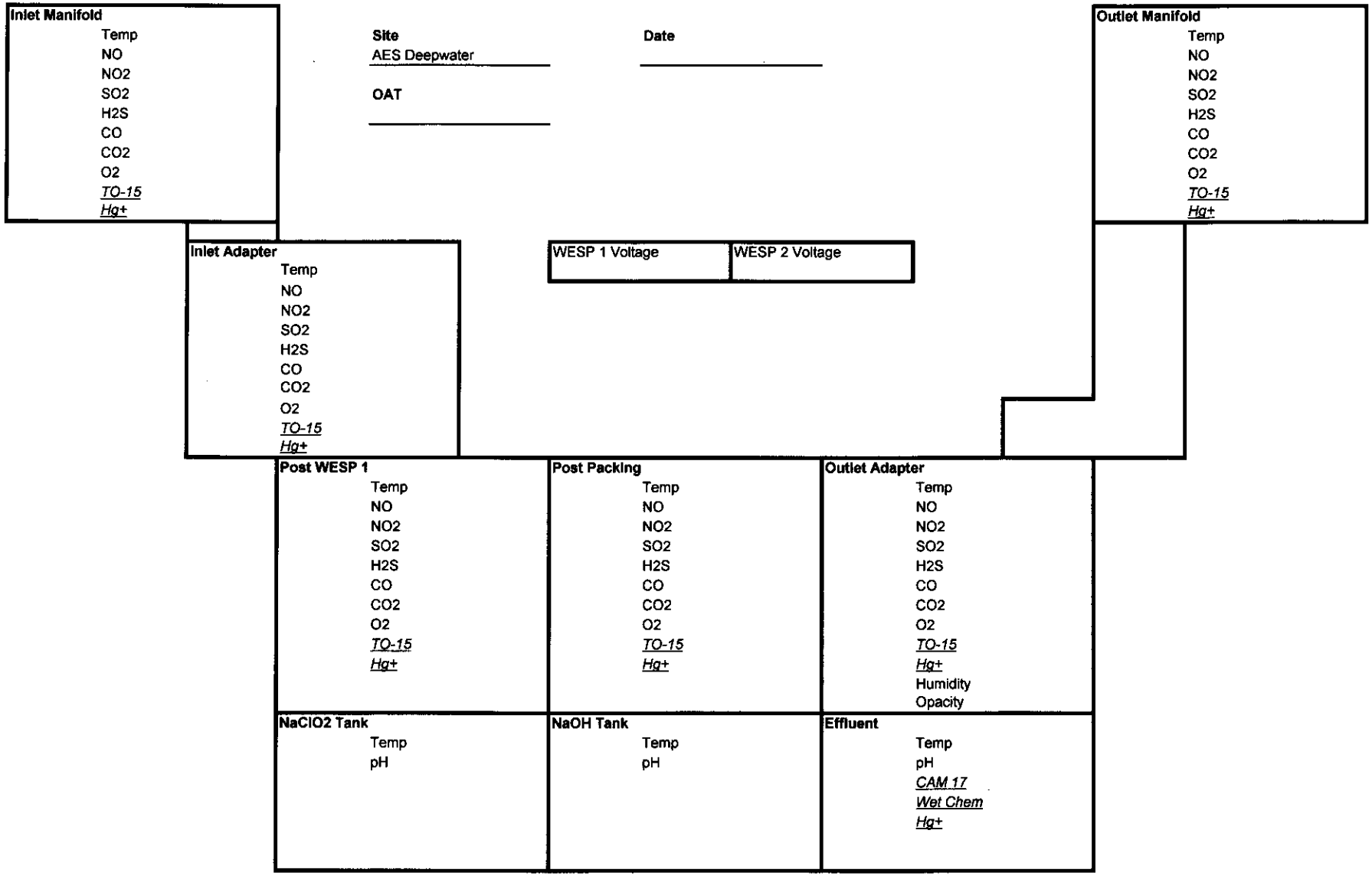
FG Chemical Scrubbing Key

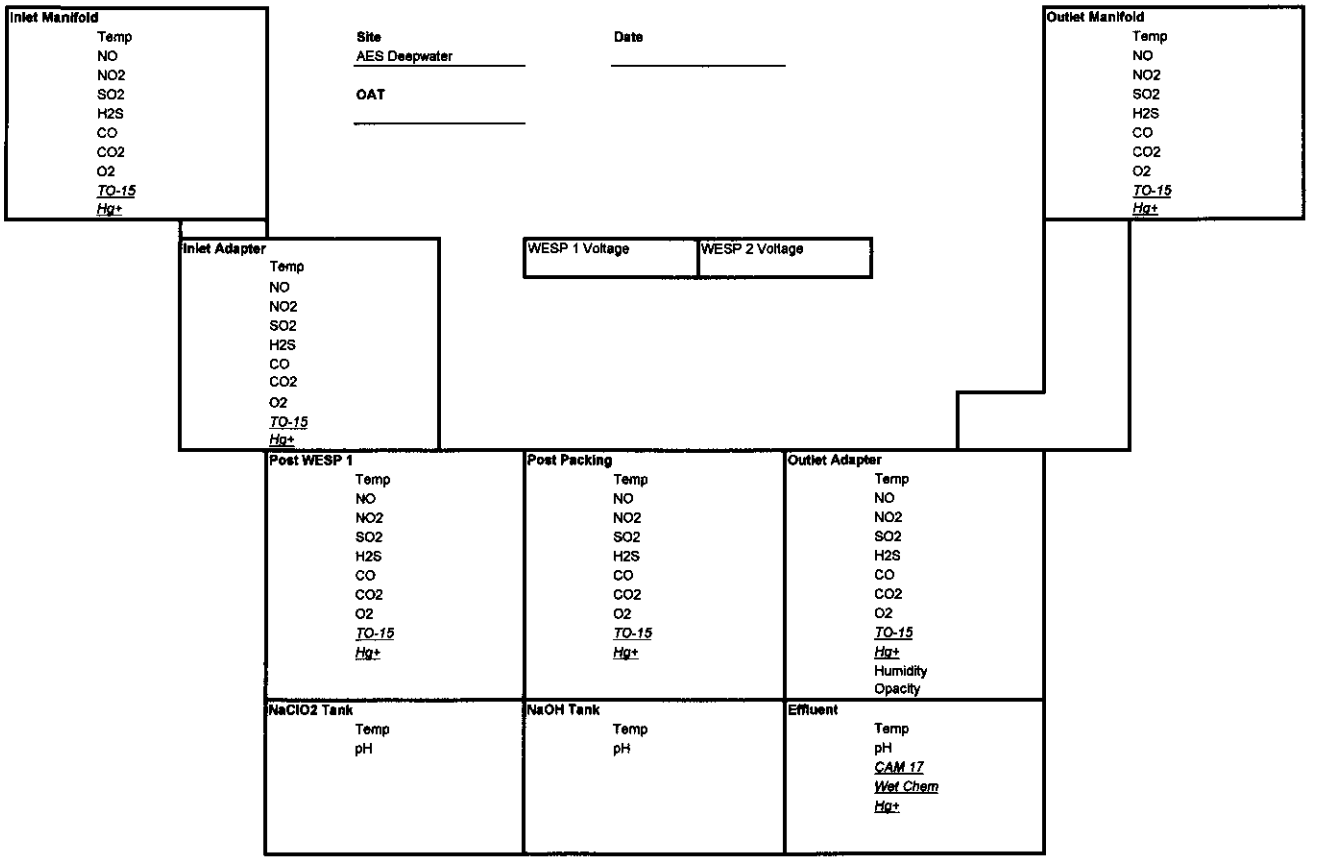
	NaClO2	NaOH
Test 1	10%	10%
Test 2	20%	10%
Test 3	30%	10%
Test 4	40%	10%
Test 5	50%	10%
Test 6	10%	20%
Test 7	20%	20%
Test 8	30%	20%
Test 9	40%	20%
Test 10	50%	20%
Test 11	10%	30%
Test 12	20%	30%
Test 13	30%	30%
Test 14	40%	30%
Test 15	50%	30%
Test 16	10%	40%
Test 17	20%	40%
Test 18	30%	40%
Test 19	40%	40%
Test 20	50%	40%
Test 21	10%	50%
Test 22	20%	50%
Test 23	30%	50%
Test 24	40%	50%
Test 25	50%	50%

FG Voltage Key

	WESP 1	WESP 2
Test A	30 KVDC	30 KVDC
Test B	40 KVDC	30 KVDC
Test C	50 KVDC	30 KVDC
Test D	60 KVDC	30 KVDC
Test E	30 KVDC	40 KVDC
Test F	40 KVDC	40 KVDC
Test G	50 KVDC	40 KVDC
Test H	60 KVDC	40 KVDC
Test I	30 KVDC	50 KVDC
Test J	40 KVDC	50 KVDC
Test K	50 KVDC	50 KVDC
Test L	60 KVDC	50 KVDC
Test M	30 KVDC	60 KVDC
Test N	40 KVDC	60 KVDC
Test O	50 KVDC	60 KVDC
Test P	60 KVDC	60 KVDC


Inlet Manifold
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Site
AES Deepwater
Date
OAT
Outlet Manifold
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Inlet Adapter
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
WESP 1 Voltage
WESP 2 Voltage
Post WESP 1
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Post Packing
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Outlet Adapter
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Humidity
Opacity
NaClO2 Tank
Temp
pH
NaOH Tank
Temp
pH
Effluent
Temp
pH
CAM 17
Wet Chem
Hg+


Inlet Manifold
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Site
AES Deepwater
Date
OAT
Outlet Manifold
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Inlet Adapter
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
WESP 1 Voltage
WESP 2 Voltage
Post WESP 1
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Post Packing
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Outlet Adapter
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Humidity
Opacity
NaClO2 Tank
Temp
pH
NaOH Tank
Temp
pH
Effluent
Temp
pH
CAM 17
Wet Chem
Hg+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TO-15
Hg+
Site
AES Deepwater
Date
OAT
Outlet Manifold
Temp
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NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Inlet Adapter
Temp
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NO2
SO2
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CO2
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TO-15
Hg+
WESP 1 Voltage
WESP 2 Voltage
Post WESP 1
Temp
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TO-15
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Post Packing
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Outlet Adapter
Temp
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Humidity
Opacity
NaClO2 Tank
Temp
pH
NaOH Tank
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Effluent
Temp
pH
CAM 17
Wet Chem
Hg+

FG Chemical-Voltage Test Data

TEST	Inlet Adapter								Post WESP 1								Post Packing								Outlet Adapter								
	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Humidity
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FG Chemical-Voltage Test Data

TEST	Inlet Adapter								Post WESP 1								Post Packing								Outlet Adapter								
	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Humidity
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FG Chemical-Voltage Test Data

TEST	Inlet Adapter								Post WESP 1								Post Packing								Outlet Adapter								
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FG Chemical-Voltage Test Data

TEST	Inlet Adapter								Post WESP 1								Post Packing								Outlet Adapter								
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FG Chemical-Voltage Test Data

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FG Chemical-Voltage Test Data

TEST	Inlet Adapter								Post WESP 1								Post Packing								Outlet Adapter								
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FG Chemical-Voltage Test Data

TEST	Inlet Adapter								Post WESP 1								Post Packing								Outlet Adapter								
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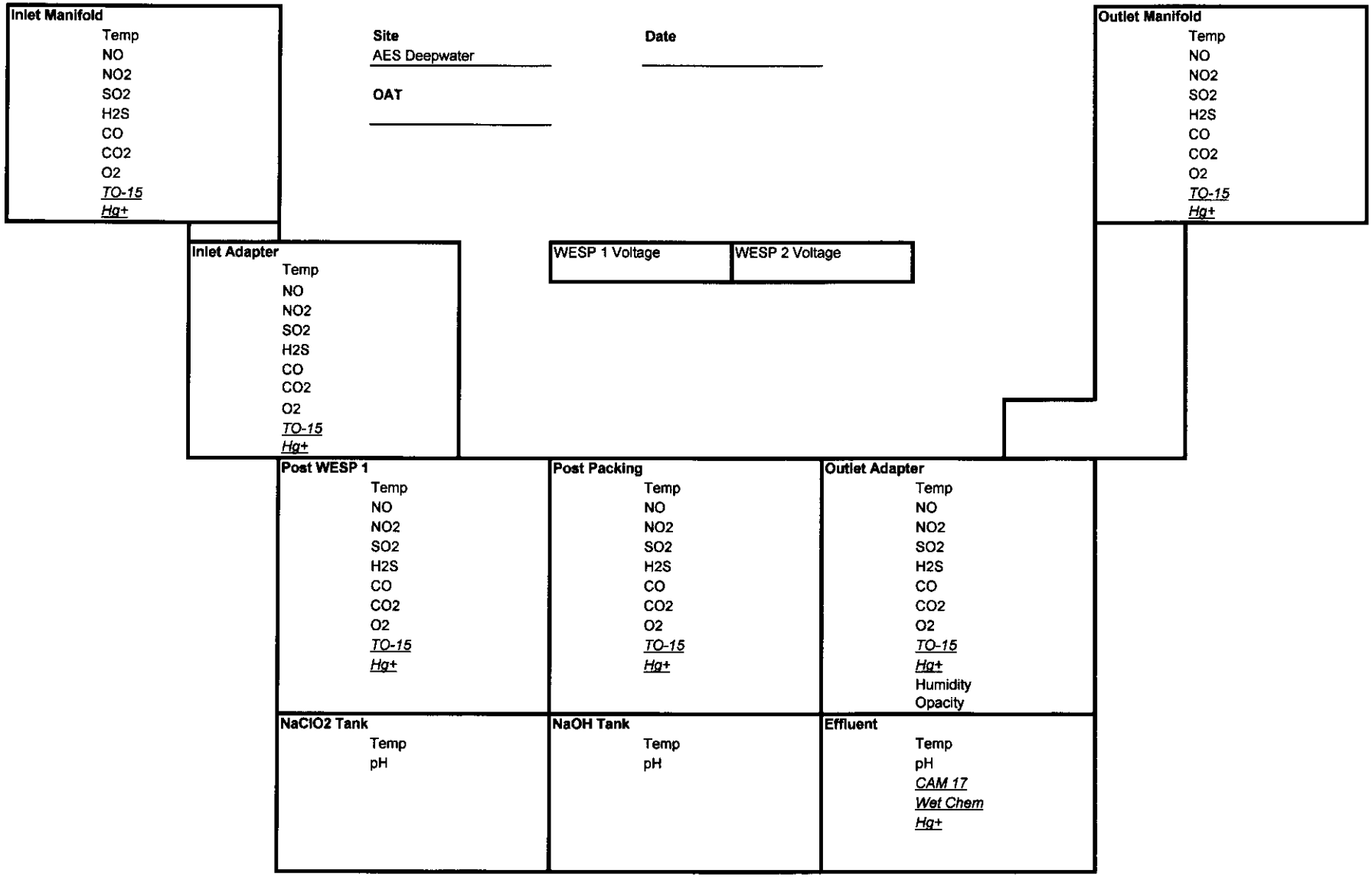
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AES Deepwater
Date
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Inlet Adapter
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WESP 1 Voltage
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CAM 17
Wet Chem
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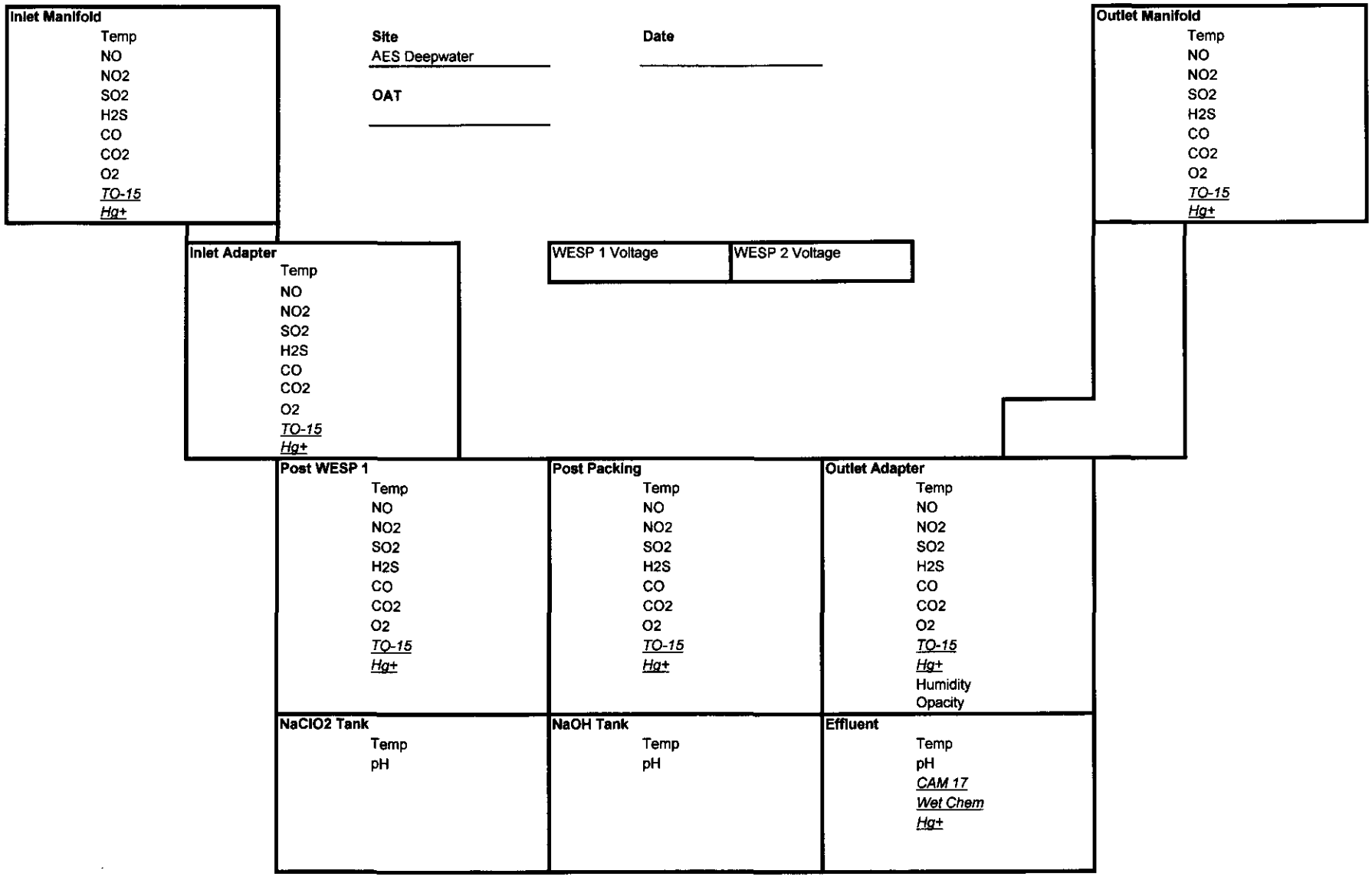
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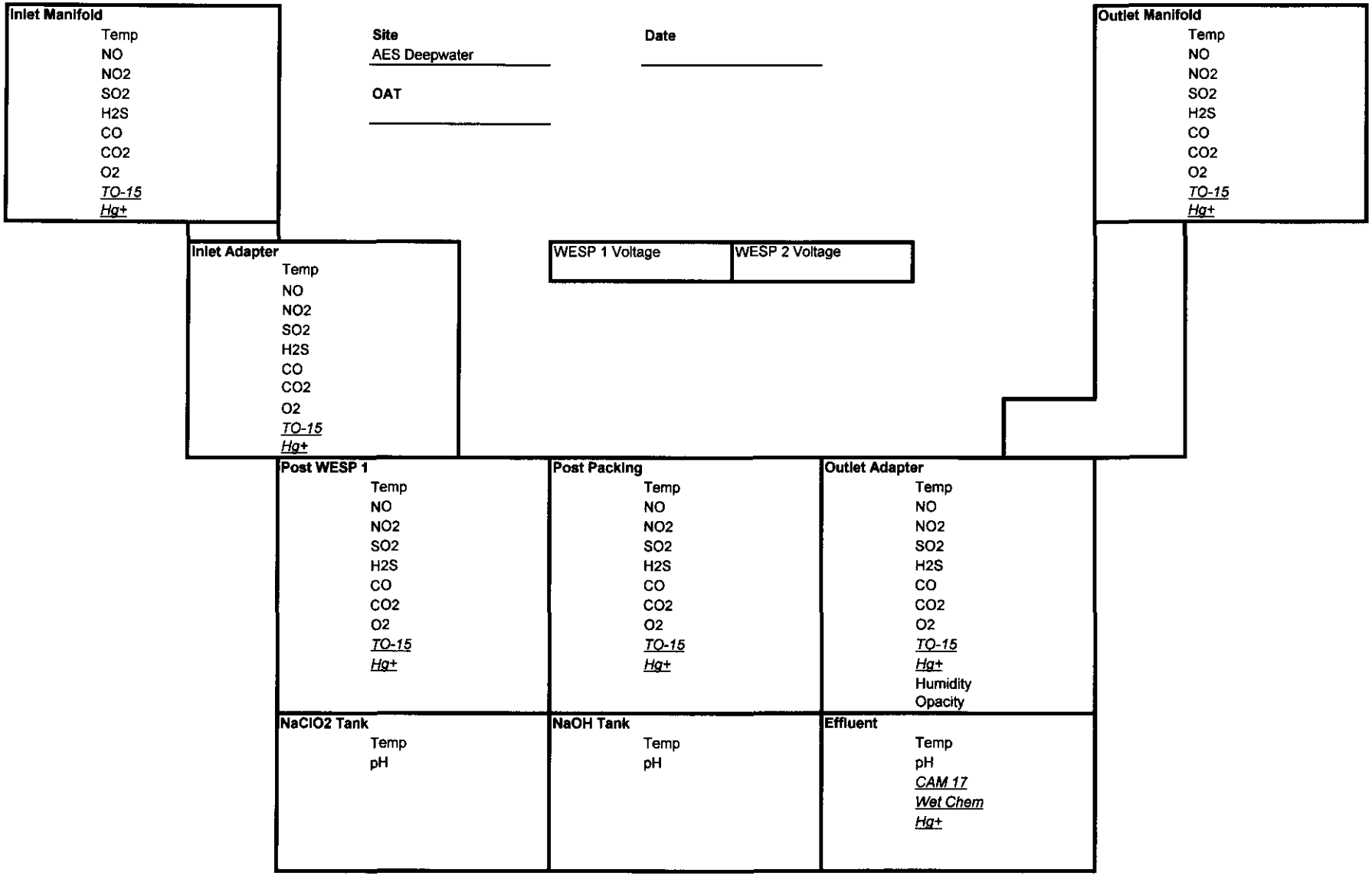
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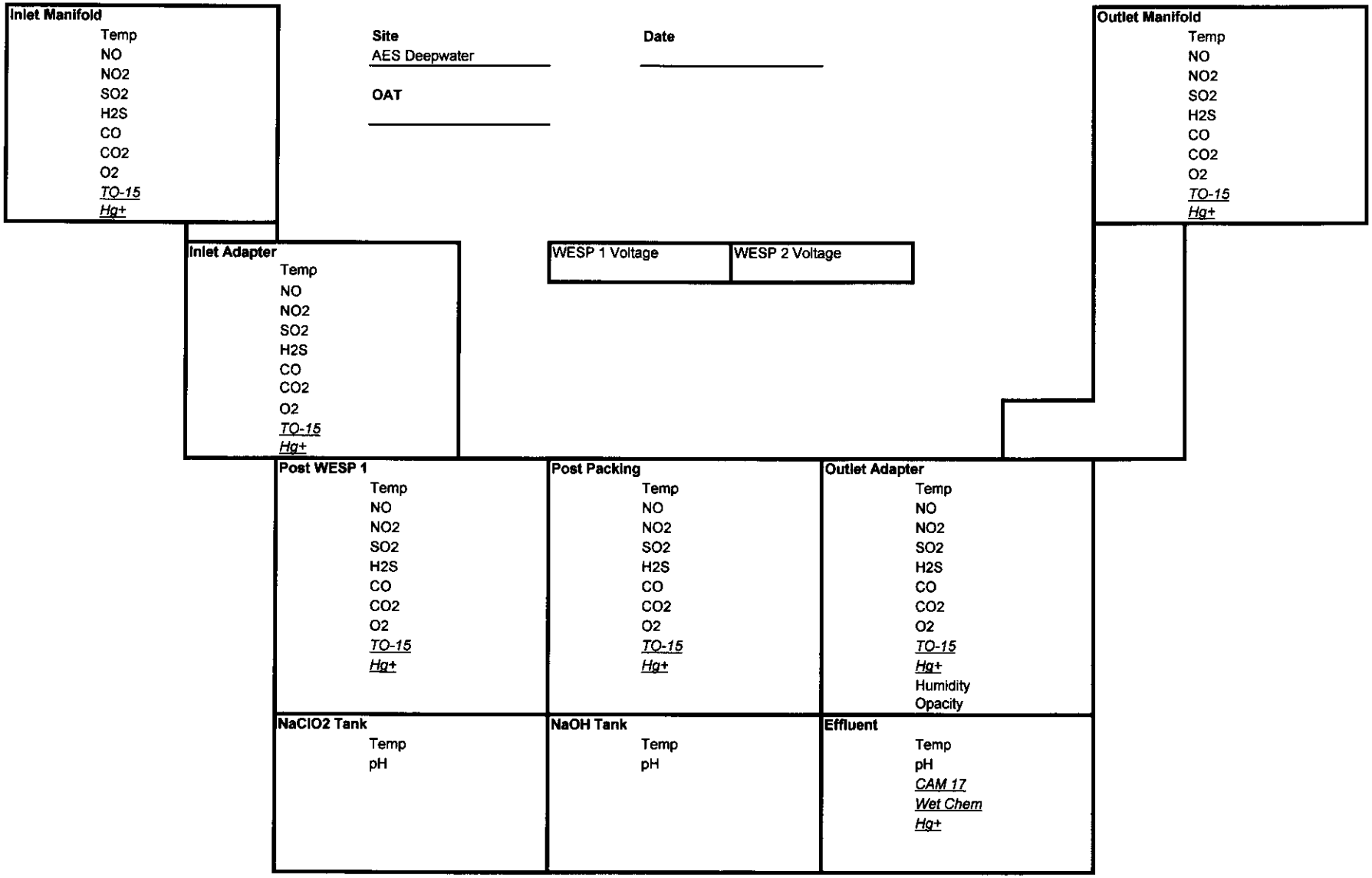
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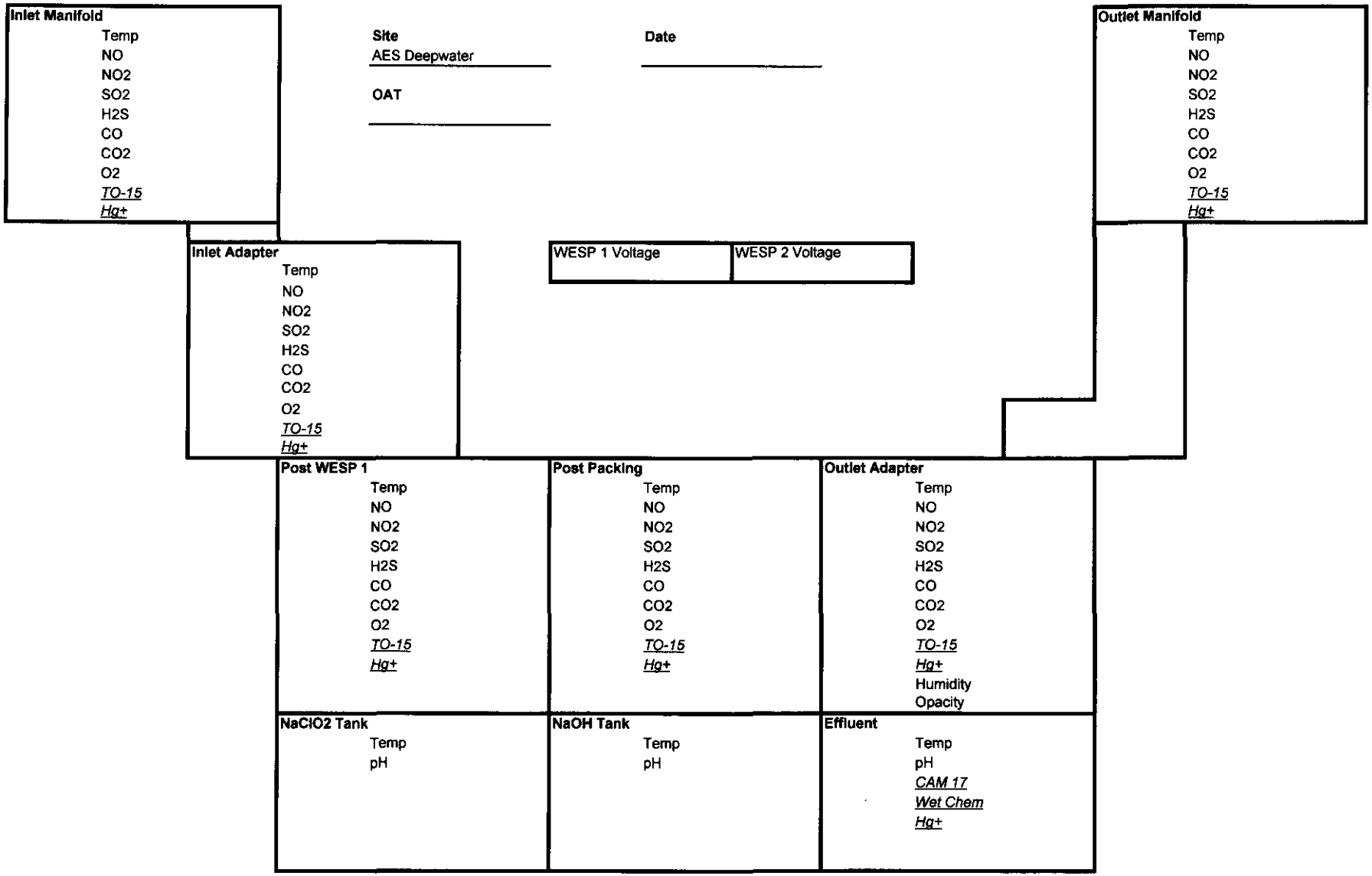
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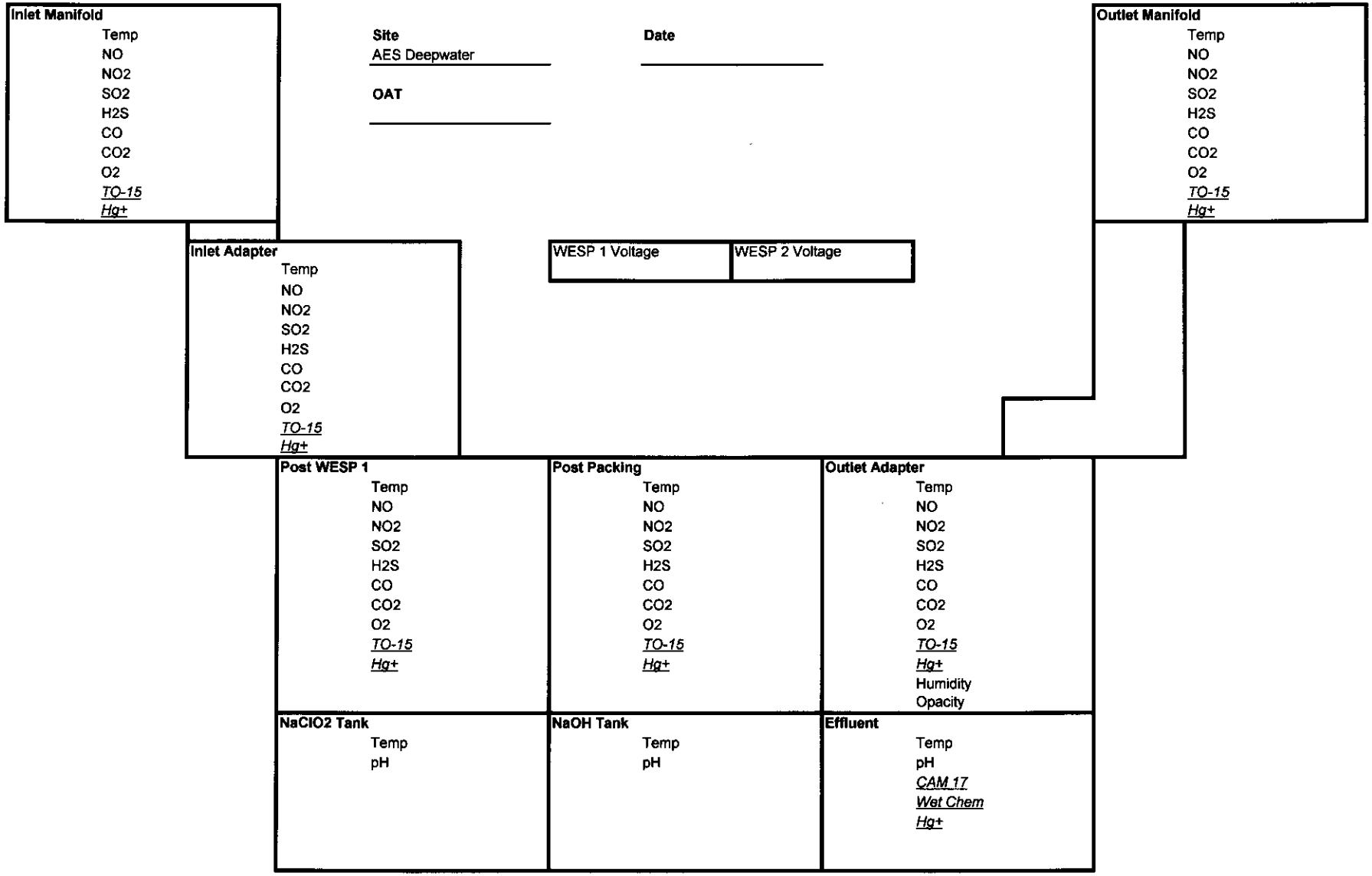
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Inlet Adapter
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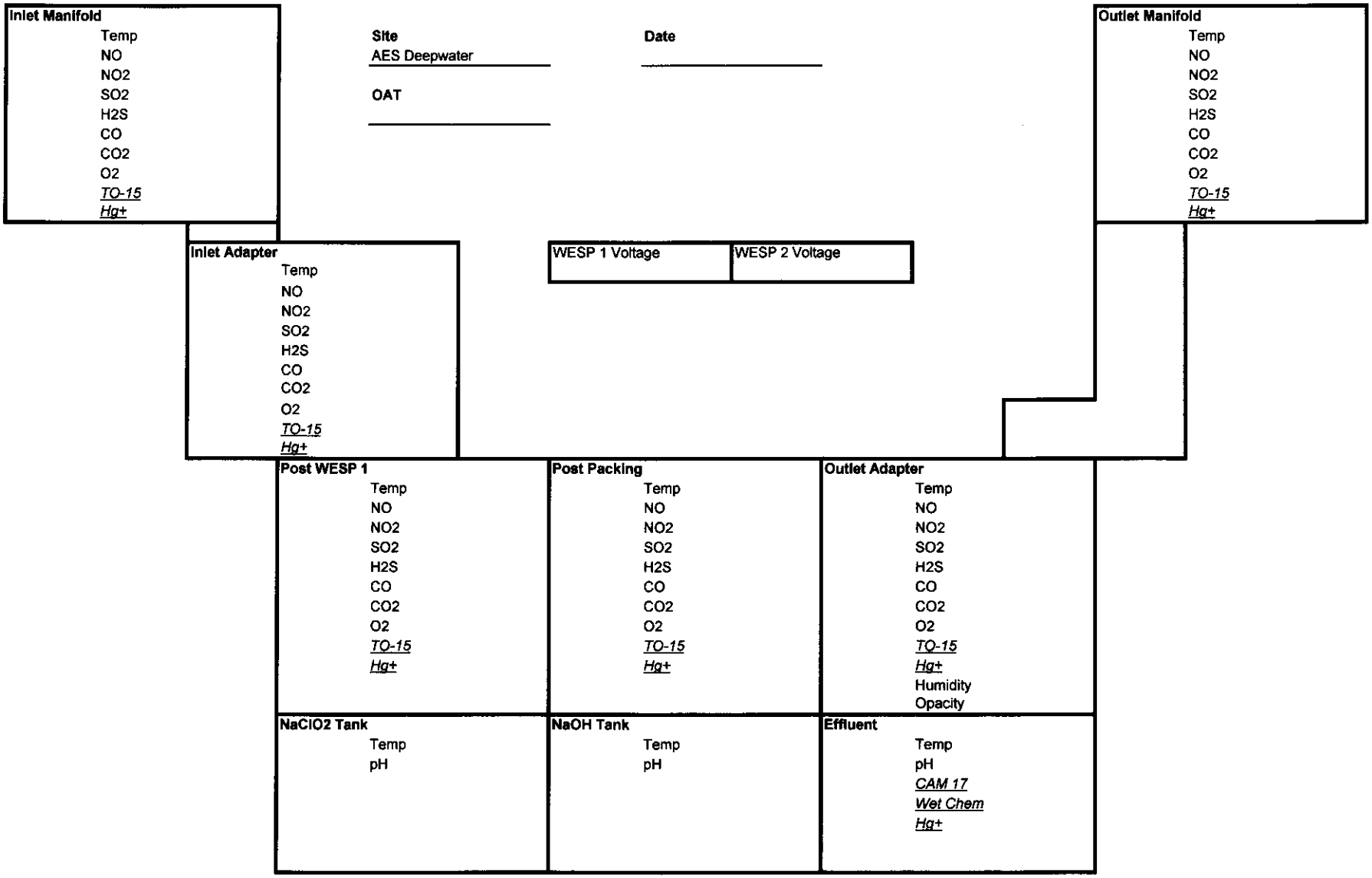
CAM 17
Wet Chem
Hg+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Temp
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CO2
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Hg+
Site
AES Deepwater
Date
OAT
Outlet Manifold
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Inlet Adapter
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
WESP 1 Voltage
WESP 2 Voltage
Post WESP 1
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Post Packing
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Outlet Adapter
Temp
NO
NO2
SO2
H2S
CO
CO2
O2
TO-15
Hg+
Humidity
Opacity
NaClO2 Tank
Temp
pH
NaOH Tank
Temp
pH
Effluent
Temp
pH
CAM 17
Wet Chem
Hg+

Hydrogen Peroxide Test

TEST	Inlet Adapter								Post WESP 1							Post Packing							Outlet Adapter									
	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Temp	NO	NO2	SO2	H2S	CO	CO2	O2	Humidity	Opacity
HOH 10%																																		
HOH 20%																																		
HOH 30%																																		
HOH 40%																																		
HOH 50%																																		