DOCKETED

Docket Number:	12-AFC-02C
Project Title:	Huntington Beach Energy Project - Compliance
TN #:	211433
Document Title:	South Coast Air Quality Management District Correspondance 05-06-16 Part 7
Description:	N/A
Filer:	Cindy Salazar
Organization:	CH2M HILL
Submitter Role:	Applicant Consultant
Submission Date:	5/10/2016 11:02:27 AM
Docketed Date:	5/10/2016

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

Emissions and Requirements:

14. THIS EQUIPMENT IS SUBJECT TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING RULES AND REGULATIONS:
NH3 (AMMONIA SLIP): 5 PPMV AT 15% O2, 60 MINUTE AVERAGE, AFTER SCR START UP.
[RULE 1303(b) (1)], [RULE 1402]

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

PERMIT TO CONSTRUCT

A/N 565930
Granted as of 11/12/2014

Equipment Description:

MODIFICATIONS TO AIR POLLUTION CONTROL SYSTEM (G27920) CONSISTING OF;

1. FOUL AIR EXHAUST DUCTS FROM THREE (3) TRICKLING FILTERS, TRICKLING FILTER FACILITY'S (JOB NO. P2-90), IN PARALLEL.

2. THREE (3) EXHAUST BLOWERS, IN PARALLEL, EACH 11,000 SCFM, 25 H.P.

3. THREE (3) CAUSTIC IMPREGNATED ACTIVATED CARBON UNITS, IN PARALLEL, EACH CONTAINING MINIMUM OF 10,600 LBS OF ACTIVATED CARBON BY NORIT AMERICAS OR WESTATES OR EQUIVALENT, EACH VENTING A SINGLE TRICKLING FILTER.

4. THREE (3) EXHAUST STACKS, EACH 2.0'- 3" DIA. X 28' HIGH.

BY THE ADDITION OF:

5. THREE (3) CHEMICAL SCRUBBERS (JOB NO. FE13-04), EACH SINGLE STAGE, SIEMENS OR EQUIVALENT, APPROXIMATELY 20' H. X 6' D., JAEGER 7'-10' H. PACKING MATERIAL OR EQUAL, SCRUBBING SOLUTION RECIRCULATION LINE, ASSOCIATED PUMPS, METERS AND AUTOMATIC CONTROLS, MIST ELIMINATOR AND CONTINUOUS H2S MONITORING SYSTEM (OPTIONAL).

6. ASSOCIATED SODIUM HYDROXIDE AND SODIUM HYPOCHLORITE STORAGE TANKS.

7. ITEM NO. 3 ABOVE, USED AS OPTIONAL POLISHING UNIT CONTAINING GRANULAR ACTIVATED CARBON, IF NEEDED, OR EMPTY VESSEL USED AS EXHAUST FOR THE CHEMICAL SCRUBBERS.

PERMIT CONDITIONS:

1. CONSTRUCTION AND OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATIONS UNDER WHICH THIS PERMIT IS ISSUED.
[RULE 204]

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITIONS AT ALL TIMES.
[RULE 204]

3. THIS PERMIT TO CONSTRUCT IS VALID FOR ONE YEAR FROM ITS' ISSUANCE DATE. AN EXTENSION MAY BE GRANTED UPON WRITTEN REQUEST. SUCH A REQUEST SHALL INCLUDE THE REASONS THE EXTENSION IS REQUIRED, THE LENGTH OF THE EXTENSION, AND THE STATUS OF THE CONSTRUCTION ACTIVITIES COMPLETED TO DATE.
[RULE 204]

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

4. THIS EQUIPMENT SHALL BE OPERATED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.
[RULE 204]

5. A FLOW METER SHALL BE INSTALLED AND MAINTAINED AT EACH OF THE ODOR CONTROL SYSTEM EXHAUST TO INDICATE THE TOTAL FOUL AIR FROM EACH OF THE TRICKLING FILTER TREATED, IN STANDARD CUBIC FEET PER MINUTE (SCFM). IN CASE A PRESSURE SENSOR DEVICE IS USED TO DETERMINE FLOW RATE, IN PLACE OF THE FLOW METER, A CONVERSION CHART SHALL BE MAINTAINED TO INDICATE THE CORRESPONDENT FLOW RATE, IN SCFM, TO THE PRESSURE READING.
[RULE 204]

6. MAXIMUM FOUL AIR FLOW RATE FROM EACH TRICKLING FILTER TO BE TREATED SHALL NOT EXCEED 11,000 SCFM, AVERAGED OVER CALENDAR MONTH.
[RULE 204]

7. SCRUBBER SYSTEM SHALL BE EQUIPPED WITH DIFFERENTIAL PRESSURE GAUGE, PH METER AND FLOW METER TO INDICATE AND MEASURE (GPM) FOR SCRUBBING LIQUID RECIRCULATION RATE.
[RULE 204]

8. WHEN THE SCRUBBERS ARE IN OPERATION, AUTOMATIC HYDROGEN SULFIDE (H2S) MONITORING SYSTEM SHALL BE IN OPERATION AND MAINTAINED TO RECORD THE OUTLET H2S CONCENTRATION, IN PPMV. THE H2S MONITORING SYSTEM SHALL BE CALIBRATED PURSUANT TO MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.
[RULE 204]

9. WHEN THE AUTOMATIC H2S MONITORING SYSTEM IS NOT OPERATING, THE OPERATOR SHALL, ON A DAILY BASIS, MONITOR, RECORD AND MAINTAIN THE FOLLOWING PARAMETERS PER MANUFACTURER'S RECOMMENDATIONS.

- DIFFERENTIAL PRESSURE ACROSS THE SCRUBBER, INCHES OF WATER COLUMN
- SCRUBBING SOLUTION RECIRCULATION RATE, GPM
- PH OF THE SCRUBBING SOLUTION
- HYDROGEN SULFIDE (H2S) CONCENTRATION, PPMV, IN THE SCRUBBER EXHAUST.

[RULE 204]

10. THE PH OF THE SCRUBBING SOLUTION SHALL BE MAINTAINED BETWEEN 8 AND 12 ON A DAILY AVERAGE.
[RULE 204]

11. CONCENTRATION MEASURED AT EXHAUST SHALL NOT EXCEED THE FOLLOWING:

CONSTITUENT	CONCENTRATION
H2S	1.0 PPMV, DAILY AVERAGE

[RULE 402, 1401]

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

12. IN CASE, WHEN AN OPTIONAL POLISHING UNIT (GRANULAR ACTIVATED CARBON) IS PUT IN SERVICE, THE UNIT SHALL BE OPERATED AS PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS AND, IN COMPLIANCE WITH ABOVE CONDITION NO. 11.
[RULE 204]

13. RECORDS SHALL BE MAINTAINED AS REQUIRED BY THIS PERMIT FOR COMPLIANCE. THE RECORDS SHALL BE KEPT FOR AT LEAST FIVE YEARS AND MADE AVAILABLE TO SCAQMD PERSONNEL UPON REQUEST.
[RULE 204]

EPA → 45-day ends Nov. 7, 2014

Catherine Rodriguez

From: Catherine Rodriguez
Sent: Tuesday, September 23, 2014 10:42 AM
To: 'R9AirPermits_SC@epa.gov'
Cc: Gaurang Rawal; Charles Tupac; Andrew Lee; Charlene Delgado; Helen Quintana
Subject: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Proposed Minor
Attachments: ID 29110 OCSD Huntington Beach - EPA Cover Letter AN 565930 565929.pdf; ID 29110 OCSD Huntington Beach - Proposed TV Permit Revision ANs 565930 565929.pdf; ID 29110 OCSD Huntington Beach - Engr Eval AN 565929.pdf; ID 29110 OCSD Huntington Beach - Engr Eval AN 565930.pdf

Facility Name: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach
Facility ID: 029110
Address: 22212 Brookhurst Street, Huntington Beach, CA
Type of Mod: Proposed Minor
Description: Section H: Permit to Construct and Temporary Permit to Operate:

pplication No.	Equipment	Description
565930	Air Pollution Control (APC) System	Modifications to permit to operate, G27920, by the addition of three new single stage chemical scrubbers to improve odor control treatment at the Trickling Filters facility (OCSD Job No. FE13-04).

Title V Application #: 565929
Attachments:

1. EPA Cover Letter
2. Proposed Permit
3. Engineering Evaluations

Please contact me if there are any problems with the transmission of the attached files.

Catherine Rodriguez
Secretary to
Andrew Lee, P.E.
Sr. AQ Engineering Manager
South Coast AQMD
Energy/Public Services/Waste Mgmt/Terminals-Permitting
Engineering and Compliance Division
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-2735; crodriguez@aqmd.gov

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

September 23, 2014
Via electronic submittal

Mr. Gerardo Rios
USEPA – Region IX
Mail Stop A-5-2
75 Hawthorne Blvd.
San Francisco, CA 94105

Re: Proposed Minor Revision to Title V Permit for Orange County Sanitation District (OCSD), Sewage Treatment Plant, Huntington Beach (ID# 029110)

Dear Mr. Rios,

Enclosed for your 45-day review is the proposed minor revision to the Title V Permit (A/N 565929) for OCSD, sewage treatment plant, located at 22212 Brookhurst Street, Huntington Beach, CA in Orange County. This revision is not subject to public notice. We are enclosing the appropriate pages of the proposed Section H which includes the permit as shown below, and the engineering evaluations.

SECTION H: Permit to Construct and Temporary Permit to Operate

Application Number	Equipment	Description
565930	Air Pollution Control (APC) System	Modifications to permit to operate, G27920, by the addition of three new single stage chemical scrubbers to improve odor control treatment at the Trickling Filters facility (OCSD Job No. FE13-04).

This request is being made via electronic submittal in order to facilitate your review. If you have any questions or need additional information, please contact Mr. Gaurang Rawal at (909) 396-2543 or by email at grawal@aqmd.gov.

Sincerely,

Andrew Y. Lee, P.E.
Senior AQ Engineering Manager
Energy/Public Services/
Waste Mgmt/Terminals-Permitting

AYL: CDT: GCR
Enclosures
cc: James D. Ruth, General Manager, OCSD, without enclosures
A/N 565929 - TV permit revision

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

SECTION H: PERMIT TO CONSTRUCT AND TEMPORARY PERMIT TO OPERATE

This section consists of a table listing all equipment with Permits to Construct and copies of all individual Permits to Construct issued to various equipment at the facility. Each permit will list operating conditions including periodic monitoring requirements and applicable emission limits and requirements that the equipment is subject to. Also included is the rule origin and authority of each emission limit and permit condition.

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

PERMITTED EQUIPMENT LIST

THE FOLLOWING IS A LIST OF ALL PERMITS TO CONSTRUCT AND PERMITS TO OPERATE AT THIS FACILITY:

Application Number	Permit to Construct Granted On	Equipment Description	Page Number
428804	9/22/2004	ODOR CONTROL SYSTEM, FOR TRUNKLINES AND HEADWORKS	5
519422	6/07/2012	ODOR CONTROL SYSTEM, FOR BIOSOLIDS TRUCK LOADING STATION	9
518276	6/07/2012	ODOR CONTROL SYSTEM, FOR DAF THICKENING PROCESS	11
545003	6/26/2014	ODOR CONTROL UNIT, BIOFILTER	14
545004	10/17/2013, will supersede R-D94235	BOILER, 10.2 MMBTU/HR, DIGESTER GAS AND NATURAL GAS	17
545005	10/17/2013, will supersede R-D94232	BOILER, 10.2 MMBTU/HR, DIGESTER GAS AND NATURAL GAS	20
546364	4/16/2014	ICE CG-1, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	23
546365	4/16/2014	ICE CG-2, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	27
546366	4/16/2014	ICE CG-3, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	31
546367	4/16/2014	ICE CG-4, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	35
546368	4/16/2014	ICE CG-5, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	39
556626	6/26/2014	SEWAGE TREATMENT (>5 MG/D) ANAEROBIC	43
556627	6/26/2014	AIR POLLUTION CONTROL SYSTEM, WET SCRUBBER AND BIOFILTER	47
557229	4/16/2014	STORAGE TANK, AQUEOUS UREA SOLUTION	50
557230	4/16/2014	STORAGE TANK, AQUEOUS UREA SOLUTION	51
559228	4/16/2014	APC SYSTEM 1, SCR/CO CATALYST	52
559229	4/16/2014	APC SYSTEM 2, SCR/CO CATALYST	55
559230	4/16/2014	APC SYSTEM 3, SCR/CO CATALYST	58
559231	4/16/2014	APC SYSTEM 4, SCR/CO CATALYST	61
559232	4/16/2014	APC SYSTEM 4, SCR/CO CATALYST	64
565930	TBD	AIR POLLUTION CONTROL SYSTEM, CHEM. SCRUBBERS FOR TRICKLING FILTERS	68

NOTE: EQUIPMENT LISTED ABOVE THAT HAVE NO CORRESPONDING PERMITS TO OPERATE NUMBER ARE ISSUED PERMITS TO CONSTRUCT. THE ISSUANCE OR DENIAL OF THEIR PERMITS TO OPERATE IS SUBJECT TO ENGINEERING FINAL REVIEW. ANY OTHER APPLICATIONS THAT ARE STILL BEING

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

PERMIT TO CONSTRUCT

A/N 565930
Granted as of TBD

Equipment Description:

MODIFICATIONS TO AIR POLLUTION CONTROL SYSTEM (G27920) CONSISTING OF;

1. FOUL AIR EXHAUST DUCTS FROM THREE (3) TRICKLING FILTERS, TRICKLING FILTER FACILITY'S *(JOB NO. P2-90), IN PARALLEL.*

2. THREE (3) EXHAUST BLOWERS, IN PARALLEL, EACH 11,000 SCFM, 25 H.P.

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BY THE ADDITION OF:

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6. ASSOCIATED SODIUM HYDROXIDE AND SODIUM HYPOCHLORITE STORAGE TANKS.

7. ITEM NO. 3 ABOVE, USED AS OPTIONAL POLISHING UNIT CONTAINING GRANULAR ACTIVATED CARBON, IF NEEDED, OR EMPTY VESSEL USED AS EXHAUST FOR THE CHEMICAL SCRUBBERS.

PERMIT CONDITIONS:

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[RULE 204]

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FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

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[RULE 204]

9. WHEN THE AUTOMATIC H2S MONITORING SYSTEM IS NOT OPERATING, THE OPERATOR SHALL, ON A DAILY BASIS, MONITOR, RECORD AND MAINTAIN THE FOLLOWING PARAMETERS PER MANUFACTURER'S RECOMMENDATIONS.

- DIFFERENTIAL PRESSURE ACROSS THE SCRUBBER, INCHES OF WATER COLUMN
- SCRUBBING SOLUTION RECIRCULATION RATE, GPM
- PH OF THE SCRUBBING SOLUTION
- HYDROGEN SULFIDE (H2S) CONCENTRATION, PPMV, IN THE SCRUBBER EXHAUST.

[RULE 204]

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CONSTITUENT	CONCENTRATION
H2S	1.0 PPMV, DAILY AVERAGE

[RULE 402, 1401]

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

12. IN CASE, WHEN AN OPTIONAL POLISHING UNIT (CAUSTIC IMPREGNATED ACTIVATED CARBON) IS PUT IN SERVICE, THE UNIT SHALL BE OPERATED AS PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS AND, IN COMPLIANCE WITH ABOVE CONDITION NO. 11.
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13. RECORDS SHALL BE MAINTAINED AS REQUIRED BY THIS PERMIT FOR COMPLIANCE. THE RECORDS SHALL BE KEPT FOR AT LEAST FIVE YEARS AND MADE AVAILABLE TO SCAQMD PERSONNEL UPON REQUEST.
[RULE 204]

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	PAGES 1	PAGE 1
ENGINEERING AND COMPLIANCE DIVISION	APPL NO 565929	DATE 9/19/2014
PERMIT APPLICATION EVALUATION AND CALCULATIONS	PROCESSED BY GCR	CHECKED BY CM

TITLE V PERMIT REVISION EVALUATION
(Minor Permit Revision)

APPLICANT'S NAME: ORANGE COUNTY SANITATION DISTRICT (OCSD)

MAILING ADDRESS: 10844 ELLIS AVENUE
FOUNTAIN VALLEY, CA 92708
ATTN.: TERRY AHN, REGULATORY SPECIALIST

EQUIPMENT ADDRESS: 22212 BROOKHURST STREET
(WASTEWATER TREATMENT PLANT NO. 2)
HUNTINGTON BEACH, CA 92646-8406

FACILITY ID NO.: **029110**

Background:
This application 565929 was submitted for Title V permit revision on 6/25/2014. This revision is to include proposed modifications (A/N 565930) to the existing permit to operate G27920, odor control equipment to treat foul-air from the existing trickling filters (TF) facility.

Most recent Title V permit revision for this facility was issued on 6/26/2014 (A/Ns 545502-de minimis significant revision and 556625- minor revision).

Evaluation:
The proposed modification is to add single-stage chemical scrubber (upstream of the existing GAC odor control system) to treat foul-air from the trickling filter. There are 3 trickling filters and exhaust from each will be treated by its' designated chemical scrubber prior to air discharge into the atmosphere. Initially, existing GAC vessels will be empty and foul-air treated by scrubber will pass through it. However, GACs will be kept as optional polishing units if needed in future. Each scrubber will treat 11,000 cfm foul-are from each of the TF.

This is considered a minor permit revision with no change in permitted wastewater treatment plant throughput and no net increase in emissions. Also, foul air flow rate to be treated by the proposed APC system is same and improved odor control is expected based on OCSD's experience with other chemical scrubbers permitted. With no net increase in emissions, new odor control system is not subject to additional requirements for NSPS or NESHAP, pursuant to 40 CFR 60 and 40 CFR 63.
No public notice is required for this minor revision; however, EPA 45-day review is required.

Rules Evaluation:
Compliance with Reg. XXX -Title V permit and applicable rules and regulations is expected.

Note: No NOV or NC was issued per SCAQMD records; 2012 - 9//19/2014. Two odor complaints were received on 5/02/12, however, no alleged source for odor was determined.

Conclusions & Recommendations:
Issue a Title V minor permit revision with (Section H, 08) upon completion of EPA review and approval period.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	PAGES 6	PAGE 1
ENGINEERING AND COMPLIANCE DIVISION	APPL. NO 565930 rev (2)	DATE 9/19/2014
PERMIT APPLICATION EVALUATION AND CALCULATIONS	PROCESSED BY GCR	CHECKED BY

PERMIT TO CONSTRUCT EVALUATION

APPLICANT'S NAME: ORANGE COUNTY SANITATION DISTRICT (OCSD)

MAILING ADDRESS: 10844 ELLIS AVENUE
FOUNTAIN VALLEY, CA 92708-7018
ATTN.: TERRY AHN, REGULATORY SPECIALIST

EQUIPMENT ADDRESS: 22212 BROOKHURST STREET (PLANT NO. 2)
HUNTINGTON BEACH, CA 92646

FACILITY ID NO.: **029110**

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[RULE 204]

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[RULE 204]

Note: Equipment description and conditions revised, as necessary, after OCSD's review and comments (E-mail 8/7/14). 9/19/2014, revised and updated conditions.

BACKGROUND:

On 6-25-2014, Orange County Sanitation District (OCSD) submitted this application for modifications to the existing air pollution control system (odor control unit, G27920, A/N 453244) that treats exhaust from the trickling filters. The permit consists of three identical trickling filters (TF) as part of the secondary treatment process and foul air (exhaust) from TF is treated by each of the GAC systems (11,000 cfm for each train). Prior to the submittal of the application, OCSD and SCAQMD staff had email exchanges and a meeting to discuss the proposed project. It was brought to our attention with reference to unsatisfactory performance of the existing activated carbon systems; resulting in odor complaints.

OCSD has also submitted Title V permit revision A/N 565929 to include proposed modifications. For this facility, most recent Title V permit revision was issued on 6/26/2014.

3/21/2013 facility inspection states that facility was operating in compliance.

PROCESS DESCRIPTION & EMISSIONS:

Foul-air from the existing three (3) trickling filters, 11000 cfm each, is venting through the caustic impregnated activated carbon system for odor (H2S) control. Over some time, OCSD has experienced inadequate performance by the carbon adsorbers resulting in odor complaints from the neighborhood. OCSD has extensively investigated the cause for the odors and believes that accumulation of moisture laden solids has resulted in unreliable carbon media performance, causing carbon changeover in a short period of time increasing operating costs.

OCSD has proposed modifications to the existing odor control system by treating TF exhaust through one-state chemical scrubber based on OCSD's experience at both the sewage treatment plants. TF exhaust will pass through the packed bed with a counter-current chemical scrubbing solution to remove odorous compounds, mainly H2S. Scrubbing solution will recalculate through the packing media, coming in close contact with the foul-air and dissolving /absorbing odors in scrubbing solution. Treated exhaust air will then pass through the demisters and discharge into the atmosphere. NaOH and NaOCl solution is used to maintain the Ph of the scrubbing solution in the range of 8 to 12. Operating parameters, such as differential pressure across packing bed, scrubbing recirculation flow rate, Ph, make-up water flow rate will be monitored and records will be kept. A continuous H2S monitoring system for the scrubber exhaust will monitor H2S concentration (ppmv). Permit conditions are imposed for monitoring and recording operating parameters and to maintain exhaust H2S con., $\leq$ 1 ppmv, daily avg.

The existing GAC system will be kept as an optional, polishing unit. When scrubbers are in service treated exhaust will pass through the empty carbon vessels and discharged into the atmosphere. However, in case, optional carbon vessels are put in service (with media) to treat or polish H2S laden exhaust, equipment will be operated to comply with H2S limit ($\leq$ 1 ppmv H2S). GACs are required to be operated as per manufacturer's recommendations and specifications.

Single-Stage NaOH + NaOCl scrubbing solution:
Under alkaline conditions and with the presence of excess NaOCl, H2S is oxidized to form sulfuric acid which is then neutralized by NaOH to form byproduct sodium sulfate. PH for the scrubbing solution is maintained in the range of 8-12. Chemicals are added to the sump by automatic metering pumps to maintain the desired PH. These parameters are monitored and controlled.

$$H2S + 4\ NaOCl + 2\ NaOH = Na2SO4 + 4\ NaCl + 2H2O$$

A polypropylene packing media is provided to allow for the necessary chemical reactions to occur in the system. The packing is designed to allow the maximum amount of surface area while minimizing the pressure drop. This configuration is critical to maximize the amount of liquid to gas contact is the system thereby maximizing the removal efficiency of the system and minimizing chemical consumption.

The salt byproducts, dissolved in the sump liquid overflows out of the sump and at the same rate fresh water is injected into the sump. A pressure differential gauge is provided to insure that the packing does not retain excess amount of the byproducts or "plug".

Treated air pass through the demister and exhausted through the stack (three stacks for three scrubbers).

Following are specifications for the packed –bed scrubber,

Manufacturer: Siemens OR Equivalent, Model: N/A
Packing material type: Jeager, polypropylene or equal
Packing Factor: 1.18
Packing Size: 1.5"
Height of Packing Material: 7 - 10 ft.
Number of Transfer Unit (NTU): 5
Height of Transfer Unit (HTU): 1.7 ft.
Pressure Drop: N/A, in H_2O across the packing material
Mist Eliminator: Yes
Overall pressure drop across the scrubber = 6 in. H2O
Exhaust blower (existing) = 11,000 cfm, 25 HP (Total 33,000 cfm, 3 units).
Recirculation pump = 15 HP.
Recirculation water flow rate = 220 gpm
Make up water rate = 3.0 gpm.
PH operating Range = 8-12 (NaOH & NaOCl)
Exhaust Stack: 3' Dia. X 33'-9" H., no rain cap.

AEIS & NSR:
Entries for the existing control equipment; A/N 453244 for TF's exhaust and A/N 457410 for sludge blending tanks-SBTs' exhaust are assigned zero values.
AEIS/NSR emissions covered under basic equipment, A/N 453240.

For this A/N 565930 emissions are kept same as under current PO G27920 ;
H2S = 1 ppmv

RULES EVALUATION:
There is no change in total volume of foul-air treated by the chemical scrubbers (total 11,000 cfm x 3 units = 33,000 cfm, max.) and H2S limit for permit is kept same as under current PO G27920. Compliance with all applicable rules and regulations is expected.

For information purpose, following is the odor control analysis from current permit G27920, A/N 453244.

H2S ODOR CONTROL ANALYSIS:
SCREEN 3 analysis (at PC stage) indicated 1-hr maximum ground level con. = 42.32 mcg/m3 @ 204 meter receptor, for 1 lb/hr emission rate.
H2S emission at 1.0 ppmv = 0.059 lbs/hr.
0.059 lbs H2S /hr x 42.32 mcg/m3 / 1 lb/hr x (0.02445 / 34) = 0.0018 ppmv H2S
= 1.8 ppbv H2S < 30 ppbv H2S limit under CSAAQS.
and < 8 ppbv H2S odor threshold under OEHHA.
California State Ambient Air Quality Standard (CSAAQS)
California Office of Environmental Health Hazard Assessment Office (OEHHA).

Therefore, H2S con. limit in exhaust, each GAC = **1.0 ppmv** is okay for permit condition.

CONCLUSIONS / RECOMMENDATIONS:

Issue a P/C for the above equipment subject to the conditions listed on Pgs.1 trough 3.

Approved PC will be included under Title V minor revision (565929), Section H.

Gaurang Rawal

From: Gaurang Rawal
Sent: Tuesday, September 23, 2014 11:10 AM
To: 'Ahn, Terry'; Kogan, Vlad
Cc: Charles Tupac
Subject: FW: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Proposed Minor
Attachments: ID 29110 OCSD Huntington Beach - EPA Cover Letter AN 565930 565929.pdf; ID 29110 OCSD Huntington Beach - Proposed TV Permit Revision ANs 565930 565929.pdf; ID 29110 OCSD Huntington Beach - Engr Eval AN 565929.pdf; ID 29110 OCSD Huntington Beach - Engr Eval AN 565930.pdf

FYI.

From: Catherine Rodriguez
Sent: Tuesday, September 23, 2014 10:42 AM
To: R9AirPermits_SC@epa.gov
Cc: Gaurang Rawal; Charles Tupac; Andrew Lee; Charlene Delgado; Helen Quintana
Subject: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Proposed Minor

Facility Name: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach
Facility ID: 029110
Address: 22212 Brookhurst Street, Huntington Beach, CA
Type of Mod: Proposed Minor
Description: Section H: Permit to Construct and Temporary Permit to Operate:

Application No.	Equipment	Description
565930	Air Pollution Control (APC) System	Modifications to permit to operate, G27920, by the addition of three new single stage chemical scrubbers to improve odor control treatment at the Trickling Filters facility (OCSD Job No. FE13-04).

Title V Application #: 565929
Attachments:

1. EPA Cover Letter
2. Proposed Permit
3. Engineering Evaluations

Please contact me if there are any problems with the transmission of the attached files.

Catherine Rodriguez
Secretary to
Andrew Lee, P.E.
Sr. AQ Engineering Manager
South Coast AQMD
Energy/Public Services/Waste Mgmt/Terminals-Permitting
Engineering and Compliance Division
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-2735; crodriguez@aqmd.gov

NSR DATA SUMMARY SHEET

Application No	565929
Application Type	55
Application status	PENDAPPRV
Previous Apps, Dev	,

Company Name	ORANGE COUNTY SANITATION DISTRICT
Company ID	29110
Address	22212 BROOKHURST ST, HUNTINGTON BEACH, CA 92646-8457
Reclaim	NO
Reclaim Zone	01
Air Basin	SC
Zone	18
Title V	YES

Device ID	0 - TITLE-V
Estimated Completion Date	06-15-2016
Heat Input Capacity	0 Millions BTU/Hr
Priority Reserve	NONE - No Priority Access Requested
Recommended Disposition	32 - BANKING/ PLAN GRANTED
PR Expiration	12-31-9999
School within 1,000 feet	NO
Operating Weeks per year	52
Operating Days per week	5
Operating Hours	
Monday	08:00 to 16:00
Tuesday	08:00 to 16:00
Wednesday	08:00 to 16:00
Thursday	08:00 to 16:00
Friday	08:00 to 16:00
Saturday	00:00 to 00:00
Sunday	00:00 to 00:00

Emittant	ROG	
BACT		
Cost effectiveness	NO	
Source Type	MINOR	
Emis Increase	0	
Modelling	N/A	
Public Notice	N	
Controlled Emission		
Max Hourly	0.00	Lbs/Hr
Max Daily	0.00	Lbs/day
Uncontrolled Emission		
Max Hourly	0.00	Lbs/Hr
Max Daily	0.00	Lbs/day
Current Emission		
BACT 30 Day Avg	0.00	Lbs/day
Annual Emission	0.00	Lbs/year
District Emission		

Supervisor's Approval _____ Supervisor's Review Date _____

Processed By gaurangr

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT	PAGES 1	PAGE 1
ENGINEERING AND COMPLIANCE DIVISION	APPL NO 565929	DATE 9/19/2014
PERMIT APPLICATION EVALUATION AND CALCULATIONS	PROCESSED BY GCR	CHECKED BY

TITLE V PERMIT REVISION EVALUATION
(Minor Permit Revision)

APPLICANT'S NAME: ORANGE COUNTY SANITATION DISTRICT (OCSD)

MAILING ADDRESS: 10844 ELLIS AVENUE
FOUNTAIN VALLEY, CA 92708
ATTN.: TERRY AHN, REGULATORY SPECIALIST

EQUIPMENT ADDRESS: 22212 BROOKHURST STREET
(WASTEWATER TREATMENT PLANT NO. 2)
HUNTINGTON BEACH, CA 92646-8406

FACILITY ID NO.: 029110

Background:
This application 565929 was submitted for Title V permit revision on 6/25/2014. This revision is to include proposed modifications (A/N 565930) to the existing permit to operate G27920, odor control equipment to treat foul-air from the existing trickling filters (TF) facility.

Most recent Title V permit revision for this facility was issued on 6/26/2014 (A/Ns 545502-de minimis significant revision and 556625- minor revision).

Evaluation:
The proposed modification is to add single-stage chemical scrubber (upstream of the existing GAC odor control system) to treat foul-air from the trickling filter. There are 3 trickling filters and exhaust from each will be treated by its' designated chemical scrubber prior to air discharge into the atmosphere. Initially, existing GAC vessels will be empty and foul-air treated by scrubber will pass through it. However, GACs will be kept as optional polishing units if needed in future. Each scrubber will treat 11,000 cfm foul-are from each of the TF.

This is considered a minor permit revision with no change in permitted wastewater treatment plant throughput and no net increase in emissions. Also, foul air flow rate to be treated by the proposed APC system is same and improved odor control is expected based on OCSD's experience with other chemical scrubbers permitted. With no net increase in emissions, new odor control system is not subject to additional requirements for NSPS or NESHAP, pursuant to 40 CFR 60 and 40 CFR 63.
No public notice is required for this minor revision; however, EPA 45-day review is required.

Rules Evaluation:
Compliance with Reg. XXX -Title V permit and applicable rules and regulations is expected.

Note: No NOV or NC was issued per SCAQMD records; 2012 - 9//19/2014. Two odor complaints were received on 5/02/12, however, no alleged source for odor was determined.

Conclusions & Recommendations:
Issue a Title V minor permit revision with (Section H, 08) upon completion of EPA review and approval period.

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

PERMIT TO CONSTRUCT

A/N 565930
Granted as of TBD

Equipment Description:

MODIFICATIONS TO AIR POLLUTION CONTROL SYSTEM (G27920) CONSISTING OF;

1. FOUL AIR EXHAUST DUCTS FROM THREE (3) TRICKLING FILTERS, TRICKLING FILTER FACILITY'S (JOB NO. P2-90), IN PARALLEL.

2. THREE (3) EXHAUST BLOWERS, IN PARALLEL, EACH 11,000 SCFM, 25 H.P.

3. THREE (3) CAUSTIC IMPREGNATED ACTIVATED CARBON UNITS, IN PARALLEL, EACH CONTAINING MINIMUM OF 10,600 LBS OF ACTIVATED CARBON BY NORIT AMERICAS OR WESTATES OR EQUIVALENT, EACH VENTING A SINGLE TRICKLING FILTER.

4. THREE (3) EXHAUST STACKS, EACH 2.0'- 3" DIA. X 28' HIGH.

BY THE ADDITION OF:

5. THREE (3) CHEMICAL SCRUBBERS (JOB NO. FE13-04), EACH SINGLE STAGE, SIEMENS OR EQUIVALENT, APPROXIMATELY 20' H. X 6' D., JAEGER 7' -10' H. PACKING MATERIAL OR EQUAL, SCRUBBING SOLUTION RECIRCULATION LINE, ASSOCIATED PUMPS, METERS AND AUTOMATIC CONTROLS, MIST ELIMINATOR AND CONTINUOUS H2S MONITORING SYSTEM (OPTIONAL).

6. ASSOCIATED SODIUM HYDROXIDE AND SODIUM HYPOCHLORITE STORAGE TANKS.

7. ITEM NO. 3 ABOVE, USED AS OPTIONAL POLISHING UNIT CONTAINING GRANULAR ACTIVATED CARBON, IF NEEDED, OR EMPTY VESSEL USED AS EXHAUST FOR THE CHEMICAL SCRUBBERS.

PERMIT CONDITIONS:

1. CONSTRUCTION AND OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATIONS UNDER WHICH THIS PERMIT IS ISSUED.
[RULE 204]

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITIONS AT ALL TIMES.
[RULE 204]

3. THIS PERMIT TO CONSTRUCT IS VALID FOR ONE YEAR FROM ITS' ISSUANCE DATE. AN EXTENSION MAY BE GRANTED UPON WRITTEN REQUEST. SUCH A REQUEST SHALL INCLUDE THE REASONS THE EXTENSION IS REQUIRED, THE LENGTH OF THE EXTENSION, AND THE STATUS OF THE CONSTRUCTION ACTIVITIES COMPLETED TO DATE.
[RULE 204]

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

4. THIS EQUIPMENT SHALL BE OPERATED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.
[RULE 204]

5. A FLOW METER SHALL BE INSTALLED AND MAINTAINED AT EACH OF THE ODOR CONTROL SYSTEM EXHAUST TO INDICATE THE TOTAL FOUL AIR FROM EACH OF THE TRICKLING FILTER TREATED, IN STANDARD CUBIC FEET PER MINUTE (SCFM). IN CASE A PRESSURE SENSOR DEVICE IS USED TO DETERMINE FLOW RATE, IN PLACE OF THE FLOW METER, A CONVERSION CHART SHALL BE MAINTAINED TO INDICATE THE CORRESPONDENT FLOW RATE, IN SCFM, TO THE PRESSURE READING.
[RULE 204]

6. MAXIMUM FOUL AIR FLOW RATE FROM EACH TRICKLING FILTER TO BE TREATED SHALL NOT EXCEED 11,000 SCFM, AVERAGED OVER CALENDAR MONTH.
[RULE 204]

7. SCRUBBER SYSTEM SHALL BE EQUIPPED WITH DIFFERENTIAL PRESSURE GAUGE, PH METER AND FLOW METER TO INDICATE AND MEASURE (GPM) FOR SCRUBBING LIQUID RECIRCULATION RATE.
[RULE 204]

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[RULE 204]

9. WHEN THE AUTOMATIC H2S MONITORING SYSTEM IS NOT OPERATING, THE OPERATOR SHALL, ON A DAILY BASIS, MONITOR, RECORD AND MAINTAIN THE FOLLOWING PARAMETERS PER MANUFACTURER'S RECOMMENDATIONS.

- DIFFERENTIAL PRESSURE ACROSS THE SCRUBBER, INCHES OF WATER COLUMN
- SCRUBBING SOLUTION RECIRCULATION RATE, GPM
- PH OF THE SCRUBBING SOLUTION
- HYDROGEN SULFIDE (H2S) CONCENTRATION, PPMV, IN THE SCRUBBER EXHAUST.

[RULE 204]

10. THE PH OF THE SCRUBBING SOLUTION SHALL BE MAINTAINED BETWEEN 8 AND 12 ON A DAILY AVERAGE.
[RULE 204]

11. CONCENTRATION MEASURED AT EXHAUST SHALL NOT EXCEED THE FOLLOWING:

CONSTITUENT	CONCENTRATION
H2S	1.0 PPMV, DAILY AVERAGE

[RULE 402, 1401]

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

12. IN CASE, WHEN AN OPTIONAL POLISHING UNIT (CAUSTIC IMPREGNATED ACTIVATED CARBON) IS PUT IN SERVICE, THE UNIT SHALL BE OPERATED AS PER MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS AND, IN COMPLIANCE WITH ABOVE CONDITION NO. 11.
[RULE 204]

13. RECORDS SHALL BE MAINTAINED AS REQUIRED BY THIS PERMIT FOR COMPLIANCE. THE RECORDS SHALL BE KEPT FOR AT LEAST FIVE YEARS AND MADE AVAILABLE TO SCAQMD PERSONNEL UPON REQUEST.
[RULE 204]

PERMIT TO CONSTRUCT EVALUATION

APPLICANT'S NAME: ORANGE COUNTY SANITATION DISTRICT (OCSD)

MAILING ADDRESS: 10844 ELLIS AVENUE
FOUNTAIN VALLEY, CA 92708-7018
ATTN.: TERRY AHN, REGULATORY SPECIALIST

EQUIPMENT ADDRESS: 22212 BROOKHURST STREET (PLANT NO. 2)
HUNTINGTON BEACH, CA 92646

FACILITY ID NO.: **029110**

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6. ASSOCIATED SODIUM HYDROXIDE AND SODIUM HYPOCHLORITE STORAGE TANKS.

7. ITEM NO. 3 ABOVE, USED AS OPTIONAL POLISHING UNIT CONTAINING GRANULAR ACTIVATED CARBON, IF NEEDED, OR EMPTY VESSEL USED AS EXHAUST FOR THE CHEMICAL SCRUBBERS.

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[RULE 204]

Note: Equipment description and conditions revised, as necessary, after OCSD's review and comments (E-mail 8/7/14). 9/19/2014, revised and updated conditions.

BACKGROUND:

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3/21/2013 facility inspection states that facility was operating in compliance.

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Under alkaline conditions and with the presence of excess NaOCl, H2S is oxidized to form sulfuric acid which is then neutralized by NaOH to form byproduct sodium sulfate. PH for the scrubbing solution is maintained in the range of 8-12. Chemicals are added to the sump by automatic metering pumps to maintain the desired PH. These parameters are monitored and controlled.

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The salt byproducts, dissolved in the sump liquid overflows out of the sump and at the same rate fresh water is injected into the sump. A pressure differential gauge is provided to insure that the packing does not retain excess amount of the byproducts or "plug".

Treated air pass through the demister and exhausted through the stack (three stacks for three scrubbers).

Following are specifications for the packed –bed scrubber,

Manufacturer: Siemens OR Equivalent, Model: N/A
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Packing Size: 1.5"
Height of Packing Material: 7 - 10 ft.
Number of Transfer Unit (NTU): 5
Height of Transfer Unit (HTU): 1.7 ft.
Pressure Drop: N/A, in H_2O across the packing material
Mist Eliminator: Yes
Overall pressure drop across the scrubber = 6 in. H2O
Exhaust blower (existing) = 11,000 cfm, 25 HP (Total 33,000 cfm, 3 units).
Recirculation pump = 15 HP.
Recirculation water flow rate = 220 gpm
Make up water rate = 3.0 gpm.
PH operating Range = 8-12 (NaOH & NaOCl)
Exhaust Stack: 3' Dia. X 33'-9" H., no rain cap.

AEIS & NSR:
Entries for the existing control equipment; A/N 453244 for TF's exhaust and A/N 457410 for sludge blending tanks-SBTs' exhaust are assigned zero values.
AEIS/NSR emissions covered under basic equipment, A/N 453240.

For this A/N 565930 emissions are kept same as under current PO G27920 ;
H2S = 1 ppmv

RULES EVALUATION:
There is no change in total volume of foul-air treated by the chemical scrubbers (total 11,000 cfm x 3 units = 33,000 cfm, max.) and H2S limit for permit is kept same as under current PO G27920. Compliance with all applicable rules and regulations is expected.

For information purpose, following is the odor control analysis from current permit G27920, A/N 453244.

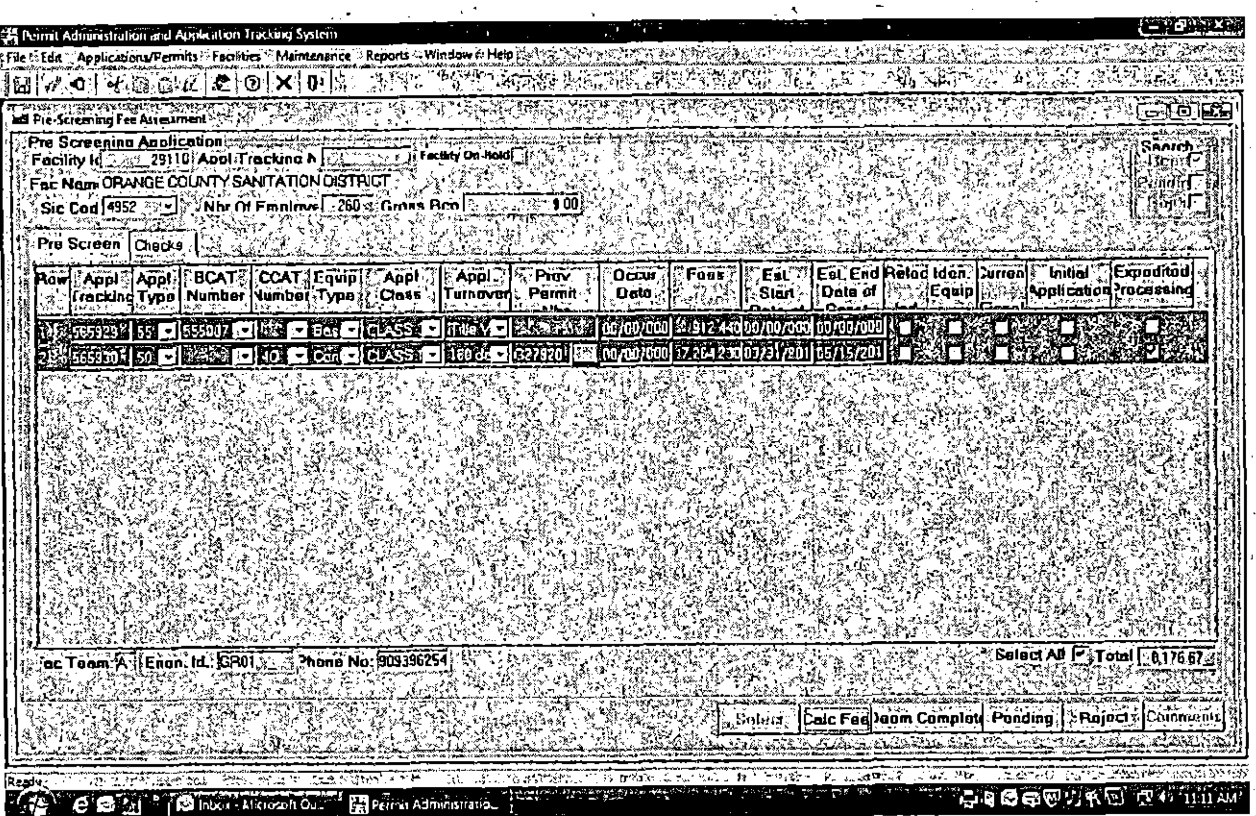
H2S ODOR CONTROL ANALYSIS:
SCREEN 3 analysis (at PC stage) indicated 1-hr maximum ground level con. = 42.32 mcg/m3 @ 204 meter receptor, for 1 lb/hr emission rate.
H2S emission at 1.0 ppmv = 0.059 lbs/hr.
0.059 lbs H2S /hr x 42.32 mcg/m3 / 1 lb/hr x (0.02445 / 34) = 0.0018 ppmv H2S
= 1.8 ppbv H2S < 30 ppbv H2S limit under CSAAQS.
and < 8 ppbv H2S odor threshold under OEHHA.
California State Ambient Air Quality Standard (CSAAQS)
California Office of Environmental Health Hazard Assessment Office (OEHHA).

Therefore, H2S con. limit in exhaust, each GAC = **1.0 ppmv** is okay for permit condition.

CONCLUSIONS / RECOMMENDATIONS:

Issue a P/C for the above equipment subject to the conditions listed on Pgs.1 trough 3.

Approved PC will be included under Title V minor revision (565929), Section H.



FY 2013-2014

7-9-2014

TV Rev. (Type 55) Minor Rev. $912.44

Odor Control (CCat 40, Sch-D), Alt/Mod + XPP – $7264.23

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

June 26, 2014

Mr. James Herberg
General Manager
Orange County Sanitation District
10844 Ellis Avenue
Fountain Valley, CA 92708-7018

Re: Title V Revised Permit for Orange County Sanitation District (OCSD), ID# 029110

Dear Mr. Herberg,

Enclosed please find revision to the Title V facility permit, for the Orange County Sanitation District (OCSD) Huntington Beach, Sewage Treatment Plant No. 2 (Facility ID 029110), located at 22212 Brookhurst Street, Huntington Beach, California. The draft permit, which included minor revision (under A/N 556625) and de-minimis significant revision (under A/N 545002), was sent to EPA on May 6, 2014 for review and there were no comments received by the SCAQMD.

The following applications were included under Section H (rev 07) - Permits to Construct and Temporary Permits to Operate.

SECTION H: Permit to Construct and Temporary Permit to Operate

Application Number	Equipment	Description
556626	Sewage Treatment (>5 MGD) Anaerobic	Modifications to permit to operate, G25942, by the removal of existing sludge dewatering facility (belt filter press) with new sludge dewatering facility (Centrifuges and associated equipment, Project P2-92).
556627	Air Pollution Control (APC) System - Wet Scrubber and Biofilter	APC system consisting of wet scrubber and biofilter to treat foul-air from the new Sludge Dewatering Facility (Project P2-92). Existing odor control permitted equipment will be replaced with new APC system.
545003	Odor Control System, Biofilters	Change of condition and equipment description revision for clarification for the existing permit to construct, A/N518276. H2S emission limit is revised for the biofilters that treats dissolved air floatation thickeners (DAFTs), Project P2-89.

This permit revision includes Title Page, Table of Contents and Section H. Please review the attached pages and section carefully. Insert the enclosed pages in your Title V Facility Permit and discard the earlier versions. Questions concerning this revised permit should be directed to Mr. Gaurang Rawal at (909) 396-2543.

The operation of your facility is bound by the conditions and/or requirements stated in your Facility Permit to Operate. If you determine any administrative errors, please contact Mr. Gaurang Rawal at the above number or e-mail grawal@aqmd.gov, within 30 days of receipt of your permit.

Sincerely,

Andrew Y. Lee, P.E.
Senior AQ Engineering Manager
Energy/Public Services/
Waste Mgmt/Terminals-Permitting

AYL: CDT: GCR
Enclosures
cc: w/ enclosure
Geraldo Rios, EPA Region IX
Compliance-SCAQMD
Title V Central File
A/N 545002 - de minimis significant revision
A/N 556625- minor revision

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

Facility Equipment and Requirements
(Section D)

This section consists of a table listing all permitted equipment at the facility, facility wide requirements, copies of all individual Permits to Construct and Permits to Operate issued to various equipment at the facility, and Rule 219-exempt equipment subject to source-specific requirements. Each permit and Rule 219-exempt equipment will list operating conditions including periodic monitoring requirements, and applicable emission limits and requirements that the equipment is subject to. Also included is the rule origin and authority of each emission limit and permit condition.

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

PERMITTED EQUIPMENT LIST

The following is a list of all permits to construct and operate at this facility:

Application Number	Permit Number	Equipment Description	Page Number
06045A	R-M29144	ICE, 1515 HP, EMER. ELEC. GEN., DIESEL	6
06046A	R-M29146	ICE, 1515 HP, EMER. ELEC. GEN., DIESEL	8
06047A	R-M29147	ICE, 1515 HP, EMER. ELEC. GEN., DIESEL	10
06048A	R-M29148	ICE, 1515 HP, EMER. ELEC. GEN., DIESEL	12
291030	R-D94235	BOILER, 10.46 MMBTU/HR, DIGESTER GAS & NATURAL GAS	14
291031	R-D94232	BOILER, 10.46 MMBTU/HR, DIGESTER GAS & NATURAL GAS	16
331911	F11229	ODOR CONTROL SYSTEM, FOR PRIMARY TREATMENT PROCESS	18
424369	F65823	ICE, 2936 HP, EMER. ELEC. GEN., DIESEL	20
429663	F71055	FLARE, ENCLOSED, DIGESTER GAS	22
444111	F99405	ODOR CONTROL SYSTEM, NORTH SCRUBBER COMPLEX, FOR HEADWORKS AND PRIMARY TREATMENT PROCESS	26
444112	F99406	ODOR CONTROL SYSTEM, FOR DEWATERING PROCESS AND BUILDING	28
444113	F99408	ODOR CONTROL SYSTEM, FOR DAF THICKENING PROCESS	29
453240	G25942	SEWAGE TREATMENT (>5 MGD) ANAEROBIC	30
453244	G27920	APC SYSTEM, ACTIVATED CARBON ADSORBER	33
455670	R-F81554	ICE, 2936 HP, EMER. ELEC. GEN., DIESEL	35
455671	R-F81555	ICE, 2936 HP, EMER. ELEC. GEN., DIESEL	37
455673	R-F81556	ICE, 2936 HP, EMER. ELEC. GEN., DIESEL	39
457410	G24634	AIR POLLUTION CONTROL SYSTEM, FOR SLUDGE BLENDING TANKS	41
474766	F95584	ICE, 1482 HP, EMER. ELEC. GEN., DIESEL	43
474767	F95585	ICE, 1482 HP, EMER. ELEC. GEN., DIESEL	45
474768	F95586	ICE, 1482 HP, EMER. ELEC. GEN., DIESEL	47
474769	F95587	ICE, 2935 HP, EMER. ELEC. GEN., DIESEL	49
474770	F95588	ICE, 2935 HP, EMER. ELEC. GEN., DIESEL	51
512604	G12233	STORAGE TANK, FIXED ROOF, HCl, W/SPARGER	53
512832	G12234	STORAGE TANK, FIXED ROOF, HCl, W/CONTROL	54
512833	G12235	STORAGE TANK, FIXED ROOF, HCl, W/CONTROL	55

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

PERMITTED EQUIPMENT LIST (CONT'D)

The following is a list of all permits to construct and permits to operate at this facility:

Application Number	Permit Number	Equipment Description	Page Number
540708	G27394	ICE, 4166 HP, DIGESTER GAS AND NATURAL GAS, 3000 KW GENERATOR	56
540709	G27395	ICE, 4166 HP, DIGESTER GAS AND NATURAL GAS, 3000 KW GENERATOR	59
540710	G27396	ICE, 4166 HP, DIGESTER GAS AND NATURAL GAS, 3000 KW GENERATOR	62
540711	G27397	ICE, 4166 HP, DIGESTER GAS AND NATURAL GAS, 3000 KW GENERATOR	65
540712	G27398	ICE, 4166 HP, DIGESTER GAS AND NATURAL GAS, 3000 KW GENERATOR	68

NOTE: APPLICATIONS THAT ARE STILL BEING PROCESSED AND HAVE NOT BEEN ISSUED PERMITS TO CONSTRUCT OR PERMITS TO OPERATE WILL NOT BE FOUND IN THIS TITLE V PERMIT.

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

SECTION H: PERMIT TO CONSTRUCT AND TEMPORARY PERMIT TO OPERATE

This section consists of a table listing all equipment with Permits to Construct and copies of all individual Permits to Construct issued to various equipment at the facility. Each permit will list operating conditions including periodic monitoring requirements and applicable emission limits and requirements that the equipment is subject to. Also included is the rule origin and authority of each emission limit and permit condition.

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

PERMITTED EQUIPMENT LIST

THE FOLLOWING IS A LIST OF ALL PERMITS TO CONSTRUCT AND PERMITS TO OPERATE AT THIS FACILITY:

Application Number	Permit to Construct Granted On	Equipment Description	Page Number
428804	9/22/2004	ODOR CONTROL SYSTEM, FOR TRUNKLINES AND HEADWORKS	5
519422	6/07/2012	ODOR CONTROL SYSTEM, FOR BIOSOLIDS TRUCK LOADING STATION	9
518276	6/07/2012	ODOR CONTROL SYSTEM, FOR DAF THICKENING PROCESS	11
545003	6/26/2014	ODOR CONTROL UNIT, BIOFILTER	14
545004	10/17/2013, will supersede R-D94235	BOILER, 10.2 MMBTU/HR, DIGESTER GAS AND NATURAL GAS	17
545005	10/17/2013, will supersede R-D94232	BOILER, 10.2 MMBTU/HR, DIGESTER GAS AND NATURAL GAS	20
546364	4/16/2014	ICE CG-1, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	23
546365	4/16/2014	ICE CG-2, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	27
546366	4/16/2014	ICE CG-3, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	31
546367	4/16/2014	ICE CG-4, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	35
546368	4/16/2014	ICE CG-5, 4166 HP, DG/NG WITH DG FUEL PRETREATMENT	39
556626	6/26/2014	SEWAGE TREATMENT (>5 MG/D) ANAEROBIC	43
556627	6/26/2014	AIR POLLUTION CONTROL SYSTEM, WET SCRUBBER AND BIOFILTER	47
557229	4/16/2014	STORAGE TANK, AQUEOUS UREA SOLUTION	50
557230	4/16/2014	STORAGE TANK, AQUEOUS UREA SOLUTION	51
559228	4/16/2014	APC SYSTEM 1, SCR/CO CATALYST	52
559229	4/16/2014	APC SYSTEM 2, SCR/CO CATALYST	55
559230	4/16/2014	APC SYSTEM 3, SCR/CO CATALYST	58
559231	4/16/2014	APC SYSTEM 4, SCR/CO CATALYST	61
559232	4/16/2014	APC SYSTEM 4, SCR/CO CATALYST	64

NOTE: EQUIPMENT LISTED ABOVE THAT HAVE NO CORRESPONDING PERMITS TO OPERATE NUMBER ARE ISSUED PERMITS TO CONSTRUCT. THE ISSUANCE OR DENIAL OF THEIR PERMITS TO OPERATE IS SUBJECT TO ENGINEERING FINAL REVIEW. ANY OTHER APPLICATIONS THAT ARE STILL BEING PROCESSED AND HAVE NOT BEEN ISSUED PERMITS TO CONSTRUCT OR PERMITS TO OPERATE WILL NOT BE FOUND IN THIS TITLE V PERMIT.

Gaurang Rawal

From: Ahn, Terry [tahn@ocsd.com]
Sent: Thursday, July 03, 2014 3:28 PM
To: Charles Tupac; Gaurang Rawal
Cc: Kogan, Vlad; AbuShaban, Randa
Subject: RE: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Final Minor/De Minimis Significant
Attachments: image001.jpg

Hi Charlie,

Thanks for your explanation. I guess I kind of get it.

Happy Independence Day and have a nice long weekend!

Terry

From: Charles Tupac [ctupac@aqmd.gov]
Sent: Thursday, July 03, 2014 1:43 PM
To: Ahn, Terry; Gaurang Rawal
Cc: Kogan, Vladimir; AbuShaban, Randa
Subject: RE: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Final Minor/De Minimis Significant

Terry,

Thanks for reviewing the permits. The first item is not a discrepancy - here is the explanation- the old PC remains because it cannot be cancelled until the newer PC is converted to PO (likewise a PO which has been modified by a PC cannot be removed until the new PC is converted to PO).Both situations are because of NSR offsetting (an offset can only be used once). If we removed the prior PC or PO too soon then we would have to offset the newer application (twice). Unless Orange Co doesn't mind supplying the extra offsets. As far as the inspection, a comparison between the facility permit to the AQMD equipment list (like the one on FIND) and show consistency since the application numbers should match.

Charlie

From: Ahn, Terry [mailto:tahn@ocsd.com]
Sent: Thursday, July 03, 2014 1:08 PM
To: Gaurang Rawal
Cc: Kogan, Vlad; Charles Tupac; AbuShaban, Randa
Subject: RE: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Final Minor/De Minimis Significant

Hi Gaurang,

Thank you for the permits. Now we can proceed with the bid advertisement for the Centrifuge/Dewatering facility project next week as scheduled.

In order to avoid any possible inquiry by the AQMD Inspector in the future, I'd like to point out a couple of discrepancies I noted in the new permit. They are as follows:

Gaurang Rawal

From: Ahn, Terry [tahn@ocsd.com]
Sent: Thursday, July 03, 2014 1:08 PM
To: Gaurang Rawal
Cc: Kogan, Vlad; Charles Tupac; AbuShaban, Randa
Subject: RE: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Final Minor/De Minimis Significant
Attachments: Cover Letter.pdf; PTC List.pdf; AN 556626 Condition No7.pdf

Hi Gaurang,

Thank you for the permits. Now we can proceed with the bid advertisement for the Centrifuge/Dewatering facility project next week as scheduled.

In order to avoid any possible inquiry by the AQMD Inspector in the future, I'd like to point out a couple of discrepancies I noted in the new permit. They are as follows:

- As highlighted in the attached Cover Letter, A/N 515276 was replaced by A/N 545003; however, A/N 545003 is still included in Section H. In the next Title V revision, it should be removed.
- Two sentences in the Condition No. 7 in PTC A/N 556626 contradict each other. In the next Title V revision, the first sentence should be deleted as shown in the attached pdf file.

If you have any questions please let me know.

Terry
(714) 593-7082

From: Gaurang Rawal [mailto:grawal@aqmd.gov]
Sent: Friday, June 27, 2014 3:13 PM
To: Ahn, Terry
Cc: Kogan, Vladimir; Charles Tupac
Subject: FW: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Final Minor/De Minimis Significant

FYI.

From: Catherine Rodriguez
Sent: Friday, June 27, 2014 9:32 AM
To: R9AirPermits_SC@epamail.epa.gov
Cc: Gaurang Rawal; Charles Tupac; Andrew Lee; Helen Quintana; Charlene Delgado
Subject: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach (029110) Final Minor/De Minimis Significant

Facility Name: Orange County Sanitation District (OCSD) Sewage Treatment Plant, Huntington Beach
Facility ID: 029110
Address: 22212 Brookhurst Street, Huntington Beach, CA
Type of Mod: Final Minor/De Minimis Significant
Description: Section H: Permit to Construct and Temporary Permit to Operate: (Minor)

Application No.	Equipment	Description
556626	Sewage Treatment (>5 MGD) Anaerobic	Modifications to permit to operate, G25945, by the removal of existing sludge dewatering facility (belt filter press) with new sludge

		dewatering facility (Centrifuges and associated equipment, Project P2-92).
556627	Air Pollution Control (APC) System – Wet Scrubber and Biofilter	APC system consisting of wet scrubber and biofilter to treat foul-air from the new Sludge Dewatering Facility (Project P2-92). Existing odor control permitted equipment will be replaced with new APC system.

Section H: Permit to Construct and Temporary Permit to Operate: (De Minimis Significant)

Application No.	Equipment	Description
545003	Odor Control System, Biofilters	Change of condition and equipment description revision for clarification for the existing permit to construct, A/N 518276. H2S emission limit is revised for the biofilters that treats dissolved air floatation thickeners (DAFTs), Project P2-89.

Title V Application #: 556625 545002

Attachments:

1. Facility Cover Letter with Final Title V Permit Revision

Please contact me if there are any problems with the transmission of the attached files.

Catherine Rodriguez
Secretary to
Andrew Lee, P.E.
Sr. AQ Engineering Manager
South Coast AQMD
Energy/Public Services/Waste Mgmt/Terminals-Permitting
Engineering and Compliance Division
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-2735; crodriguez@aqmd.gov

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

June 26, 2014

Mr. James Herberg
General Manager
Orange County Sanitation District
10844 Ellis Avenue
Fountain Valley, CA 92708-7018

Re: Title V Revised Permit for Orange County Sanitation District (OCSD), ID# 029110

Dear Mr. Herberg,

Enclosed please find revision to the Title V facility permit, for the Orange County Sanitation District (OCSD) Huntington Beach, Sewage Treatment Plant No. 2 (Facility ID 029110), located at 22212 Brookhurst Street, Huntington Beach, California. The draft permit, which included minor revision (under A/N 556625) and de-minimis significant revision (under A/N 545002), was sent to EPA on May 6, 2014 for review and there were no comments received by the SCAQMD.

The following applications were included under Section H (rev 07) - Permits to Construct and Temporary Permits to Operate.

SECTION H: Permit to Construct and Temporary Permit to Operate

Application Number	Equipment	Description
556626	Sewage Treatment (>5 MGD) Anaerobic	Modifications to permit to operate, G25942, by the removal of existing sludge dewatering facility (belt filter press) with new sludge dewatering facility (Centrifuges and associated equipment, Project P2-92).
556627	Air Pollution Control (APC) System - Wet Scrubber and Biofilter	APC system consisting of wet scrubber and biofilter to treat foul-air from the new Sludge Dewatering Facility (Project P2-92). Existing odor control permitted equipment will be replaced with new APC system.
545003	Odor Control System, Biofilters	Change of condition and equipment description revision for clarification for the existing permit to construct, A/N518276. H2S emission limit is revised for the biofilters that treats dissolved air floatation thickeners (DAFTs), Project P2-89.

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

PERMITTED EQUIPMENT LIST

THE FOLLOWING IS A LIST OF ALL PERMITS TO CONSTRUCT AND PERMITS TO OPERATE AT THIS FACILITY:

NOTE: EQUIPMENT LISTED ABOVE THAT HAVE NO CORRESPONDING PERMITS TO OPERATE NUMBER ARE ISSUED PERMITS TO CONSTRUCT. THE ISSUANCE OR DENIAL OF THEIR PERMITS TO OPERATE IS SUBJECT TO ENGINEERING FINAL REVIEW. ANY OTHER APPLICATIONS THAT ARE STILL BEING PROCESSED AND HAVE NOT BEEN ISSUED PERMITS TO CONSTRUCT OR PERMITS TO OPERATE WILL NOT BE FOUND IN THIS TITLE V PERMIT.

FACILITY PERMIT TO OPERATE
ORANGE COUNTY SANITATION DISTRICT

Conditions:

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.
[RULE 204]

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.
[RULE 204]

3. THIS EQUIPMENT SHALL BE OPERATED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.
[RULE 204]

4. THIS PERMIT SHALL EXPIRE IF CONSTRUCTION OF THE EQUIPMENT IS NOT COMPLETED WITHIN ONE YEAR FROM THE DATE OF ISSUANCE OF THIS PERMIT UNLESS AN EXTENSION IS GRANTED BY THE EXECUTIVE OFFICER.
[RULE 205]

5. ORANGE COUNTY SANITATION DISTRICT (OCSD) SHALL COMPLY WITH ALL APPLICABLE MITIGATION MEASURES STIPULATED IN THE STATEMENT OF FINDINGS, STATEMENT OF OVERRIDING CONSIDERATION, AND MITIGATION OR MONITORING PLAN DOCUMENT (THAT APPLIES TO PROJECT P2-92), WHICH IS PART OF THE CERTIFIED FINAL SUBSEQUENT ENVIRONMENTAL IMPACT REPORT (SEIR) FOR THIS FACILITY AS APPROVED BY THE LEAD AGENCY.
[CA PRC CEQA, 11-23-1970]

6. HEADWORKS FACILITY, PRIMARY BASINS, SLUDGE BLENDING FACILITY, DISSOLVED AIR FLOATATION THICKENERS, TRICKLING FILTER FACILITY AND NEW SLUDGE DEWATERING FACILITY (PROJECT P2-92) SHALL BE VENTED TO THEIR DESIGNATED AIR POLLUTION CONTROL SYSTEMS WHICH ARE IN OPERATION PER ITS' VALID PERMITS TO CONSTRUCT OR OPERATE ISSUED BY THE SCAQMD. IN THE EVENT AN AIR POLLUTION CONTROL SYSTEM IS REMOVED FROM OPERATION DURING CONSTRUCTION OR MAINTENANCE WORK, THE H2S CONCENTRATION IN EXHAUST AIR SHALL BE BELOW THE LIMITS SPECIFIED IN THE REMOVED AIR POLLUTION CONTROL SYSTEM'S PERMIT. EACH SUCH CONSTRUCTION OR MAINTENANCE EVENT SHALL BE RECORDED IN A DAILY LOG.
[RULE 402, 1303(a) (1)-BACT, 1401]

7. ~~AFTER COMPLETION OF CONSTRUCTION OF P2-92, THE BUILDING ENCLOSING THE DIGESTED SLUDGE DEWATERING FACILITY SHALL REMAIN CLOSED AT ALL TIMES, EXCEPT TO ALLOW PERSONNEL TO ENTER OR EXIT;~~ AFTER COMPLETION OF CONSTRUCTION OF P2-92, THE BUILDING ENCLOSING THE DIGESTED SLUDGE DEWATERING FACILITY SHALL REMAIN CLOSED AT ALL TIMES, EXCEPT TO ALLOW PERSONNEL TO ENTER OR EXIT; FACILITATE OPERATIONS/MAINTENANCE ACTIVITIES OR TO ALLEVIATE SAFETY ISSUES.
[RULE 204, 402]

8. THE FERROUS AND/OR FERRIC CHLORIDE INJECTION STATION SHALL BE IN USE TO THE EXTENT NECESSARY TO MAINTAIN THE H2S CONCENTRATION IN THE DIGESTER GAS TO THE PERMITTED LIMIT.
[RULE 431.1]

Orange County Sanitation District

10844 Ellis Avenue, Fountain Valley, CA 92708
(714) 962-2411 www.ocsewers.com

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Rossmoor/Los Alamitos Area Sewer District

June 24, 2014

Permit Services
South Coast Air Quality Management District
21865 E. Copley Drive
Diamond Bar, CA 91765-4182

SUBJECT: Application for Title V Permit Revision for Orange County Sanitation District Plant No. 2 (Facility ID No. 029110): Modification of Existing Odor Control System at the Trickling Filter Facility (Permit No. F99404)

Enclosed with this letter is an application for Title V permit revision for Orange County Sanitation District's Wastewater Treatment Plant No. 2. The Title V permit revision is requested for the modification of the Permit-to-Operate No. G27920 for the addition of three new chemical scrubbers to the existing odor control system which consists of three carbon adsorbers.

Enclosed with this letter are:

- (2) SCAQMD Form 400-A: Application for Permit to Construct and Permit to Operate
- (1) SCAQMD Form 500-A2: Title V Application Certification
- (1) SCAQMD Form 500-C1: Title V Compliance Status Report
- (1) SCAQMD Form 400-CEQA
- (1) SCAQMD Form 400-E-3: Scrubber
- (1) SCAQMD Form 400-XPP: Express Permit Processing Request
- Supplemental Information
- A check in the amount of $8,176.67 for the processing fee

If you have any questions or require further information, please contact Terry Ahn at (714) 593-7082 or tahn@ocsd.com.

James Colston
Environmental Compliance Manager

TA:JC:jb
H:\dept\eng\790\Groups\Compliance\Staff\ahn\Permitting Projects\FE13-04_P2TF New Odor Control 2014\Permitting\FE13-04_ApplCvr.doc

Enclosure(s)

cc: V. Kogan (w/o enclosures)
Gaurang Rawal (SCAQMD)

South Coast Air Quality Management District

Form 400-CEQA
California Environmental Quality Act (CEQA) Applicability

Mail To:
SCAQMD
P.O. Box 4944
Diamond Bar, CA 91765-0944

Tel: (909) 396-3385
www.aqmd.gov

The SCAQMD is required by state law, the California Environmental Quality Act (CEQA), to review discretionary permit project applications for potential air quality and other environmental impacts. This form is a screening tool to assist the SCAQMD in clarifying whether or not the project[1] has the potential to generate significant adverse environmental impacts that might require preparation of a CEQA document [CEQA Guidelines §15060(a)].[2] Refer to the attached instructions for guidance in completing this form.[3] For each Form 400-A application, also complete and submit one Form 400-CEQA. If submitting multiple Form 400-A applications for the same project at the same time, only one 400-CEQA form is necessary for the entire project. If you need assistance completing this form, contact Permit Services at (909) 396-3385 or (909) 396-2668.

Section A - Facility Information

1. **Facility Name** (Business Name of Operator To Appear On The Permit): Orange County Sanitation District

2. **Valid AQMD Facility ID** (Available On Permit Or Invoice Issued By AQMD): 029110

3. **Project Description:**
Addition of three new chemical scrubbers to the existing odor control system to improve the odor control treatment at the Trickling Filter facility (OCSD Job No. FE13-04))

Section B - Review For Exemption From Further CEQA Action

Check "Yes" or "No" as applicable

	Yes	No	Is this application for:
1.	○	◉	**A CEQA and/or NEPA document previously or currently prepared that specifically evaluates this project?** If yes, attach a copy of the signed Notice of Determination to this form.
2.	○	◉	**A request for a change of permittee only (without equipment modifications)?**
3.	○	◉	**A functionally identical permit unit replacement with no increase in rating or emissions?**
4.	○	◉	**A change of daily VOC permit limit to a monthly VOC permit limit?**
5.	○	◉	**Equipment damaged as a result of a disaster during state of emergency?**
6.	○	◉	**A Title V** (i.e., Regulation XXX) **permit renewal (without equipment modifications)?**
7.	○	◉	**A Title V administrative permit revision?**
8.	○	◉	**The conversion of an existing permit into an initial Title V permit?**

If "Yes" is checked for any question in Section B, your application does not require additional evaluation for CEQA applicability. Skip to Section D - Signatures on page 2 and sign and date this form.

Section C - Review of Impacts Which May Trigger CEQA

Complete Parts I-VI by checking "Yes" or "No" as applicable. To avoid delays in processing your application(s), explain all "Yes" responses on a separate sheet and attach it to this form.

	Yes	No	Part I - General
1.	○	◉	**Has this project generated any known public controversy regarding potential adverse impacts that may be generated by the project?** Controversy may be construed as concerns raised by local groups at public meetings; adverse media attention such as negative articles in newspapers or other periodical publications, local news programs, environmental justice issues, etc.
2.	○	◉	**Is this project part of a larger project?** If yes, attach a separate sheet to briefly describe the larger project.
			Part II - Air Quality
3.	○	◉	**Will there be any demolition, excavating, and/or grading construction activities that encompass an area exceeding 20,000 square feet?**
4.	○	◉	**Does this project include the open outdoor storage of dry bulk solid materials that could generate dust?** If Yes, include a plot plan with the application package.

[1] A "project" means the whole of an action which has a potential for resulting in physical change to the environment, including construction activities, clearing or grading of land, improvements to existing structures, and activities or equipment involving the issuance of a permit. For example, a project might include installation of a new, or modification of an existing internal combustion engine, dry-cleaning facility, boiler, gas turbine, spray coating booth, solvent cleaning tank, etc.

[2] To download the CEQA guidelines, visit http://ceres.ca.gov/env_law/state.html.

[3] To download this form and the instructions, visit http://www.aqmd.gov/ceqa or http://www.aqmd.gov/permit

Section C - Review of Impacts Which May Trigger CEQA (cont.)			
	Yes	No	**Part II - Air Quality (cont.)**
5.	○	◉	**Would this project result in noticeable off-site odors from activities that may not be subject to SCAQMD permit requirements?** For example, compost materials or other types of greenwaste (i.e., lawn clippings, tree trimmings, etc.) have the potential to generate odor complaints subject to *Rule 402 – Nuisance.*
6.	○	◉	**Does this project cause an increase of emissions from marine vessels, trains and/or airplanes?**
7.	○	◉	**Will the proposed project increase the QUANTITY of hazardous materials stored aboveground onsite or transported by mobile vehicle to or from the site by greater than or equal to the amounts associated with each compound on the attached Table 1?**[4]
			Part III – Water Resources
8.	○	◉	**Will the project increase demand for water at the facility by more than 5,000,000 gallons per day?** The following examples identify some, but not all, types of projects that may result in a "yes" answer to this question: 1) projects that generate steam; 2) projects that use water as part of the air pollution control equipment; 3) projects that require water as part of the production process; 4) projects that require new or expansion of existing sewage treatment facilities; 5) projects where water demand exceeds the capacity of the local water purveyor to supply sufficient water for the project; and 6) projects that require new or expansion of existing water supply facilities.
9.	○	◉	**Will the project require construction of new water conveyance infrastructure?** *Examples of such projects are when water demands exceed the capacity of the local water purveyor to supply sufficient water for the project, or require new or modified sewage treatment facilities such that the project requires new water lines, sewage lines, sewage hook-ups, etc.*
			Part IV – Transportation/Circulation
10.			**Will the project result in** (Check all that apply):
	○	◉	**a. the need for more than 350 new employees?**
	○	◉	**b. an increase in heavy-duty transport truck traffic to and/or from the facility by more than 350 truck round-trips per day?**
	○	◉	**c. increase customer traffic by more than 700 visits per day?**
			Part V – Noise
11.	○	◉	**Will the project include equipment that will generate noise GREATER THAN 90 decibels (dB) at the property line?**
			Part VI – Public Services
12.			**Will the project create a permanent need for new or additional public services in any of the following areas** (Check all that apply):
	○	◉	**a. Solid waste disposal?** Check "No" if the projected potential amount of wastes generated by the project is less than five tons per day.
	○	◉	**b. Hazardous waste disposal?** Check "No" if the projected potential amount of hazardous wastes generated by the project is less than 42 cubic yards per day (or equivalent in pounds).

"REMINDER: *For each "Yes" response in Section C, attach all pertinent information including but not limited to estimated quantities, volumes, weights, etc.*"

Section D - Signatures

I HEREBY CERTIFY THAT ALL INFORMATION CONTAINED HEREIN AND INFORMATION SUBMITTED WITH THIS APPLICATION IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE. I UNDERSTAND THAT THIS FORM IS A SCREENING TOOL AND THAT THE SCAQMD RESERVES THE RIGHT TO CONSIDER OTHER PERTINENT INFORMATION IN DETERMINING CEQA APPLICABILITY.

1. Signature of Responsible Official of Firm:		2. Title of Responsible Official of Firm: General Manager
3. Print Name of Responsible Official of Firm: James Herberg		4. Date Signed: 06-24-2014
5. Phone # of Responsible Official of Firm: (714) 593-7300	6. Fax # of Responsible Official of Firm: (714) 962-0356	7. Email of Responsible Official of Firm: jherberg@ocsd.com
8. Signature of Preparer, (If prepared by person other than responsible official of firm):		9. Title of Preparer: Regulatory Specialist
10. Print Name of Preparer: Terry Ahn		11. Date Signed: 6/24/14
12. Phone # of Preparer: (714) 593-7082	13. Fax # of Preparer: (714) 593-7773	14. Email of Preparer: tahn@ocsd.com

THIS CONCLUDES FORM 400-CEQA. INCLUDE THIS FORM AND ANY ATTACHMENTS WITH FORM 400-A.

[4] Table 1 – Regulated Substances List and Threshold Quantities for Accidental Release Prevention can be found in the Instructions for Form 400-CEQA.

SOURCE TEST REPORT

Relative Accuracy Test Audit of a CEMS Serving Internal Combustion Engine No. 1 for NO_X, CO, O_2, and Stack Gas Flow Rates under SCAQMD Rule 218/218.1

Facility ID: 29110

Prepared for:

Orange County Sanitation District
10844 Ellis Avenue
Fountain Valley, CA 92708

Equipment Location:

Treatment Plant No. 2
22212 Brookhurst Avenue
Huntington Beach, CA 92646

Test Date: September 29, 2015

Report Date: October 16, 2015

Project No.: 9849

Prepared by:

Almega Environmental & Technical Services
10602 Walker Street
Cypress, CA 90630

Prepared by & Title: _____
Christopher Lovett, Project Manager

Reviewed by & Title: _____
Charles Figueroa, Senior Project Manager

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1.0 EXECUTIVE SUMMARY

Key project information is provided in the summary below. Test results are summarized in Table 1-1.

Customer	Orange County Sanitation District 10844 Ellis Avenue Fountain Valley, CA 92708 Contact: Ms. Randa AbuShaban, tel. (714) 593-7413
Equipment Location	Treatment Plant No. 2 22212 Brookhurst Avenue Huntington Beach, CA 92646
Facility ID	29110
Equipment	Internal Combustion Engine No. 1 (CG1-HB) fired on natural gas and digester gas
Permit Number	Permit G27394, A/N 540708
Test Objective	Relative Accuracy Test Audit (RATA) of a CEMS serving an Internal Combustion Engine for NO_X, CO, O_2 and Stack gas flow rates under SCAQMD Rules 218/218.1
Test Requested by	Ms. Randa AbuShaban of Orange County Sanitation District
Test Date	September 29, 2015
Last Test Date	September 16, 2014
Testing Firm	Almega Environmental & Technical Services 10602 Walker Street Cypress, CA 90630 Contact: Mr. Christopher Lovett, tel. (714) 889-4000
Test Personnel	Tom Tran and Luke Barrow of Almega Environmental & Technical Services
Regulatory Agency	South Coast Air Quality Management District (SCAQMD) 21865 East Copley Drive Diamond Bar, CA 91765-4182 Contact: Eric Padilla, tel. (909) 396-2265
Measurements Stack Gas Parameters CEMS: NO_X, CO, O_2 & CO_2	 SCAQMD Methods 1.1-4.1 SCAQMD Method 100.1

TABLE 1-1. SUMMARY OF RESULTS

Facility: **OCSD, Plant No. 2** **Facility ID: 29110**
City: **Huntington Beach, CA** **Job No.: 9849**
Source: **Engine 1** **Test Date: 09/29/15**
Test: **RATA**

PARAMETER	UNIT	AVERAGE RM CEMS	PAGE NO.	AVERAGE FACILITY CEMS	CALC. RA (%)	ALLOWED RA (%)
NOx CONCENTRATION	ppm	51.26	6	52.73	**4.72**	**20%**
NOx CORRECTED CONCENTRATION	ppm@15%O2	31.61	7	32.19	**4.06**	**20%**
NOx MASS EMISSION RATE	lb/hr	3.36	8	3.55	**9.46**	**20%**
CO CONCENTRATION	ppm	477.7	9	497.4	**4.45**	**20%**
CO CORRECTED CONCENTRATION	ppm@15%O2	294.8	10	304.1	**3.56**	**20%**
CO MASS EMISSION RATE	lb/hr	19.06	11	20.47	**12.56**	**20%**
DRY VOLUMETRIC FLOW RATE	dscfh	540,269	12	564,732	**9.16**	**15%**
O2 CONCENTRATION	%	11.33	13	11.24	**1.17**	**10%**

The facility CEMS has to be reassessed annually per Rules 218/218.1.

2.0 INTRODUCTION

Almega Environmental & Technical Services (Almega) was retained by Orange County Sanitation District (OCSD) to conduct stationary source emissions testing on Internal Combustion Engine No. 1 at its Huntington Beach, California wastewater treatment facility (Treatment Plant No. 2). This testing consisted of an annual Relative Accuracy Test Audit (RATA) of the continuous emission monitoring system (CEMS) for oxides of nitrogen (NO_X), carbon monoxide (CO), oxygen (O_2), and stack gas flow rates. The purpose of the test was to demonstrate the CEMS satisfies site specific permit conditions as stipulated in the South Coast Air Quality Management District (SCAQMD) CEMS Certification Test Protocol Evaluation Approval Letter dated April 22, 2009. This RATA meets the CEMS requirements of SCAQMD Rules 1110.2 and 218, as well as the performance specifications of SCAQMD Rule 218.1.

Table 2-1 lists the sampling matrix employed during the test.

TABLE 2-1. SAMPLING MATRIX

Facility CEM System	Sampling Parameters (9 RATA Runs)	Measured Unit	Reference Method	RATA Criterion	Performance Specification
ICE No. 1 (CG1-HB)	NOx Concentrations	ppmv	SCAQMD 100.1	RA $\leq$ 20%	SCAQMD Rule 218/ 218.1
	NOx Corrected Conc.	ppmv@15% O_2	SCAQMD 100.1	RA $\leq$ 20%	
	NOx Mass Emissions	lb/hr	SCAQMD 100.1	RA $\leq$ 20%	
	CO Concentrations	ppmv	SCAQMD 100.1	RA $\leq$ 20%	
	CO Corrected Conc.	ppmv@15% O_2	SCAQMD 100.1	RA $\leq$ 20%	
	CO Mass Emissions	lb/hr	SCAQMD 100.1	RA $\leq$ 20%	
	O_2 Concentrations	%	SCAQMD 100.1	RA $\leq$ 10%	
	Stack Gas Flow Rates	dscfh	SCAQMD 1.1 – 4.1	RA $\leq$ 15%	

On September 29, 2015, Almega performed source testing on Engine No. 1 while the unit was operated under normal operating conditions. Sampling was performed at the exhaust stack. Nine RATA runs, 30 minutes in duration each, were conducted as specified in the reference methods.

2.1 Document Outline

This report is organized as follows. Section 1.0 is a summary of the project and test results. Section 2.0 describes the project, its objectives and approach. Section 3.0 discusses test results. Section 4.0 describes the equipment tested and applicable sampling locations. Section 5.0 describes the sampling and analysis procedures used to conduct the testing. And Section 6.0 describes Quality Assurance and Quality Control activities performed. The Appendices contain test results, calculated data, raw field data, facility process and CEMS data, calibration records, and certification documents.

3.0 TEST RESULTS AND DISCUSSION

The testing was conducted after the arrival of Almega's test personnel and set-up of test equipment. The unit was operated by plant personnel during testing activities. The testing was conducted at normal operating conditions for the process. No unusual operating conditions were noted during the test periods.

3.1 Test Discussion

Test results were summarized in Table 1-1. Detailed test results are shown in Tables 3-1 through Table 3-8 and discussed below.

3.1.1 Relative Accuracy (RA)

The following parameters passed RA performance specifications:

- NOx Concentration (ppmv)
- NOx Concentration (ppmv @ 15% O_2)
- NOx Mass Emission Rate (lb/hr)
- CO Concentration (ppmv)
- CO Concentration (ppmv @ 15% O_2)
- CO Mass Emission Rate (lb/hr)
- Dry Volumetric Flow Rate (dscfh)
- O_2 (%)

3.1.2 Total Runs

- Total runs conducted: 9
- Total runs used: 9

3.1.3 Others

- All measured concentrations were corrected for bias zero and bias calibration drifts according to SCAQMD Method 100.1 (See Appendix D1).

- All instruments performed properly during testing and their performance specifications were within the allowable limits specified in Method 100.1 (See Appendix D1).

- A cyclonic flow check was performed during the initial RATA certification test program in 2009. No cyclonic flow was observed.

- Two sample conditioners were used for stack gas cooling purposes. The CEMS conditioner dew point was maintained below 37°F (See Appendix C2).

Testing was performed as specified in the reference methods. No modifications to proposed sampling and analysis procedures other than those noted above were required.

3.2 Test Chronology

Testing for NOx, CO, O_2, CO_2 and Flow Rate was conducted according to the following chronology:

Parameter-Measurement	Test Date & Time
NOx, CO, O_2, CO_2 and Stack Gas Flow Rates	September 29, 2015 (7:26 - 12:27)

TABLE 3-1. RELATIVE ACCURACY SUMMARY: NOx CONCENTRATION

Facility: OCSD, Plant No. 2 Facility ID: 29110
City: Huntington Beach, CA Job No.: 9849
Source: Engine 1 Test Date: 09/29/15
Test: RATA

Run No.	Time (hh:mm)	Reference Method NOx ppm	Reference Method Report Page No.	Facility NOx ppm	Facility Report Page No.	Difference NOx ppm
1	7:26-7:55	50.95	D1-1	53.87	F1-1	-2.92
2	7:56-8:25	52.83	D1-1	54.73	F1-1	-1.90
3	8:26-8:55	51.02	D1-1	53.01	F1-1	-1.99
4	9:12-9:41	49.90	D1-1	52.61	F1-1	-2.71
5	9:42-10:11	52.12	D1-1	53.94	F1-1	-1.82
6	10:12-10:41	52.57	D1-1	54.58	F1-1	-2.01
7	10:58-11:27	52.04	D1-1	52.77	F1-1	-0.73
8	11:28-11:57	49.64	D1-1	49.36	F1-1	0.28
9	11:58-12:27	50.28	D1-1	49.66	F1-1	0.62

RM Average	CEMS Average	Difference Average (d)
51.26	52.73	-1.46

Number of Valid Runs (n):	9
Standard Deviation (Sd):	1.248
t-value (0.975):	2.306
Confidence Coefficient (cc):	0.959
Relative Accuracy Test Result:	**4.72 % of RM**

SCAQMD RULE 218/218.1 CRITERIA

RATA Allowable Limit **≤ 20.0 % of RM**

TABLE 3-2. RELATIVE ACCURACY SUMMARY: NOx CORRECTED CONCENTRATION

Facility: OCSD, Plant No. 2 — Facility ID: 29110
City: Huntington Beach, CA — Job No.: 9849
Source: Engine 1 — Test Date: 09/29/15
Test: RATA

Run No.	Time (hh:mm)	Reference Method NOx ppm@15%O2	Reference Method Report Page No.	Facility NOx ppm@15%O2	Facility Report Page No.	Difference NOx ppm@15%O2
1	7:26-7:55	31.34	D1-1	33.22	F1-1	-1.88
2	7:56-8:25	32.92	D1-1	33.77	F1-1	-0.85
3	8:26-8:55	31.10	D1-1	31.98	F1-1	-0.88
4	9:12-9:41	29.77	D1-1	31.23	F1-1	-1.46
5	9:42-10:11	31.53	D1-1	32.27	F1-1	-0.74
6	10:12-10:41	31.15	D1-1	31.94	F1-1	-0.79
7	10:58-11:27	32.57	D1-1	32.80	F1-1	-0.23
8	11:28-11:57	31.78	D1-1	31.14	F1-1	0.64
9	11:58-12:27	32.32	D1-1	31.37	F1-1	0.95

RM Average	CEMS Average	Difference Average (d)
31.61	32.19	-0.58

Number of Valid Runs (n):	9
Standard Deviation (Sd):	0.913
t-value (0.975):	2.306
Confidence Coefficient (cc):	0.701
Relative Accuracy Test Result:	**4.06 % of RM**

SCAQMD RULE 218/218.1 CRITERIA

RATA Allowable Limit — **≤ 20.0 % of RM**

TABLE 3-3. RELATIVE ACCURACY SUMMARY: NOx MASS EMISSION RATE

Facility: OCSD, Plant No. 2 — Facility ID: 29110
City: Huntington Beach, CA — Job No.: 9849
Source: Engine 1 — Test Date: 09/29/15
Test: RATA

Run No.	Time (hh:mm)	Reference Method NOx lb/hr	Reference Method Report Page No.	Facility NOx lb/hr	Facility Report Page No.	Difference NOx lb/hr
1	7:26-7:55	3.46	D1-1	3.85	F1-1	-0.392
2	7:56-8:25	3.58	D1-1	3.91	F1-1	-0.326
3	8:26-8:55	3.24	D1-1	3.38	F1-1	-0.136
4	9:12-9:41	3.08	D1-1	3.10	F1-1	-0.024
5	9:42-10:11	3.22	D1-1	3.28	F1-1	-0.056
6	10:12-10:41	3.14	D1-1	3.07	F1-1	0.070
7	10:58-11:27	3.58	D1-1	3.88	F1-1	-0.296
8	11:28-11:57	3.43	D1-1	3.73	F1-1	-0.303
9	11:58-12:27	3.47	D1-1	3.75	F1-1	-0.278

RM Average	CEMS Average	Difference Average (d)
3.356	3.550	-0.194

Number of Valid Runs (n):	9
Standard Deviation (Sd):	0.161
t-value (0.975):	2.306
Confidence Coefficient (cc):	0.124
Relative Accuracy Test Result:	**9.46 % of RM**

SCAQMD RULE 218/218.1 CRITERIA

RATA Allowable Limit — **≤ 20.0 % of RM**

TABLE 3-4. RELATIVE ACCURACY SUMMARY: CO CONCENTRATION

Facility: OCSD, Plant No. 2 — Facility ID: 29110
City: Huntington Beach, CA — Job No.: 9849
Source: Engine 1 — Test Date: 09/29/15
Test: RATA

Run No.	Time (hh:mm)	Reference Method CO ppm	Reference Method Report Page No.	Facility CO ppm	Facility Report Page No.	Difference CO ppm
1	7:26-7:55	476.66	D1-1	494.35	F1-1	-17.69
2	7:56-8:25	473.46	D1-1	493.89	F1-1	-20.43
3	8:26-8:55	472.66	D1-1	491.63	F1-1	-18.97
4	9:12-9:41	468.17	D1-1	486.28	F1-1	-18.11
5	9:42-10:11	466.09	D1-1	485.41	F1-1	-19.32
6	10:12-10:41	466.33	D1-1	483.09	F1-1	-16.76
7	10:58-11:27	482.67	D1-1	503.62	F1-1	-20.95
8	11:28-11:57	497.18	D1-1	519.27	F1-1	-22.09
9	11:58-12:27	496.12	D1-1	518.99	F1-1	-22.87

RM Average	CEMS Average	Difference Average (d)
477.71	497.39	-19.68

Number of Valid Runs (n):	9
Standard Deviation (Sd):	2.055
t-value (0.975):	2.306
Confidence Coefficient (cc):	1.579
Relative Accuracy Test Result:	**4.45 % of RM**
SCAQMD RULE 218/218.1 CRITERIA:	**≤ 20.0 % of RM**

TABLE 3-5. RELATIVE ACCURACY SUMMARY: CO CORRECTED CONCENTRATION

Facility: OCSD, Plant No. 2 — Facility ID: 29110
City: Huntington Beach, CA — Job No.: 9849
Source: Engine 1 — Test Date: 09/29/15
Test: RATA

Run No.	Time (hh:mm)	Reference Method CO ppm@15%O2	Reference Method Report Page No.	Facility CO ppm@15%O2	Facility Report Page No.	Difference CO ppm@15%O2
1	7:26-7:55	293.14	D1-1	304.92	F1-1	-11.78
2	7:56-8:25	294.97	D1-1	304.74	F1-1	-9.77
3	8:26-8:55	288.09	D1-1	296.72	F1-1	-8.63
4	9:12-9:41	279.27	D1-1	288.83	F1-1	-9.56
5	9:42-10:11	282.00	D1-1	290.46	F1-1	-8.46
6	10:12-10:41	276.32	D1-1	282.70	F1-1	-6.38
7	10:58-11:27	302.13	D1-1	313.08	F1-1	-10.95
8	11:28-11:57	318.35	D1-1	327.62	F1-1	-9.27
9	11:58-12:27	318.86	D1-1	327.87	F1-1	-9.01

RM Average	CEMS Average	Difference Average (d)
294.79	304.10	-9.31

Number of Valid Runs (n):	9
Standard Deviation (Sd):	1.539
t-value (0.975):	2.306
Confidence Coefficient (cc):	1.183

Relative Accuracy Test Result: **3.56 % of RM**

SCAQMD RULE 218/218.1 CRITERIA: **≤ 20.0 % of RM**

TABLE 3-6. RELATIVE ACCURACY SUMMARY: CO MASS EMISSION RATE

Facility: OCSD, Plant No. 2 — Facility ID: 29110
City: Huntington Beach, CA — Job No.: 9849
Source: Engine 1 — Test Date: 09/29/15
Test: RATA

Run No.	Time (hh:mm)	Reference Method CO lb/hr	Reference Method Report Page No.	Facility CO lb/hr	Facility Report Page No.	Difference CO lb/hr
1	7:26-7:55	19.690	D1-1	21.510	F1-1	-1.820
2	7:56-8:25	19.547	D1-1	21.490	F1-1	-1.943
3	8:26-8:55	18.292	D1-1	19.040	F1-1	-0.748
4	9:12-9:41	17.566	D1-1	17.430	F1-1	0.136
5	9:42-10:11	17.549	D1-1	17.980	F1-1	-0.431
6	10:12-10:41	16.955	D1-1	16.540	F1-1	0.415
7	10:58-11:27	20.234	D1-1	22.530	F1-1	-2.296
8	11:28-11:57	20.891	D1-1	23.840	F1-1	-2.949
9	11:58-12:27	20.852	D1-1	23.860	F1-1	-3.008

RM Average	CEMS Average	Difference Average (d)
19.064	20.469	-1.405

Number of Valid Runs (n):	9
Standard Deviation (Sd):	1.288
t-value (0.975):	2.306
Confidence Coefficient (cc):	0.990
Relative Accuracy Test Result:	**12.56 % of RM**

SCAQMD RULE 218/218.1 CRITERIA **≤ 20.0 % of RM**

TABLE 3-7. RELATIVE ACCURACY SUMMARY: DRY VOLUMETRIC FLOW RATE

Facility: OCSD, Plant No. 2 — Facility ID: 29110
City: Huntington Beach, CA — Job No.: 9657
Source: Engine 1 — Test Date: 09/29/15
Test: RATA

Run No.	Time (hh:mm)	Reference Method Dry Flow dscfh	Reference Method Report Page No.	Facility Dry Flow dscfh	Facility Report Page No.	Difference Dry Flow dscfh
1	7:26-7:55	559,810	D1-1	598,708	F1-1	-38,898
2	7:56-8:25	559,517	D1-1	598,571	F1-1	-39,054
3	8:26-8:55	524,458	D1-1	531,988	F1-1	-7,529
4	9:12-9:41	508,474	D1-1	493,152	F1-1	15,322
5	9:42-10:11	510,255	D1-1	509,537	F1-1	718
6	10:12-10:41	492,743	D1-1	471,106	F1-1	21,637
7	10:58-11:27	568,128	D1-1	615,470	F1-1	-47,342
8	11:28-11:57	569,437	D1-1	631,711	F1-1	-62,273
9	11:58-12:27	569,598	D1-1	632,347	F1-1	-62,750

RM Average	CEMS Average	Difference Average (d)
540,269	564,732	-24,463

Number of Valid Runs (n):	9
Standard Deviation (Sd):	32,537
t-value (0.975):	2.306
Confidence Coefficient (cc):	25,010
Relative Accuracy Test Result:	**9.16 % of RM**

SCAQMD RULE 218/218.1 CRITERIA

RATA Allowable Limit — **≤ 15.0 % of RM**

TABLE 3-8. RELATIVE ACCURACY SUMMARY: O2 CONCENTRATION

Facility: OCSD, Plant No. 2 — Facility ID: 29110
City: Huntington Beach, CA — Job No.: 9849
Source: Engine 1 — Test Date: 09/29/15
Test: RATA

Run No.	Time (hh:mm)	Reference Method O2 %	Reference Method Report Page No.	Facility O2 %	Facility Report Page No.	Difference O2 %
1	7:26-7:55	11.31	D1-1	11.33	F1-1	-0.02
2	7:56-8:25	11.43	D1-1	11.34	F1-1	0.09
3	8:26-8:55	11.22	D1-1	11.11	F1-1	0.11
4	9:12-9:41	11.01	D1-1	10.96	F1-1	0.05
5	9:42-10:11	11.15	D1-1	11.04	F1-1	0.11
6	10:12-10:41	10.94	D1-1	10.82	F1-1	0.12
7	10:58-11:27	11.47	D1-1	11.41	F1-1	0.06
8	11:28-11:57	11.69	D1-1	11.55	F1-1	0.14
9	11:58-12:27	11.72	D1-1	11.56	F1-1	0.16

RM Average	CEMS Average	Difference Average (d)
11.33	11.24	0.091

Number of Valid Runs (n):	9
Standard Deviation (Sd):	0.055
t-value (0.975):	2.306
Confidence Coefficienct (cc):	0.042
Relative Accuracy Test Result:	**1.17 % of RM**

SCAQMD RULE 218/218.1 CRITERIA

RATA Allowable Limit — **≤ 10.0 % of RM**

4.0 EQUIPMENT AND PROCESS DESCRIPTION

Orange County Sanitation District's wastewater treatment facility in Huntington Beach, California (Treatment Plant No. 2) operates a Central Power Generation System (CGS) to produce electrical power for the plant operations using five large digester gas-fired internal combustion (IC) engines fueled primarily by digester gas (a biogas) and supplemented by small amounts of natural gas. The process description and equipment tested are described below.

4.1 Process Description

Resource Recovery System No. 1 consists of Engine No. 1 (CG1-HB), which is fired on a mixture of digester gas and natural gas, driving a 3000 kW electrical generator, with an exhaust Heat Recovery Steam Generator (HRSG) rated at 6,010,200 Btu/hr capacity. An extractive continuous emissions monitoring system (CEMS) monitors the engine exhaust.

4.1.1 Facility Continuous Emission Monitoring System, CEMS

The CEMS is used to monitor stack gas concentrations for oxides of nitrogen (NO_X), carbon monoxide (CO) and oxygen (O_2). A continuous gas sample is extracted from the stack through a stainless steel probe, transported via a heated sample line to a conditioning system and analyzed by various parameter-specific analyzers. The CEMS includes the following analyzers:

TABLE 4-1. FACILITY CEMS UNIT ANALYZERS

Source	Parameter	Manufacturer	Model Number	Method of Detection	Analytical Range
ICE No. 1 (CG1-HB)	NOx ppmv	Thermo	42i-LS	Chemiluminescent	0-100 ppm
	O_2 %	Thermo	42i-LS	Paramagnetic	0-25%
	CO ppmv	Thermo	48i	Gas Filter Correlation	0-1000 ppm

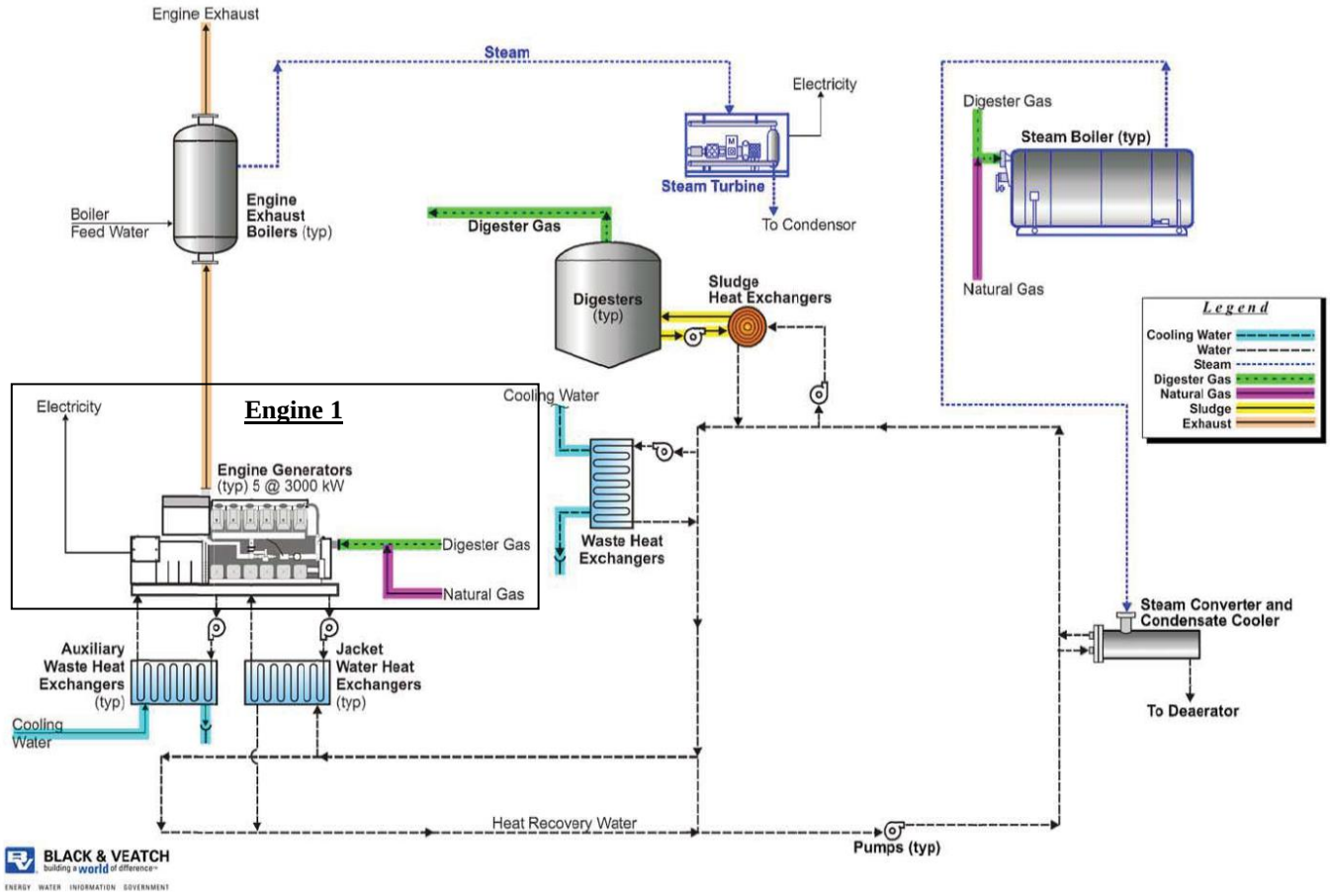
The CEMS utilizes an electronic data acquisition system (DAS) to monitor, record and report emissions data. The CEMS operation, including periodic calibration checks, is controlled electronically.

4.2 Equipment Description

The CEMS is installed on a Cooper Bessemer Model No. LSVB-16-SGC internal combustion engine, Engine No. 1, which is a four-stroke, 4166 HP, turbocharged, spark-ignited unit, utilizing pre-combustion chambers to minimize NOx emissions. The engine is directly coupled to a synchronous generator rated at 3000 kW.

A schematic of the Treatment Plant No. 2 Resource Recovery System is shown in Figure 4-1.

Figure 4-1. Treatment Plant No. 2 – Process Diagram



4.3 Operating Conditions During Test

During RATA testing, the engine was operated at normal load while burning primarily digester gas fuel and supplemented with natural gas. The following operating parameters were observed during the test period. Supporting documentation of process conditions during the testing can be found in Appendix F.

Average Engine Operating Parameters During Testing		
Engine Load	86.7	%
Natural Gas Usage	24.1	dscf/min
Digester Gas Usage	728.4	dscf/min

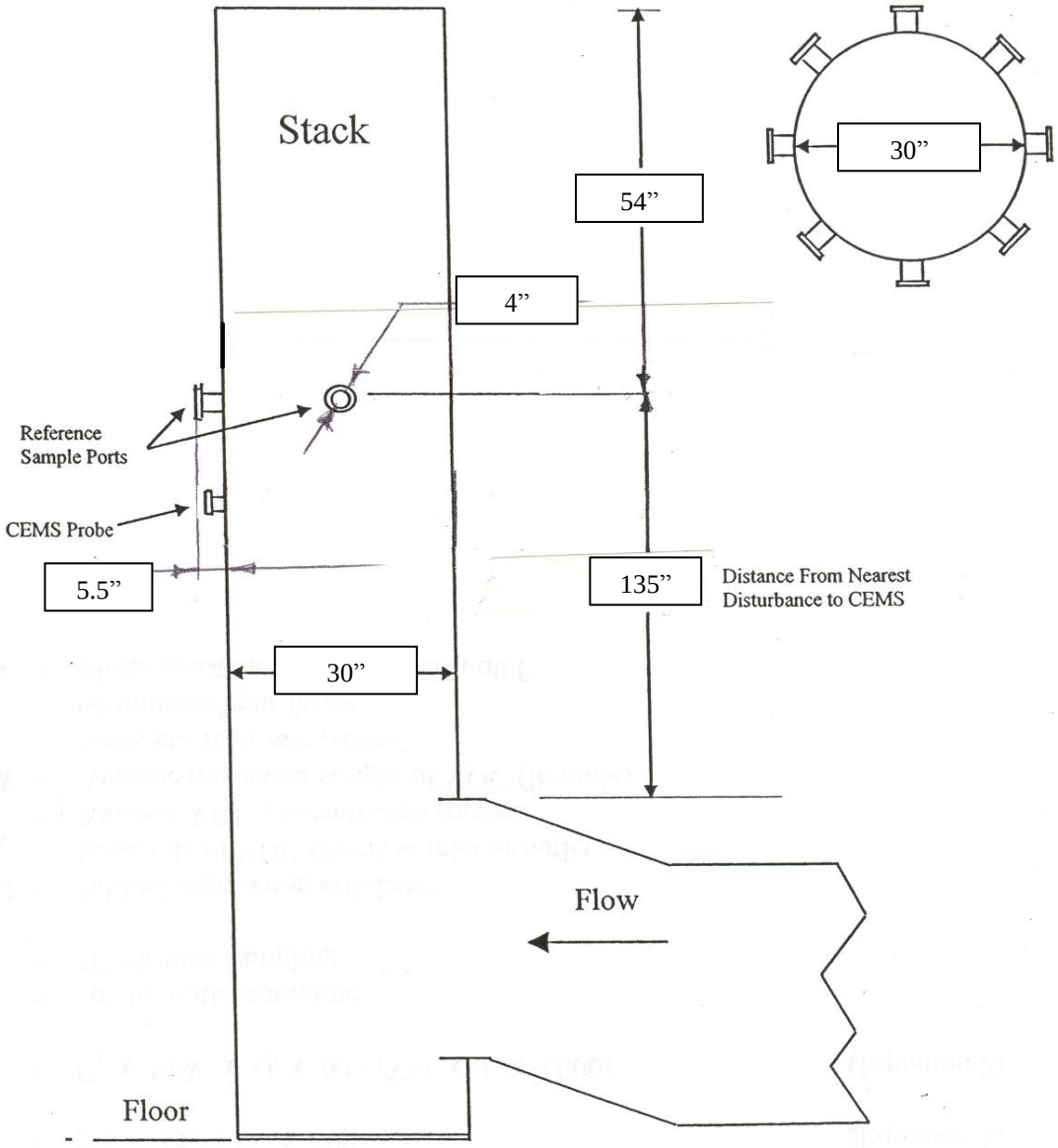
4.4 Sampling Locations

The reference method sampling locations are located on the exhaust stack. A schematic of the stack with sampling locations is shown in Figure 4-2. The reference method sampling locations meet the following specifications:

Sampling Location Configuration for Reference Method CEMS Probe	
Upstream	135 in. (4.5 duct diameters)
Downstream	54 in. (1.8 duct diameters)
Port Length	5.5 in. (measured from outside wall)
Port Inside Diameter	4 in.
Number of Sampling ports	2 (located at 90° intervals)
Stack Diameter	30 in. (internal diameter)

The sampling location complies with the requirements of SCAQMD Method 1.1.

Figure 4-2. Stack Schematic



5.0 SAMPLING AND ANALYTICAL PROCEDURES

Test measurements were performed according to sampling and analysis procedures promulgated by the South Coast Air Quality Management District (SCAQMD), California Air Resources Board (CARB), or US Environmental Protection Agency (EPA). The sampling and analysis procedures used for this test program are summarized below. Any modifications or deviations not addressed herein are discussed in Section 3 of this report.

5.1 SCAQMD Methods 1.1-4.1 – Determination of Stack Gas Volumetric Flow Rate, Molecular Weight, and Moisture Content
5.1.1 SCAQMD Method 1.1 – Sampling Traverse Points
5.1.2 SCAQMD Method 2.1 – Stack Gas Flow Rate
5.1.3 SCAQMD Method 3.1 – Stack Gas Molecular Weight
5.1.4 SCAQMD Method 4.1 – Stack Gas Moisture Content
5.2 SCAQMD Method 100.1 – Continuous Monitoring of Gaseous Emissions, CEMS

5.1 SCAQMD Methods 1.1-4.1 – Determination of Stack Gas Volumetric Flow Rate, Molecular Weight, and Moisture Content

The flue gas flow characteristics (i.e. flow rate, molecular weight, and moisture content) were determined according to SCAQMD Methods 1.1 through 4.1. The testing was conducted as follows:

5.1.1 SAMPLING AND VELOCITY TRAVERSE POINTS

The number and location of traverse points are determined according to SCAQMD Method 1 based on the physical dimensions of the sampling location and process parameters. In principle, the stack cross-section is divided into equal areas, each of which is represented by a "traverse point." Generally, the number of traverse points diminishes as the flow profile at the sampling location becomes uniform. In most cases, the maximum number of sampling points is 24 for particulate testing and 16 for velocity traverses. Fewer traverse points are permitted as described in the method.

5.1.2 STACK GAS VELOCITY AND FLOW RATE

The velocity and volumetric flow rate of the stack gas was determined according to SCAQMD Method 2. In this method, the velocity head (differential pressure) and temperature are measured at the required traverse points. The stack gas differential pressure head was determined using an "S" type pitot tube and electronic micromanometer. The temperature was measured using a type "K" thermocouple and digital temperature readout.

Prior to testing, the measurement system was set-up and leak-checked. Then the velocity head and temperature are recorded at predetermined traverse points. After the last traverse was completed, the system was again leak-checked. After completion of the traverse, the static

pressure in the stack was determined in the centroid of the stack. The stack gas velocity was calculated using the velocity head, and stack gas temperature, pressure and molecular weight.

QA/QC for the method included field performance checks, and periodic calibrations of test equipment including the pitot tube, differential pressure gauge, thermocouple (Tc) and Tc-readout.

5.1.3 STACK GAS MOLECULAR WEIGHT

The stack gas molecular weight (MW) was calculated based on the fraction of its major constituents including: oxygen (O_2), carbon dioxide, (CO_2), nitrogen (N_2), carbon monoxide (CO), and water (H_2O). The dry MW was calculated based on the partial fractions of O_2, CO_2, N_2, and CO. Specifically, the O_2 and CO_2 fractions were determined by CEMS, integrated sampling, or grab sampling, and the balance was assumed to be N_2 and CO. The wet MW was calculated based on the fractions of dry gas and water vapor. The dry and wet MW were calculated according to the following equations:

$$MW_{DRY} = 0.32 \mathbf{x} \%O_2 + 0.44 \mathbf{x} \%CO_2 + 0.28 \mathbf{x} (\%N_2 + \%CO)$$

$$MW_{WET} = 0.18 \mathbf{x} \%H_2O + MW_{DRY} \mathbf{x} (1 - \%H_2O/100)$$

where:
- MW_{DRY} = stack gas molecular weight, dry-basis
- MW_{WET} = stack gas molecular weight, wet-basis
- 0.32 = molecular weight fraction for O_2
- 0.44 = molecular weight fraction for CO_2
- 0.28 = molecular weight fraction for N_2 and CO
- 0.18 = molecular weight fraction for H_2O (water vapor)
- %X = fraction of X in stack gas, dry basis, where X = O_2, CO_2, N_2, CO
- $\%H_2O$ = fraction of water vapor in stack gas, wet-basis

5.1.4 SCAQMD METHOD 4.1- STACK GAS MOISTURE CONTENT

The stack gas moisture content was determined according to SCAQMD Method 4.1. In this method, water vapor is collected in a condenser while the dry stack gas volume is measured using a dry gas meter. The volume of water vapor was calculated from the amount of water condensed and the total gas volume was the sum of water vapor plus dry stack gas. The moisture content was determined as a fraction of the total wet stack gas volume. The following calculations were used.

$$B_{WS} = \frac{V_{W,Std}}{V_{M,Std} + V_{W,Std}}$$

$$V_{W,Std} = K_1 \mathbf{x} V_{H2O}$$

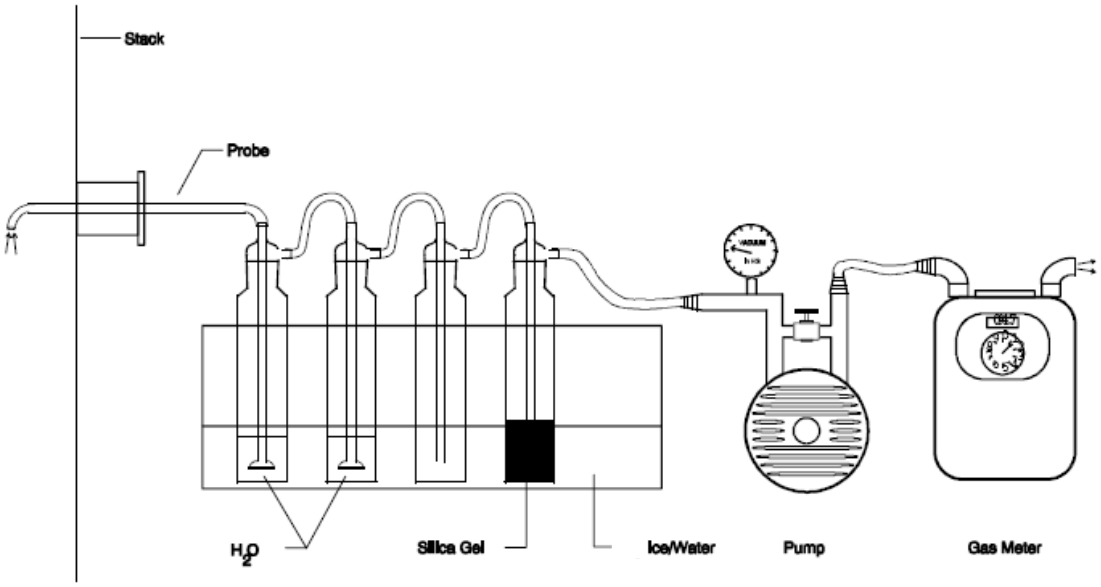
$$V_{M,Std} = T_{Std}/P_{Std} \mathbf{x} Y_M \mathbf{x} V_M \mathbf{x} P_M/T_M$$

where:
- B_{WS} = Fraction of water vapor in stack gas
- $V_{W,Std}$ = Volume of water vapor (scf)
- $V_{M,Std}$ = Volume of stack gas sampled (dscf)
- K_1 = Unit volume of water vapor (0.04707 scf @68°F or 0.0464 scf @60°F)
- T_{Std} = Standard Temperature (528°R or 520°R)
- P_{Std} = Standard Pressure, 29.92 in. Hg
- Y_M = Dry gas meter calibration factor
- V_M = Measured volume of stack gas sampled
- P_M = Dry gas meter pressure (in. Hg)
- T_M = Dry gas meter temperature (°R)

Sampling for moisture content was performed as follows:

Moisture was collected in a sampling train consisting of a probe, TFE line, four impingers in an ice bath, a leak-free pump, a vacuum gauge and a dry gas meter. Figure 5-1 is a schematic of a typical moisture train. Initially, impingers #1 and #2 contain 100 ml of water, impinger #3 was empty, and impinger #4 contains a known amount (approximately 300 g) of desiccant (e.g. Silica Gel). Prior to sampling, a leak check of the sampling train was performed. Then, the sampling probe was inserted into the centroid of the stack, the initial meter readings (volume, temperatures, etc.) are recorded, the sample pump was started and the sampling rate was adjusted to the desired sampling rate (typically 0.75 dry cfm). Sampling was conducted until at least 63 dry cubic feet were collected per 90-minute moisture run (3 RATA runs). After sampling, the final meter readings were recorded and the impinger train was recovered. The change in volume and/or weight of the impinger train components was used to determine the amount of moisture condensed. The volume of water vapor and the corrected volume of dry gas sampled were used to calculate the moisture fraction as described above.

Figure 5-1. Moisture Train



5.2 SCAQMD Method 100.1 - Continuous Monitoring of Gaseous Emissions, CEMS

In this method, gaseous components of the stack gas (e.g. NO_X, SO_2, O_2, CO_2, CO) are measured continuously according to SCAQMD Method 100.1 using Almega's mobile continuous emissions monitoring system (CEMS). Figure 5-2 is a schematic of Almega's CEMS.

The CEMS extracts and conditions a representative stack gas sample and analyzes the gas using one or more analytical instruments. Typical CEMS instrumentation is described in Table 5-1. The extraction and conditioning system consists of a stainless steel heated probe, a short heated TFE sample line, a conditioning system, a TFE-diaphragm pump and a TFE transport (sample) line. The sample conditioning system, consisting of water knockout impingers and/or a thermoelectric condenser, removes moisture before the gas is delivered to the analyzers. Sample flow and delivery are controlled using a flow control panel that includes valves, pressure gauges, and flow meters (rotameters). The flow control panel allows the user to deliver sample gas to any and all instruments. Instrument readings are recorded using a real-time strip chart and an electronic data acquisition system (DAS). Other pertinent data such as calibration gas cylinder numbers and concentrations, test location, dates, times, and operator identification are also recorded on the strip chart and on the field data form.

Sampling included pretest and post-test calibration and bias checks for each sampling run. Raw concentration data were corrected for sampling system bias according to Method 100.1 using the following equation:

$$C_{CORR} = C_{MA} \times \frac{(C_i - BIAS_{ZERO})}{(BIAS_{SPAN} - BIAS_{ZERO})}$$

Where:
- C_{CORR} = Concentration, corrected for drift and bias
- C_i = Average measured concentration (raw value)
- $BIAS_{ZERO}$ = Average instrument response during zero bias check
- C_{MA} = Certified concentration of applicable span gas
- $BIAS_{SPAN}$ = Average instrument response during span bias check

The following QA/QC activities were performed during testing.

- Prior to testing, each individual analyzer was calibrated (adjusted) by introducing zero, high-span and mid-span gases directly into each analyzer and by making corresponding adjustments.

- Prior to testing, calibration error, linearity and system bias checks were performed on each analyzer. Calibration error and linearity checks were performed by injecting known calibration gases directly to each instrument. System bias checks were performed by injecting calibration gases at the sampling-probe/junction or at the sampling probe tip.

- The system response time for each parameter was determined at the moment when the calibration gas for the bias check reaches 95% of its expected concentration value.

- A leak check was conducted before sampling and periodically thereafter to ensure that no leakage occurs in the entire sampling apparatus. The leak check was performed on the vacuum side by sealing the probe tip and drawing vacuum to above 20 inches of mercury. After the vacuum stabilizes, it should hold constantly at about 20 in Hg with no loss of greater than 1 in Hg for about to 5 minutes. On the pressure side, the pressure gauge indicator should drop to zero and flow to each individual rotameter also should drop to zero to indicate a successful leak check.

- Calibration gases used to span instrumentation conform to EPA Protocol 1. Certificates of analysis for calibration gases are included in the report (See Appendix E2).

- The NO_2-to-NO conversion efficiency (CE) check was performed on the NOx analyzer according to the procedure specified in Method 100.1. The result of the CE check is included in the report (See Appendix E3).

Figure 5-2. Continuous Emissions Monitoring System

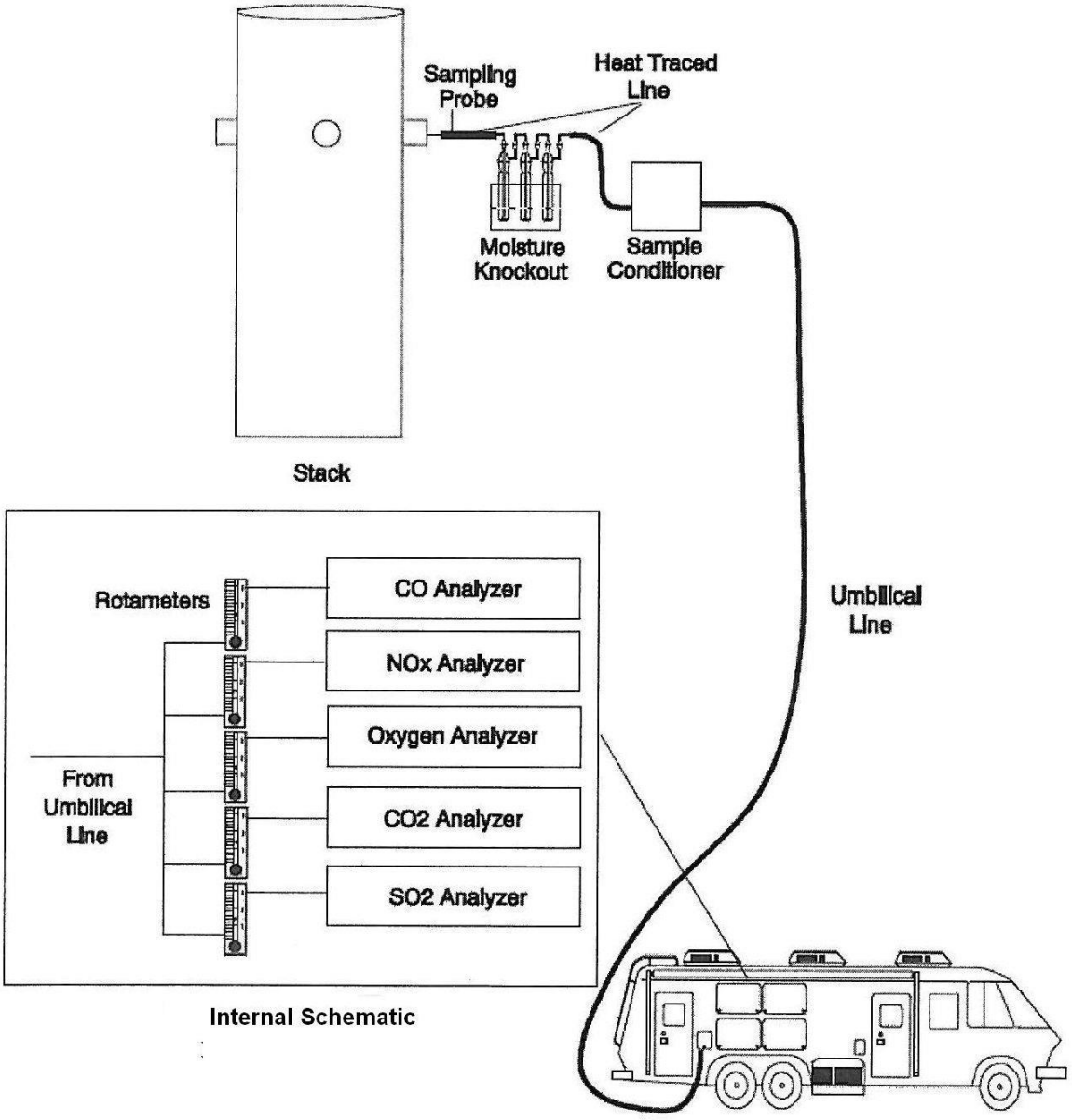


TABLE 5-1. ALMEGA CEMS – GENERAL EQUIPMENT SPECIFICATIONS

ANALYZERS					
Specification	**O2**	**CO2**	**NOx**	**CO**	**SO2**
Manufacturer	Teledyne	Servomex	T-API	Thermo Electron	Western Research
Model	326RA	1400B	200AH	48C	921
Analytical Principle	E-Chemical Cell	NDIR	Chemiluminescent	NDIR-GCC	NDUV
Ranges	%: 0-5, -10, -25	%: 0-5, -10, -20	ppmv: 0-2.5, -10, -25, -50, -100, -250, -1,000	ppmv: 0-20, -50, -100, -200, -500, -1k, x10	ppmv: 0-10, -25, -50, -100, -200, -300
Accuracy, % of Full Scale	± 1%	± 1%	± 1%	± 1%	+ 0.5%
Repeatability, % of Full Scale	0.5%	0.5%	0.5%	0.5%	0.5%
Sensitivity, % of Full Scale	0.5%	0.5%	0.5%	0.5%	<2% of Range
Zero/Span Drift, % of Full Scale	± 1%, in 24 Hrs	± 1%, in 24 Hrs	± 1%, in 24 Hrs	± 1%, in 24 Hrs	-
Response Time	3 Seconds	<2 Seconds	1.7 Seconds	<2.0 Seconds	30 seconds
Linearity, % of Full Scale	< 1%	< 1%	< 1%	< 1%	< 1%
Output	1V DC, 5V DC	0.1V DC, 1V DC	1V DC, 10V DC	1V DC, 10V DC	0-1V DC

OTHER CEMS EQUIPMENT				
Specification	**Sample Conditioner**		**Stripchart Recorder**	
System used	Primary	Back-up	System used	Primary
Manufacturer	Almega	Universal	Manufacturer	Yokogawa
Model	(in-house)	Model 1090	Model	Model HR 2400
Principle	Refrigeration	Refrigeration	Pen Response	3 sec.
Max. Inlet Temperature	>700 F	500 F	Input Voltage	user-selectable
Max. Inlet Pressure	50 psi	50 psi	Chart Speed	user-selectable
Max. Flow Rate	10 SCFH	7.0 Lpm	Chart Width	10 inches
Max. Water Concentration	50%	50%	Output	user-selectable
Outlet Dew-Point Temperature	< 37 F	35 F ± 2 F	No. of Channels	30 user-select. 30 calc'd
Dew-Point Stability		± 0.5 F	Colors	10 color, user-selectable

6.0 QUALITY ASSURANCE AND QUALITY CONTROL

Almega applies stringent quality assurance and quality control (QA/QC) procedures to ensure the validity of measurements for all test methods. The following section discusses general and project-specific QA/QC measures.

6.1 General QA/QC

Almega's QA/QC procedures follow guidelines from the "Quality Assurance Handbook for Air Pollution Measurement Systems," Volumes I through III. And, procedures for pretest preparation and calibration of sampling equipment are followed. Standardized written procedures, calculator programs, and computer spreadsheets are used for test planning, pre-survey, equipment checklist, preliminary calculations, testing, data analysis, and reporting. Typical pretest equipment preparation and maintenance include organization of the following equipment prior to testing:

- Mobile RM CEM test van: Check fluids, fuel, mechanical conditions, verify operation of CEM instruments, sample lines and sample conditioner prior to the date of the source test.

- Sampling Equipment: Check meter boxes, pitot tubes, manometers and thermocouples to ensure in good working conditions and in proper calibrations. Pre-clean sampling trains and seal all openings prior to use.

Calibrations are performed in accordance with Chapter III of the SCAQMD Source Test Manual (March 1989). Table 6-1 shows the test equipment calibration schedules. Table 6-2 shows the test equipment maintenance schedules.

6.2 Project-Specific QA/QC

This project included specific QA/QC activities required to validate the test results. These QA/QC activities are based on the test methods discussed in Section 5 and generally acceptable test procedures. Reference Methods used for source testing are promulgated by the South Coast Air Quality Management District (SCAQMD), the California Air Resource Board (CARB), or the US Environmental Protection Agency (EPA). Any deviations from published Methods are approved in advance by the regulatory agency (i.e. SCAQMD), prior to implementation if possible. Project-specific QA/QC activities and results that may impact test results are discussed in Section 3.

TABLE 6-1. TEST EQUIPMENT CALIBRATION SCHEDULE

Equipment	Calibration Period	Standard or Method of Calibration
Thermocouples	6 Months and 2 Months	Mercury Thermometer, three point (ice, boiling water, hot oil)
Dry Gas Meters	6 Months and 2 Months	Critical orifice
Field Barometers	6 Months, Check prior to usage	Mercury Barometer
S-Type Pitot	6 Months Check prior to usage	EPA Method 2, Measure physical configuration. Reshape pitot tips or calibrate if configuration does not meet the limits.
Pressure gauges	6 Months 2 Months	Five-point calibration against manometer Three-point check
Temp. Meters	6 Months	Precision Potentiometer
CEM Systems	Bimonthly, or as needed	Specified by Manufacturer

TABLE 6-2. TEST EQUIPMENT MAINTENANCE

Equipment	Check For	Correction	Frequency
CEM Systems	Absence of malfunction, noise, drift, conversion efficiency for NOx analyzer	As required by the manufacture, or depending on performance	Bimonthly
Pumps	Absence of leakage, flow, proper vacuum	Replace parts, inspect, clean	300 hours of usage
Flow Devices	Levelling, zeroing, obstruction, deformation	Clean, replace, or re-calibrate	300 hours of usage
Calibration Gases	Expiration date, tank pressure	Re-certify, order new gases	2 months and prior to field testing
Regulators	Malfunction, Gauge precision	Repair or replace	3 months and prior to field testing
Gas Divider	Malfunction, precision	Repair or replace	Monthly and before field testing
Condensers	Leakage, temperature	Repair or replace	Monthly and before field testing
Heated lines	Leakage, temperature, cleanliness	Repair, replace, clean	Monthly and before field testing

APPENDICES

APPENDIX A

GENERAL CALCULATIONS AND FORMULAE

GENERAL CALCULATIONS

Standard conditions: 29.92 in. Hg, 60 °F

Gas Moisture at standard conditions (scf): $V_{WTR} = K2*V_{COND}$
K2 = 0.04707 @ 68 °F, 0.0464 @ 60 °F

Sample volume at standard conditions (scf):
Vmstd =K1*Vmacf*Ym*(Pbar+dH/13.6)/(Tm+460)
K1 = 17.64 @ 68 °F, 17.38 @ 60 °F

Percent of water: $\%H_2O = 100*Vmstd/(Vmstd+Vwtr)$

Dry molecular weight: $M_d = (44*\%CO_2+32*\%O_2+28*(\%N_2+\%CO))/100$

Wet molecular weight: $M_w = M_d*(1-\%H_2O/100)+18*(\%H_2O/100)$

Stack gas pressure (In. Hg): $P_{stk} = P_{bar}+P_{sta}/13.6$

Average velocity head: Ave. dP = $\{SQRT\ (dP)\}^2$

Stack gas velocity (fps): $V = 85.49*C_p*SQRT(dP)*SQRT((T_S+460)/(P_{STK}*M_w))$

Percent of excess air: $\%EXCA = 100*(\%O_2-0.5\%CO)/(0.264(\%N_2-(\%O_2-0.5\%CO)))$

Stack gas flow (dscfm): $Q_{STK} = 60(1-\%H_2O/100)*V*A*(528/(T_s+460))*P_{stk}/29.92$

Concentration at 3% O_2: $PPM\ @\ 3\%\ O_2 = PPM_{measured}*17.9/(20.9-\%O_2)$

Emissions lb/MMBtu:

lb/MMBtu = lb/hr /HI (heat input rate in MMBtu/hr)

Emissions lb/hr:
lb/hr = $PPM*10^{-6}*((MW\ lb/lb\text{-}mole)/SV)*dscfm\ *60$
MMBtu/hr = facility fuel usage (scfh)*HHV (1050 Btu/scf)* 10^{-6}

CALCULATIONS FOR METHOD 100.1:

Corrected PPM = $(PPM_{measured}-C_o)*C_{ma}/(C_m-C_o)$

Where: C_o = Average of initial and final bias zeros
C_m = Average of initial and final bias calibrations
C_{ma} = Certified gas value used for the bias calibration.

GENERAL CALCULATIONS – continued

CALCULATIONS FOR METHOD 100.1, continued

Calibration Error=	100*(Certified value-Analyzer response)/Analyzer range
Percent Bias=	100*(Direct Analyzer response-Bias response)/Analyzer range
System Zero/Span Drifts=	100*(Final-Initial)/Analyzer range
Linearity=	100*(Analyzer mid. gas response-Predicted value)/range

Where the Predictive Value for the mid gas is found by a straight line drawn between the span gas and zero gas calibration points which can be calculated from the straight line equation, Y=mx+b where m is the slope of the line and b is the Y-intercept. The calculation is done by a computer spreadsheet for Method 100.1.

DEFINITIONS

A:	Stack cross area, square feet
Cp:	Pitot coefficient
@H:	Orifice pressure, in. H_2O
MW:	Molecular weight
Md:	Dry molecular weight of flue gas
Mw:	Wet molecular weight of flue gas
Pbar:	Barometric pressure, in. Hg
Psta:	Static pressure, in. H_2O
Pstk:	Stack pressure, in. Hg
P:	Stack differential pressure, in. H_2O
Qstk:	Stack gas flow, scfm
Tm:	Meter temperature, °F
Ts:	Stack gas temperature, °F
Vcond:	Volume of water condensation, ml
Vm:	Meter volume, acf
Vmstd:	Sample gas at standard conditions, scf
Vwtr:	Water vapor volume, scf
Ym:	Meter correction factor
SV:	Specific molar volume, 379.5 dscf/lb-mole at 60°F, or 385.3 dscf/lb-mole at 68°F
FF:	Fuel flow rate (scf/hr)
Fd:	Dry fuel factor, for natural gas Fd=8710 dscf/MMBtu at 68°F

APPENDIX B

APPROVALS AND CERTIFICATIONS

Appendix B1

SCAQMD and CARB Testing Approvals

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

June 10, 2015

Mr. John W. Phillips
Almega Environmental
10602 Walker Street
Cypress, CA 90630

Subject: LAP Approval Notice
Reference # 93LA0827

Dear Mr. Phillips:

We completed our review of the renewal application you submitted for approval under the South Coast Air Quality Management District's Laboratory Approval Program (SCAQMD LAP). We are pleased to inform you that your firm is approved for the period beginning June 30, 2015, and ending June 30, 2016 for the following methods, subject to the requirements in the LAP Conditions For Approval Agreement and conditions listed in the attachment to this letter:

SCAQMD Methods 1-4	SCAQMD Method 7.1
SCAQMD Method 10.1	SCAQMD Rule 1121/ 1146.2 Protocols
SCAQMD Method 100.1	SCAQMD Rule 1420/1420.1 – (Lead) Source Sampling
SCAQMD Method 25.1 (Sampling)	SCAQMD Rule 1420/1420.1 – (Lead) Ambient Sampling
SCAQMD Method 25.1 (Analysis)	SCAQMD Rule 462 Testing
SCAQMD Method 25.3 (Analysis)	ASTM D6522-00/ USEPA CTM-030
SCAQMD Methods 5.1 and 6.1	

Thank you for participating in the SCAQMD LAP. Your cooperation helps us to achieve the goal of the LAP: to maintain high standards of quality in the sampling and analysis of source emissions. You may direct any questions or information to LAP Coordinator, Glenn Kasai. He may be reached by telephone at (909) 396-2271, or via e-mail at gkasai@aqmd.gov.

Sincerely,

Rudy Eden, Senior Manager
Laboratory Services &
Source Test Engineering

RE:GK/gk

cc: Dipankar Sarkar

150610 LapRenewal.doc

ATTACHMENT

Conditions For Almega Environmental's LAP Approval

1) Almega shall adhere to the following requirements when conducting portable analyzer tests using CTM-030 or ASTM D6522:
   a) Deviations to CTM-030 or ASTM D6522 shall be documented in the Test Critique section of the test report;
   b) The test report shall be formatted and organized in a manner consistent with the example portable analyzer test report, dated September 24, 2011, and the District Source Test Manual, Chapter II; and,
   c) NO_2 measurements may be quantified to 10% of the NO_2 span under the following conditions:
      - Calibrations shall be conducted per Sections 7.3 and 7.6 of CTM-030 at the span, mid-span (40-60% of span), low-span (10% of span), and zero level. The low-span calibration shall satisfy the requirements in Section 4.2 of CTM-030;
      - A linearity check shall be conducted once every five days using the low-span calibration gas; and,
      - If the measured NO_2 emission is less than 10% of the NO_2 span, it shall be reported as less than 10% of the span, and added to the NO emission to determine the total NOx concentration.

State of California

Air Resources Board

Approved Independent Contractor

Almega Environmental & Technical Services

This is to certify that the company listed above has been approved by the Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, Title 17, Section 91207, until June 30, 2016, for the test methods listed below:

ARB Source Test Methods:

1, 2, 3, 4, 5, 8

100 (CO, CO_2, NO_X, O_2, SO_2)

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

State of California

Air Resources Board

Approved Independent Contractor

Almega Environmental & Technical Services

This is to certify that the company listed above has been approved by the Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, Title 17, Section 91207, until June 30, 2010, for the test method listed below:

Visible Emissions Evaluation

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

Almega ENVIRONMENTAL

Appendix B2

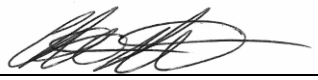
Certification of No Conflict-of-Interest

Certification of No Conflict-of-Interest

Almega Environmental & Technical Services
10602 Walker Street
Cypress, CA 90630

I certify that I am responsible for the testing operations of Almega and am authorized to sign this certificate on the Company's behalf.

Almega may conduct tests as an independent tester pursuant to SCAQMD Rule 304(k). I further certify that Almega has no conflict-of-interests, and is not owned by or related in any way to the company being tested.

Company being tested:	Orange County Sanitation District
Facility ID No.:	29110
Permit No.:	Permit G27394, A/N 540708
Signature:	
Name (printed or typed):	Christopher Lovett
Title:	Project Manager
Date:	10/14/15

Appendix B3

Non-RECLAIM CEMS Final Certification

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

Almega ENVIRONMENTAL

January 8, 2010
S/T File:C06035
(Final Certification)

Terry Ahn
Orange County Sanitation District
P.O. Box 8127
Fountain Valley, CA 92728-8127

Subject: **Final Certification of Non-RECLAIM CEMS Serving IC Engine Unit 1 CG1-HB (A/N 414653)**

Dear Ms. Terry Ahn:

I have completed the evaluation of your certification report (please refer to the accompanying attachments for specific information and conditions). The evaluation was made to determine if final certification could be granted based on the monitoring requirements of the applicable protocols found in District Rules 218 and 218.1, and EPA 40CFR60 APPENDICES B and F.

This letter serves as an official notification of final certification for the CEMS at your facility serving the process equipment described in the accompanying attachment, "DISTRICT RULE 218 - EPA 40CFR60 APPENDICES B and F, NON-RECLAIM CEMS FINAL CERTIFICATION: Specific Device-Based Information and Conditions". If the CEMS information in the accompanying attachments is not accurate, please notify me as soon as possible at (909) 396-2265. Also, please remember to notify the District for direction, prior to replacement or modification of the described CEMS or the device(s) that it serves, since such modifications may change the compliance status of the affected CEMS. Again, thank you for your continued cooperation and support.

Sincerely,

Philip E. Padilla

P. Eric Padilla, Air Quality Engineer
Source Test Engineering Branch
(909) 396-2265 FAX (909) 396-2099
epadilla@aqmd.gov@aqmd.gov

Attachment
MG:EP

cc: Rudy Eden
Mike Garibay

840CEMS_Cert - OCSD Plant 2 Unit 1 - C06035.doc

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 • www.aqmd.gov

Almega ENVIRONMENTAL

Source Test I.D:	C06035	Date:	January 8, 2010
Facility I.D:	029110		
Application/Permit No.:	414653	CEMS Certification Date:	
CEMS Rule/Regulation:	Permit Condition 13		August 14, 2009

DISTRICT RULE 218 - EPA 40CFR60 APPENDICES B & F
NON-RECLAIM CEMS FINAL CERTIFICATION:
Specific Device-Based Information and Conditions
(This document must be displayed on or near strip chart recorder or data handling system)

Name of Facility:	**Orange County Sanitation District**
Certification Test Date:	**August 14, 2009**
Test Operating Load:	**Low Operating Load (> 50% capacity)**
Equipment Description:	**IC Engine Unit 1 – 4166 HP, 3000 kW generator**
Equipment Location:	**Reclamation Plant 2, 22212 Brookhurst St, Huntington Beach, CA 92646**
Mailing Address:	**P.O. Box 8127 Fountain Valley, CA 92728-8127**

A. The components described below comprise the "CEMS" which has been granted Final Certification or Approval and they may not be changed or modified without prior District approval. (Unauthorized modification to the components shown below may void CEMS certification, and result in non-compliance with District Rule 218, EPA 40CFR60 APPENDIX B, and/or source specific rules pertaining to CEMS monitoring and recordkeeping. Be sure the information below is correct. Contact your District Source Testing representative if there are any questions):

Gaseous Emission Measurement Analyzer:

Gaseous Component Monitored	Make	Model No.	Serial No.	Method of Detection	Certified Range(s): **Instrument Range** (Valid Reporting Range[1])
CO (Dry)	**Thermo**	**48i**	**0836634048**	**Gas Filter Correlation (GFC)**	**0-1000 ppm**
NOx/O_2 (Dry)	**Thermo**	**42i-LS**	**0836634042**	**NOx: Chemiluminescence O_2: Paramagnetic**	**NOx: 0-100 ppm O_2: 0-25%**

[1] The valid reporting range of a certified CEMS is normally 10-95% of the certified instrument range or ranges, unless additional QA testing is performed to validate measurements <10% of instrument range.

Fuel or Flue Gas Flow Measurement Analyzer

Instrument Type	Manufacturer	Model No.	Serial No.
Natural Gas: Positive Displacement Meter	**Dresser Roots**	**11M175 (Range 0 – 11,000 cfh)**	***NA – renewed annually for calibration purposes***
Digester Gas: Positive Displacement Meter	**Dresser Roots**	**16M175 (Range 0 – 16,000 cfh)**	***NA – renewed annually for calibration purposes***

Sample Condition and Calibration System

Type	Manufacturer	Model No.	Serial No.
Gas Sample Conditioning Unit	**M&C**	**ECM-2G**	***NA***

Supporting Equipment (Data Acquisition, Reduction, and Recording) Excluding RTU

Type	Manufacturer	Model No.	Serial No.
DAS	**Dell**		***NA***
PLC	**Modicon**	**M340**	***NA***

DAHS, PLC Programming Formulas and Correction Factors

Parameter	Formula
NOx Concentration	**Uncorrected, and standard correction to 15% O_2 for concentration compliance requirement (no additional factors, BAFs or constants are authorized).**
CO Concentration	**Uncorrected, and std. correction to 15% O_2 for concentration compliance requirement (no additional factors, BAFs or constants are authorized).**
Stack Flow Rate	**Based on fuel usage & standard fuel F-Factor calculation using default HHV of 1050 Btu/scf and Fd_{O2} of 8710 dscf/mmBtu for natural gas and using analysis results for digester gas (no additional factors, BAFs or constants are authorized).**
NOx Emission Rate	**Based on the product of uncorrected concentration and stack flow rate as described above (no additional factors, BAFs or constants are authorized).**

B. The CEMS described above is subject to the following conditions:

1. CEMS Operating Range

The operating range(s) selected for each gas analyzer must be such that most all measurements fall within 10-95%[2] of range full-scale. With time, these ranges may not prove adequate and the analyzer(s) must be re-ranged, or more-than-one range must be used to maintain compliance. Always consult your AQMD CEMS Engineer before modifying the process monitored and/or the CEMS itself.

2. CEMS Specific Operating Requirements

This CEMS shall be operated pursuant to the requirements of District Rules 218/218.1 and/or 40CFR60 Appendices B & F, and be subject to the following specific monitoring, reporting, and recordkeeping requirements:

PERMIT CONDITION 13:

- Monitor/record/report raw NOx concentration (ppm)
- Monitor/record/report raw O_2 concentration (%)
- Calculate/record/report NOx concentration (ppm), corrected to 15% O2
- Calculate/record/report exceedances in the permitted limit of: 36 ppmv for NOx or 2000 ppmv for CO, both corrected to 15% O_2

The Data Acquisition & Handling System/Programmable Logic Controller (DAHS/PLC) shall perform the calculations necessary to meet the above emission reporting requirements, using accepted methods.

3. *Periodic Testing, Record Keeping, Quality Assurance, and Reporting*

Orange County Sanitation District has elected to maintain this CEMS according to EPA 40CFR60 APPENDICES B & F. This includes periodic testing[3], quality assurance, reporting, and recordkeeping. Designated personnel at Orange County Sanitation District shall be instructed and be responsible regarding periodic testing dates and requirements, scheduled and unscheduled breakdown and outage procedures, and CEMS and process modifications. A comprehensive Quality Assurance Plan describing the above procedures and other contingencies as described in EPA 40CFR60 APPENDIX F, must be compiled and stored on-site for review by authorized AQMD personnel. This Quality Assurance Plan must be regularly updated with CEMS, process, and responsibility changes.

4. *On-Site Data Availability*

Orange County Sanitation District understands that CEMS emission measurements shall be available in realtime display and as a continuous record, on-site, upon request by authorized

[2] There are circumstances where analyzer measurements less than 10% of full-scale are acceptable. See your assigned Source Testing Engineer for details.

[3] Units must be tested annually at a minimum, or sooner if modifications to process and/or CEMS are performed, or as prescribed by the AQMD.

AQMD personnel. This also includes raw data and calculations used for realtime displays and records.

5. *RATA Protocol*
Orange County Sanitation District shall submit a periodic CEMS assessment/RATA protocol for approval if the RATA procedures differ from the previously approved CEMS certification test protocol.

6. *Notification of RATA Schedule*
Orange County Sanitation District shall notify the District at least two weeks prior to conducting all subsequent periodic CEMS assessments/RATAs. Notification is to be made to Eric Padilla, either by phone at 909-296-2265, or via e-mail at epadilla@aqmd.gov.

7. *Quality Assurance Program (QAP)*
The QAP shall automatically be updated as needed (e.g., as personnel are reassigned, or the process and/or the CEMS components are modified).

Evaluated By: Philip E. Padilla Dated: January 8, 2010

P. Eric Padilla, Air Quality Engineer
Source Test Engineering Branch
(909) 396-2265 FAX (909) 396-2099
epadilla@aqmd.gov@aqmd.gov

840CEMS_Cert - OCSD Plant 2 Unit 1 - C06035.doc

APPENDIX C

SCAQMD METHOD 1.1-4.1 – STACK GAS FLOW RATE

Appendix C1

STACK GAS FLOW RATE – Results and Calculations

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA

Source: Engine 1
Test: RATA

Test Date: 9/29/15

DATA ENTRY	Symbols	Units	RUN 1.0	RUN 2.0	RUN 3.0	RUN 4.0	RUN 5.0	RUN 6.0	RUN 7.0	RUN 8.0	RUN 9.0		
Stack Diameter	D	in.	30	30	30	30	30	30	30	30	30		
Length	L	in.		0	0	0	0	0	0	0	0		
Width	W	in.		0	0	0	0	0	0	0	0		
Barometric Pressure	Pbar	in. Hg.	29.91	29.91	29.91	29.91	29.91	29.91	29.91	29.91	29.91		
Static Pressure	Ps	in. H2O	-0.28	-0.28	-0.28	-0.28	-0.28	-0.28	-0.28	-0.28	-0.28		
Pitot Coefficient	Cp	none	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84		
Meter Cal. Factor	Y	none	0.9871	0.9871	0.9871	0.9871	0.9871	0.9871	0.9871	0.9871	0.9871		
Standard Temperature	Tstd	deg. F	60	60	60	60	60	60	60	60	60		
Moisture Factor	K1	cu.ft./mL	.0464	.0464	.0464	.0464	.0464	.0464	.0464	.0464	.0464		
PT Factor	K2	R/in.Hg	17.38	17.38	17.38	17.38	17.38	17.38	17.38	17.38	17.38		
Velocity Head (dP)	(dP)	(in. H2O)	0.790	0.789	0.694	0.649	0.654	0.611	0.808	0.811	0.811		
Velocity Head (Sqrt dP)	Sqrt (dP)	Sqrt(in. H2O)	0.888	0.888	0.832	0.805	0.808	0.781	0.898	0.900	0.900		
Average Delta H	dH	in. H2O	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000	2.000		
Gas Volume Collected	Vm	cf	68.370	68.370	68.370	68.109	68.109	68.109	68.051	68.051	68.051		
Stack Gas Temperature	Ts	deg. F	574.4	574.7	573.9	573.7	573.6	575.3	575.4	575.3	575.0		
Meter Temperature	Tm	deg. F	82.7	82.7	82.7	86.2	86.2	86.2	88.9	88.9	88.9		
%O2 in Stack Gas	%O2	%	11.31	11.43	11.22	11.01	11.15	10.94	11.47	11.69	11.72		
%CO2 in Stack Gas	%CO2	%	7.86	7.83	8.02	8.08	8.01	8.18	7.88	7.55	7.47		
Total Impinger Water	Ww	g	159.8	159.8	159.8	154.3	154.3	154.3	149.9	149.9	149.9		
CALCULATIONS	**Symbols**	**Units**	**RUN 1.0**	**RUN 2.0**	**RUN 3.0**	**RUN 4.0**	**RUN 5.0**	**RUN 6.0**	**RUN 7.0**	**RUN 8.0**	**RUN 9.0**		
Stack Area	As	sq. ft.	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91	4.91		
Stack Gas Temperature	Ts,r	deg. R	1034	1035	1034	1034	1034	1035	1035	1035	1035		
Meter Temperature	Tm,r	deg. R	543	543	543	546	546	546	549	549	549		
Abs Stk Pressure	Pabs	in. Hg.	29.89	29.89	29.89	29.89	29.89	29.89	29.89	29.89	29.89		
Gas Vol. @ STD	Vmstd	dscf	64.97	64.97	64.97	64.30	64.30	64.30	63.92	63.92	63.92		
Vol. of Water Vapor	Vwstd	dscf	7.41	7.41	7.41	7.16	7.16	7.16	6.96	6.96	6.96		
Dry Mol. Wt.	Md	lb/lb-mol.	29.71	29.71	29.73	29.73	29.73	29.75	29.72	29.68	29.66		
Wet Mol. Wt.	Ms	lb/lb-mol.	28.51	28.51	28.53	28.56	28.55	28.57	28.57	28.53	28.52		
Average Velocity	Vs	ft/s	70.28	70.26	65.81	63.63	63.85	61.76	71.05	71.20	71.20		
Moisture Content	Bws	%	10.24	10.24	10.24	10.02	10.02	10.02	9.81	9.81	9.81		
Actual Stack Gas Flow Rate	Qa	acfm	20,699	20,693	19,381	18,741	18,805	18,189	20,926	20,970	20,971		
Dry Stack Gas Flow Rate	Qds	dscfm	**9,330**	**9,325**	**8,741**	**8,475**	**8,504**	**8,212**	**9,469**	**9,490**	**9,493**		
Dry Stack Gas Flow Rate	Qds	dscfh	**559,810**	**559,517**	**524,458**	**508,474**	**510,255**	**492,743**	**568,116**	**569,426**	**569,587**		
Wet Stack Gas Flow Rate	Qws	wscfm	**10,395**	**10,390**	**9,739**	**9,418**	**9,451**	**9,127**	**10,499**	**10,523**	**10,526**		

CALCULATIONS

Abs Stk Pressure	Pabs	Pabs=Pbar +(Ps/13.6)	Average Velocity	Vs	Vs = 85.49Cp Sqrt(dp)[Sqrt(Ts,r/(Pabs Ms))]
Gas Vol. @ STD	Vmstd	Vmstd=17.64VmY[Pbar+dH/13.6)]/Tm	Moisture Content	Bws	Bws = 100 Vwstd/(Vmstd+Vwstd)
Vol. of Water Vapor	Vwstd	Vwstd=0.04707 Vh2o	Actual Stack Gas Flow Rate	Qa	Qa = 60 Vs As
Dry Mol. Wt.	Md	Md=.44(%CO2)+.32(%O2)+.28[100-(%CO2+%O2)]	Dry Stack Gas Flow Rate	Qds	Qds=17.64 Qa[1-(Bws/100)](Pabs/Ts,r)
Wet Mol. Wt.	Ms	Ms=Md[1-(Bws/100)]+18(Bws/100)	Wet Stack Gas Flow Rate	Qws	Qws= Qds(dscfm)/(1-Bws/100)

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA

Source: Engine 1
Test: RATA

Test Date: 9/29/15

	RUN 1.0			
Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
Avg	**0.790**	**574.4**	**.8883**	**9,330**
1	0.86	565	.9274	9,785
2	0.84	573	.9165	9,633
3	0.81	576	.9000	9,446
4	0.78	578	.8832	9,260
5	0.77	577	.8775	9,205
6	0.75	577	.8660	9,085
7	0.76	576	.8718	9,150
8	0.70	576	.8367	8,781
9	0.85	566	.9220	9,723
10	0.87	572	.9327	9,809
11	0.85	575	.9220	9,681
12	0.84	577	.9165	9,615
13	0.79	577	.8888	9,324
14	0.75	576	.8660	9,089
15	0.72	575	.8485	8,910
16	0.70	575	.8367	8,785
17				
18				
19				
20				
21				
22				
23				
24				
25				

	Orifice	Meter Temp.		DGM	Moist.	
	dH	Inlet	Outlet	Volume	Collect.	
	2.00	**Avg:**	**82.7**	**68.370**	**159.8**	**Net:**
10	2.00	84	80	569.718	770.0	Initial
20	2.00	84	80	638.088	889.0	Final
30	2.00	84	80		682.0	Initial
40	2.00	84	81		702.6	Final
50	2.00	84	81		606.9	Initial
60	2.00	85	81		614.2	Final
70	2.00	85	81		813.6	Initial
80	2.00	85	82		826.5	Final
90	2.00	85	82			

	RUN 2.0			
	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
	0.789	**574.7**	**.8879**	**9,325**
	0.87	564	.9327	9,847
	0.84	573	.9165	9,633
	0.81	576	.9000	9,446
	0.79	578	.8888	9,320
	0.77	577	.8775	9,205
	0.77	576	.8775	9,210
	0.76	575	.8718	9,154
	0.70	575	.8367	8,785
	0.86	565	.9274	9,785
	0.85	575	.9220	9,681
	0.86	576	.9274	9,733
	0.82	578	.9055	9,495
	0.78	578	.8832	9,260
	0.72	577	.8485	8,901
	0.73	577	.8544	8,963
	0.70	575	.8367	8,785

	Orifice	Meter Temp.		DGM	Moist.	
	dH	Inlet	Outlet	Volume	Collect.	
	2.00	**Avg:**	**82.7**	**68.370**	**159.8**	**Net:**
	2.00	84	80	569.718	770.0	Initial
	2.00	84	80	638.088	889.0	Final
	2.00	84	80		682.0	Initial
	2.00	84	81		702.6	Final
	2.00	84	81		606.9	Initial
	2.00	85	81		614.2	Final
	2.00	85	81		813.6	Initial
	2.00	85	82		826.5	Final
	2.00	85	82			

	RUN 3.0			
	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
	0.694	**573.9**	**.8322**	**8,741**
	0.77	564	.8775	9,260
	0.68	574	.8246	8,660
	0.68	575	.8246	8,656
	0.71	577	.8426	8,836
	0.70	577	.8367	8,774
	0.76	576	.8718	9,147
	0.74	574	.8602	9,034
	0.65	574	.8062	8,467
	0.77	565	.8775	9,256
	0.69	573	.8307	8,728
	0.73	575	.8544	8,969
	0.70	577	.8367	8,774
	0.72	577	.8485	8,898
	0.62	575	.7874	8,265
	0.59	575	.7681	8,063
	0.59	574	.7681	8,067

	Orifice	Meter Temp.		DGM	Moist.	
	dH	Inlet	Outlet	Volume	Collect.	
	2.00	**Avg:**	**82.7**	**68.370**	**159.8**	**Net:**
	2.00	84	80	569.718	770.0	Initial
	2.00	84	80	638.088	889.0	Final
	2.00	84	80		682.0	Initial
	2.00	84	81		702.6	Final
	2.00	84	81		606.9	Initial
	2.00	85	81		614.2	Final
	2.00	85	81		813.6	Initial
	2.00	85	82		826.5	Final
	2.00	85	82			

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA

Source: Engine 1
Test: RATA

Test Date: 9/29/15

RUN 4.0

Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
Avg	**0.649**	**573.7**	**.8052**	**8,475**
1	0.64	563	.8000	8,464
2	0.61	572	.7810	8,227
3	0.62	574	.7874	8,286
4	0.70	577	.8367	8,792
5	0.68	577	.8246	8,665
6	0.72	576	.8485	8,921
7	0.70	575	.8367	8,800
8	0.60	575	.7746	8,148
9	0.70	564	.8367	8,847
10	0.68	573	.8246	8,682
11	0.69	574	.8307	8,741
12	0.68	576	.8246	8,670
13	0.67	578	.8185	8,597
14	0.58	576	.7616	8,007
15	0.57	575	.7550	7,941
16	0.55	574	.7416	7,804
17				
18				
19				
20				
21				
22				
23				
24				
25				

	Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
	2.00	**Avg:**	**86.2**	**68.109**	**154.3**	**Net:**
10	2.00	87	84	638.733	779.5	Initial
20	2.00	87	84	706.842	906.5	Final
30	2.00	87	84		702.6	Initial
40	2.00	88	84		717.5	Final
50	2.00	88	85		614.2	Initial
60	2.00	88	85		617.2	Final
70	2.00	88	85		818.7	Initial
80	2.00	88	85		828.1	Final
90	2.00	89	85			

RUN 5.0

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
0.654	**573.6**	**.8079**	**8,504**
0.65	562	.8062	8,535
0.62	572	.7874	8,295
0.64	574	.8000	8,419
0.70	576	.8367	8,797
0.67	576	.8185	8,606
0.70	575	.8367	8,801
0.70	574	.8367	8,805
0.61	574	.7810	8,220
0.71	565	.8426	8,907
0.70	574	.8367	8,805
0.69	576	.8307	8,734
0.69	578	.8307	8,725
0.68	577	.8246	8,666
0.55	576	.7416	7,797
0.58	575	.7616	8,011
0.57	574	.7550	7,946

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
2.00	**Avg:**	**86.2**	**68.109**	**154.3**	**Net:**
2.00	87	84	638.733	779.5	Initial
2.00	87	84	706.842	906.5	Final
2.00	88	84		702.6	Initial
2.00	88	84		717.5	Final
2.00	88	85		614.2	Initial
2.00	88	85		617.2	Final
2.00	88	85		818.7	Initial
2.00	88	85		828.1	Final
2.00	89	85			

RUN 6.0

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
0.611	**575.3**	**.7810**	**8,212**
0.54	568	.7348	7,754
0.57	576	.7550	7,936
0.59	577	.7681	8,070
0.69	579	.8307	8,718
0.69	578	.8307	8,723
0.68	577	.8246	8,663
0.68	576	.8246	8,668
0.58	575	.7616	8,009
0.65	565	.8062	8,520
0.63	574	.7937	8,351
0.63	576	.7937	8,343
0.62	578	.7874	8,268
0.59	577	.7681	8,070
0.58	576	.7616	8,005
0.55	576	.7416	7,795
0.51	576	.7141	7,506

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
2.00	**Avg:**	**86.2**	**68.109**	**154.3**	**Net:**
2.00	87	84	638.733	779.5	Initial
2.00	87	84	706.842	906.5	Final
2.00	88	84		702.6	Initial
2.00	88	84		717.5	Final
2.00	88	85		614.2	Initial
2.00	88	85		617.2	Final
2.00	88	85		818.7	Initial
2.00	88	85		828.1	Final
2.00	89	85			

STACK GAS MOISTURE AND FLOW RATE CALCULATIONS

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA

Source: Engine 1
Test: RATA

Test Date: 09/29/15

RUN 7.0

Point	dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
Avg	**0.808**	**575.4**	**.8985**	**9,469**
1	0.88	565	.9381	9,936
2	0.86	575	.9274	9,775
3	0.83	576	.9110	9,598
4	0.79	578	.8888	9,355
5	0.77	577	.8775	9,240
6	0.76	577	.8718	9,180
7	0.78	576	.8832	9,304
8	0.76	576	.8718	9,184
9	0.88	566	.9381	9,931
10	0.88	575	.9381	9,888
11	0.88	577	.9381	9,878
12	0.81	579	.9000	9,468
13	0.80	578	.8944	9,414
14	0.78	578	.8832	9,295
15	0.76	577	.8718	9,180
16	0.71	577	.8426	8,873
17				
18				
19				
20				
21				
22				
23				
24				
25				

	Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
	2.00	**Avg:**	**88.9**	**68.051**	**149.9**	**Net:**
10	2.00	90	86	706.959	764.6	Initial
20	2.00	90	87	775.010	886.7	Final
30	2.00	90	87		695.6	Initial
40	2.00	90	87		707.4	Final
50	2.00	91	87		617.2	Initial
60	2.00	91	88		620.7	Final
70	2.00	91	88		828.1	Initial
80	2.00	91	88		840.6	Final
90	2.00	91	88			

RUN 8.0

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
0.811	**575.3**	**.8999**	**9,490**
0.89	566	.9434	9,994
0.87	576	.9327	9,833
0.83	577	.9110	9,600
0.77	579	.8775	9,238
0.78	578	.8832	9,302
0.76	577	.8718	9,186
0.78	576	.8832	9,311
0.77	575	.8775	9,255
0.87	566	.9327	9,881
0.89	575	.9434	9,950
0.88	576	.9381	9,890
0.81	578	.9000	9,479
0.81	577	.9000	9,484
0.79	576	.8888	9,370
0.76	576	.8718	9,191
0.71	576	.8426	8,883

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
2.00	**Avg:**	**88.9**	**68.051**	**149.9**	**Net:**
2.00	90	86	706.959	764.6	Initial
2.00	90	87	775.010	886.7	Final
2.00	90	87		695.6	Initial
2.00	90	87		707.4	Final
2.00	91	87		617.2	Initial
2.00	91	88		620.7	Final
2.00	91	88		828.1	Initial
2.00	91	88		840.6	Final
2.00	91	88			

RUN 9.0

dP (in. H2O)	Ts (deg F)	SQRT (dP)	Qds (dscfm)
0.811	**575.0**	**.8998**	**9,493**
0.90	566	.9487	10,052
0.87	575	.9327	9,840
0.83	577	.9110	9,602
0.74	578	.8602	9,062
0.77	577	.8775	9,248
0.77	577	.8775	9,248
0.78	576	.8832	9,312
0.78	576	.8832	9,312
0.86	565	.9274	9,831
0.89	574	.9434	9,957
0.89	576	.9434	9,947
0.81	578	.9000	9,481
0.80	577	.8944	9,427
0.79	576	.8888	9,372
0.77	576	.8775	9,253
0.72	576	.8485	8,947

Orifice dH	Meter Temp. Inlet	Meter Temp. Outlet	DGM Volume	Moist. Collect.	
2.00	**Avg:**	**88.9**	**68.051**	**149.9**	**Net:**
2.00	90	86	706.959	764.6	Initial
2.00	90	87	775.010	886.7	Final
2.00	90	87		695.6	Initial
2.00	90	87		707.4	Final
2.00	91	87		617.2	Initial
2.00	91	88		620.7	Final
2.00	91	88		828.1	Initial
2.00	91	88		840.6	Final
2.00	91	88			

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Appendix C2

STACK GAS FLOW RATE – Field Data

SAMPLING AND VELOCITY TRAVERSE POINT DETERMINATION
SCAQMD METHOD 1.2

FACILITY: Orange County Sanitation District
CITY, STATE: Huntington Beach, CA
SAMPLING LOCATION: Plant No. 2, Engine 1
TYPE OF TESTING: RATA

NO. OF PORTS AVAILABLE: 2
NO. OF PORTS TO BE USED: 2
PORT INSIDE DIAMETER: 4 inches

DISTANCE FROM FAR WALL TO OUTSIDE OF PORT: 35.5 inches
NIPPLE LENGTH AND/OR WALL THICKNESS: 5.5 inches
DEPTH OF STACK OR DUCT, D: 30.0 inches
STACK OR DUCT WIDTH (IF RECTANGULAR), W: inches

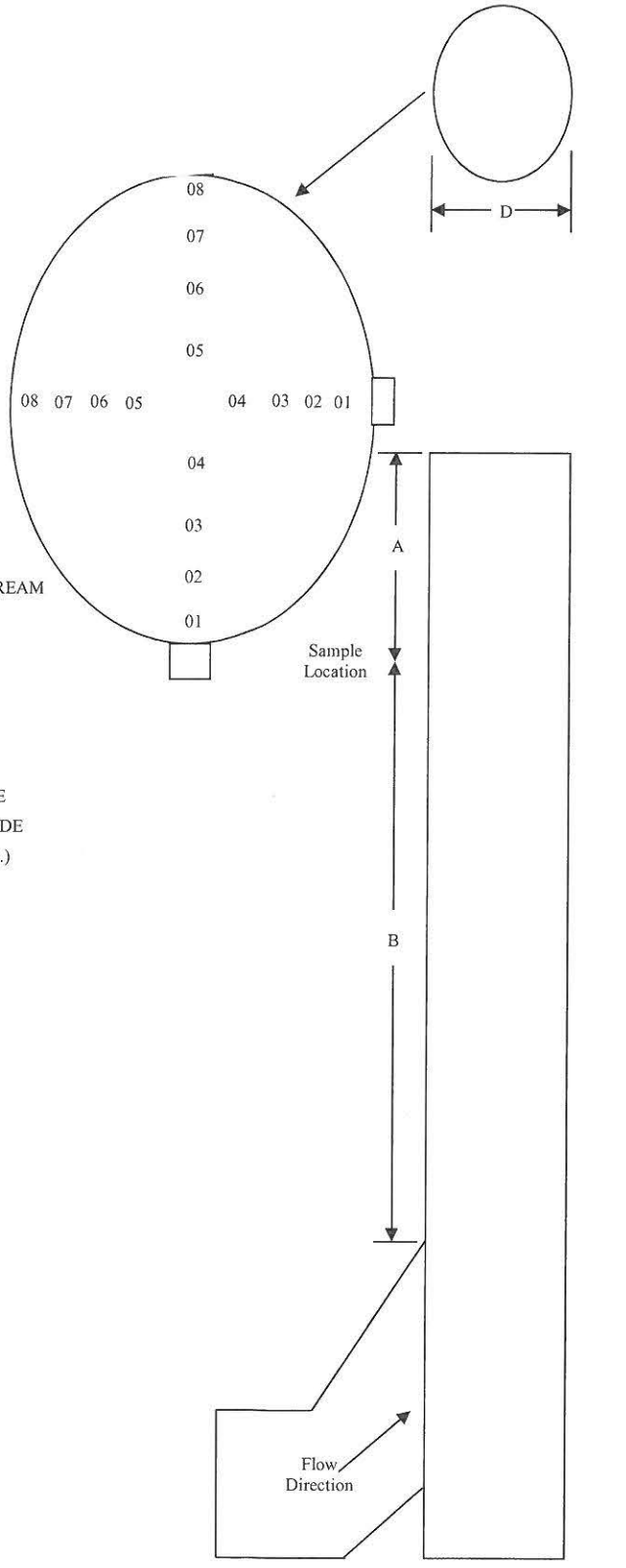
EQUIVALENT DIAMETER
De = 2*(DEPTH)*(WIDTH)/(DEPTH+WIDTH) = inches

STACK/DUCT AREA = sq.feet sq.inches

DISTANCE FROM PORT TO FLOW DISTURBANCES	UPSTREAM B	DOWNSTREAM A
# OF INCHES	135.0	54.0
# OF DIAMETERS	4.50	1.80

MINIMUM NUMBER OF TRAVERSE POINTS: 16

POINT NO.	% OF DUCT DEPTH	DISTANCE FROM INSIDE WALL (in.)	DISTANCE FROM OUTSIDE OF PORT (in.)
1	6.3	1.00	6 1/2
2	18.8	5.64	11 1/8
3	31.3	9.39	14 7/8
4	43.8	13.14	18 5/8
5	56.3	16.89	22 3/8
6	68.8	20.64	26 1/8
7	81.3	24.39	29 7/8
8	93.8	29.00	34 1/2



DRAWING NOT TO SCALE

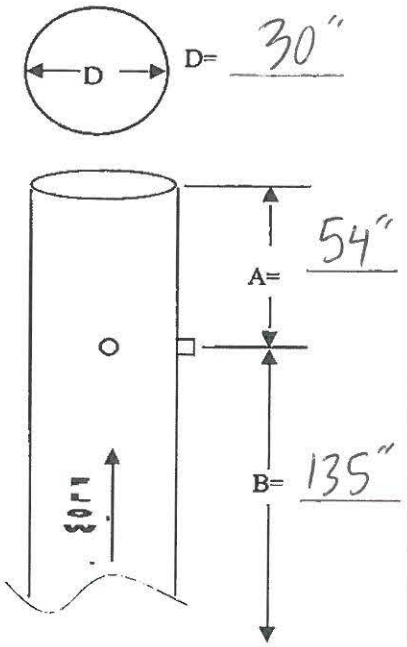
ALMEGA ENVIRONMENTAL TECHNICAL SERVICES
10602 Walker Street
Cypress, CA 90630

Almega ENVIRONMENTAL

SAMPLE POINT LOCATION DATA SHEET - Round Stack

Facility:	OCSD #2
Project Number:	9849
Date:	9.15.14
Unit ID #	Engs 1 → 5
Inside of far wall to outside of port:	35.5
Port Distance:	5.5
Stack Diameter (D):	30"
Upstream Distance (A):	54"
Equivalent Duct Diameter (A/D):	
Downstream Distance (B):	135"
Equivalent Duct Diameter (B/D):	
Total Number of Traverse Points :	16
Number of Sampling Ports Used:	2
Port Diameter:	4"

STACK DRAWING



Sample Point No.	% of Stack Diameter	x	Stack Diameter	=	Distance from Wall	+	Port Distance	=	Distance from Sample Port
1	3.2	x	30	=	.96	+	5.5	=	6.46
2	10.5	x	↓	=	3.15	+	↓	=	8.65
3	19.4	x	↓	=	5.82	+	↓	=	11.32
4	32.3	x	↓	=	9.69	+	↓	=	15.19
5	67.7	x	↓	=	20.31	+	↓	=	25.81
6	80.6	x	↓	=	24.18	+	↓	=	29.68
7	89.5	x	↓	=	26.85	+	↓	=	32.35
8	96.8	x	↓	=	29.04	+	↓	=	34.54
		x		=		+		=	
		x		=		+		=	
		x		=		+		=	
		x		=		+		=	

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SCAQMD METHODS 2-4

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Run # :	1,2,3	Pitot ID :	S-type	Impinger	Initial	Final	Net
Date :	09/29/15	Pitot Coeff. :	.84	Water 1 :	770.0	889.0	
Client :	OCSD	Meter Box # :	002	Water 2 :	682.0	702.6	
Unit :	Engine 1	Meter @ Dh :	1.987	Blank :	606.9	614.2	
Operator :	L. Barrow	Meter Y :	.9871	Sil. Gel :	813.6	826.5	
Stack Dia :	30"	TC # :	83	H2O Gain =			
Amb. Press :	29.91	Start Time :	7:26	Pressure Type/Range	ADM880 &	—	
Static Press :	-.28	Stop Time :	8:56				

Pitot Leak Check		
Initial :	✓	✓
Final :	✓	✓

Meter Box Leak Check	Rate	"HG
Initial :	.000	23"
Final :	.000	23"

Time (Minute)	Meter Volume (acf)	Pump Vac (inch Hg)	Meter Temperatures Inlet (F)	Meter Temperatures Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Sample Point #	Port 1 : Delta P ("H2O)	Port 1 : Stack Temp. (F)	Port 2 : Delta P ("H2O)	Port 2 : Stack Temp. (F)	Pitot ID: Cyclonic Flow ("H2O)	Pitot ID: TE Cooler Temp. (F)
0	569.718				2.0		1	.86	565	.85	566		34
10	577.33	5	84	80	↓	53	2	.84	573	.87	572		34
20	584.91	↓	84	80	↓	54	3	.81	576	.85	575		34
30	592.57	↓	84	80	↓	54	4	.78	578	.84	577		34
40	600.14	↓	84	81	↓	55	5	.77	577	.79	577		34
50	607.85	↓	84	81	↓	55	6	.75	577	.75	576		34
60	615.39	↓	85	81	↓	56	7	.76	576	.72	575		34
70	622.92	↓	85	81	↓	57	8	.70	576	.70	575		34
80	630.50	↓	85	82	↓	53							34
90	638.088	5	85	82	2.0	53	1	.87	564	.86	565		34
							2	.84	573	.85	575		
							3	.81	576	.86	576		
							4	.79	578	.82	578		
							5	.77	577	.78	578		
							6	.77	576	.72	577		
							7	.76	575	.73	577		
							8	.70	575	.70	575		
							1	.77	564	.77	565		
							2	.68	574	.69	573		
							3	.68	575	.73	575		
							4	.71	577	.70	577		
							5	.70	577	.72	577		
							6	.76	576	.62	575		
							7	.74	574	.59	575		
							8	.65	574	.59	574		

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SCAQMD METHODS 2-4

Run # :	4,5,6	Pitot ID :	S Type	Impinger	Initial	Final	Net
Date :	09/29/15	Pitot Coeff. :	.84	Water 1 :	799.5	906.5	
Client :	OCSD	Meter Box # :	002	Water 2 :	702.6	717.5	
Unit :	Engine1	Meter @ Dh :	1.987	Blank :	614.2	617.2	
Operator :	L. Barrow	Meter Y :	.9871	Sil. Gel :	818.7	828.1	
Stack Dia :	30"	TC # :	83	H2O Gain =			
Amb. Press :	29.91	Start Time :	9:12	Pressure Type/Range			
Static Press :	-.28	Stop Time :	10:42	ADM 880	—		

Pitot Leak Check

Initial :	✓	✓
Final :	✓	

Meter Box Leak Check

	Rate	"HG
Initial :	.000	24"
Final :	.000	24"

							Sample	Port 1 :		Port 2 :		Pitot ID:	
Time (Minute)	Meter Volume (acf)	Pump Vac (inch Hg)	Meter Temperatures Inlet (F)	Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Point #	Delta P ("H2O)	Stack Temp. (F)	Delta P ("H2O)	Stack Temp. (F)	Cyclonic Flow ("H2O)	TE Cooler Temp. (F)
0	638.733				2.0		1	.64	563	.70	564		34
10	646.33	6	87	84	↓	53	2	.61	572	.68	573		35
20	653.92	↓	87	84	↓	54	3	.62	574	.69	574		35
30	661.54	↓	87	84	↓	54	4	.70	577	.68	576		35
40	669.17	↓	88	84	↓	55	5	.68	577	.67	578		35
50	676.68	↓	88	85	↓	56	6	.72	576	.58	576		35
60	684.29	↓	88	85	↓	57	7	.70	575	.57	575		35
70	691.77	↓	88	85	↓	53	8	.60	575	.55	574		35
80	699.36	↓	88	85	↓	54							35
90	706.842	6	89	85	2.0	54	1	.65	562	.71	565		35
							2	.62	572	.70	574		
							3	.64	574	.69	576		
							4	.70	576	.69	578		
							5	.67	576	.68	577		
							6	.70	575	.55	576		
							7	.70	574	.58	575		
							8	.61	574	.57	574		
							1	.54	568	.65	565		
							2	.57	576	.63	574		
							3	.59	577	.63	576		
							4	.69	579	.62	578		
							5	.69	578	.59	577		
							6	.68	577	.58	576		
							7	.68	576	.55	576		
							8	.58	575	.51	576		

Almega ENVIRONMENTAL

SCAQMD METHODS 2-4

Run # :	7,8,9	Pitot ID :	S type	Impinger	Initial	Final	Net
Date :	09/29/15	Pitot Coeff. :	.84	Water 1 :	764.6	886.7	
Client :	OCSD	Meter Box # :	002	Water 2 :	695.6	707.4	
Unit :	Engine 1	Meter @ Dh :	1.987	Blank :	617.2	620.7	
Operator :	L. Barnow	Meter Y :	.9871	Sil. Gel :	828.1	840.6	
Stack Dia :	30"	TC # :	83	H2O Gain =			
Amb. Press :	29.91	Start Time :	10:58	Pressure Type/Range			
Static Press :	-.28	Stop Time :	12:28	ADM 880 C	—		

Pitot Leak Check		
Initial :	✓	✓
Final :	✓	✓

Meter Box Leak Check	Rate	"HG
Initial :	.000	25"
Final :	.000	25"

							Sample	Port 1 :		Port 2 :		Pitot ID:	
Time (Minute)	Meter Volume (acf)	Pump Vac (inch Hg)	Meter Temperatures Inlet (F)	Outlet (F)	Set Delta H (Inch H2O)	Impinger Temp. (F)	Point #	Delta P ("H2O)	Stack Temp. (F)	Delta P ("H2O)	Stack Temp. (F)	Cyclonic Flow ("H2O)	TE Cooler Temp. (F)
0	706.959				2.0		1	.88	565	.88	566		36
10	714.52	5	90	86		53	2	.86	575	.88	575		36
20	722.11		90	87		53	3	.83	576	.88	577		36
30	729.64		90	87		54	4	.79	578	.81	579		36
40	737.17		90	87		54	5	.77	577	.80	578		36
50	744.69		91	87		54	6	.76	577	.78	578		36
60	752.20		91	88		55	7	.78	576	.78	577		36
70	759.83		91	88		55	8	.76	576	.71	577		36
80	767.45		91	88		56							36
90	775.010	5	91	88	2.0	57	1	.89	576	.87	576		36
							2	.87	576	.89	575		
							3	.83	577	.88	576		
							4	.77	579	.81	578		
							5	.78	578	.81	577		
							6	.76	577	.79	576		
							7	.78	576	.76	576		
							8	.77	575	.71	576		
							1	.90	566	.86	565		
							2	.87	575	.89	574		
							3	.83	577	.89	576		
							4	.74	578	.81	578		
							5	.77	577	.80	577		
							6	.77	577	.79	576		
							7	.78	576	.77	576		
							8	.78	576	.72	576		

APPENDIX D

SCAQMD METHOD 100.1 – CONTINUOUS MONITORING OF GASEOUS EMISSIONS

Appendix D1

CEMS – Results and Calculations

REFERENCE METHOD DATA SUMMARY

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA
Source: Engine 1
Test: RATA

Run No.	Time (hh:mm)	NOx ppm	NOx ppm@15%O2	NOx lb/hr	CO ppm	CO ppm@15%O2	CO lb/hr	Dry Flow dscfh	O_2 %	CO_2 %
1	7:26-7:55	50.95	31.34	3.46	476.7	293.1	19.69	559,810	11.31	7.86
2	7:56-8:25	52.83	32.92	3.58	473.5	295.0	19.55	559,517	11.43	7.83
3	8:26-8:55	51.02	31.10	3.24	472.7	288.1	18.29	524,458	11.22	8.02
4	9:12-9:41	49.90	29.77	3.08	468.2	279.3	17.57	508,474	11.01	8.08
5	9:42-10:11	52.12	31.53	3.22	466.1	282.0	17.55	510,255	11.15	8.01
6	10:12-10:41	52.57	31.15	3.14	466.3	276.3	16.96	492,743	10.94	8.18
7	10:58-11:27	52.04	32.57	3.58	482.7	302.1	20.23	568,128	11.47	7.87
8	11:28-11:57	49.64	31.78	3.43	497.2	318.4	20.89	569,437	11.69	7.54
9	11:58-12:27	50.28	32.32	3.47	496.1	318.9	20.85	569,598	11.72	7.46
	Average	**51.26**	**31.61**	**3.36**	**477.7**	**294.8**	**19.06**	**540,269**	**11.33**	**7.87**

Reference Method CEMS Summary

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA
Source: Engine 1
Test: RATA

Run Information			Flue Gas Composition					Pollutant 1: NOx (MW: 46 lb/lb-mole)			Pollutant 2: CO (MW: 28 lb/lb-mole)		
			Moisture	Flow Rate:		O2	CO2	dry	dry ppm		dry	dry ppm	
No.	Date	Time	%	dry scfm	dry scfh	dry %	dry %	ppm	@15%O2	lbs/hr	ppm	@15%O2	lbs/hr
1	09/29/15	7:26-7:55	10.24	9,330	559,810	11.31	7.86	50.95	31.34	3.46	476.7	293.1	19.69
2	09/29/15	7:56-8:25	10.24	9,325	559,517	11.43	7.83	52.83	32.92	3.58	473.5	295.0	19.55
3	09/29/15	8:26-8:55	10.24	8,741	524,458	11.22	8.02	51.02	31.10	3.24	472.7	288.1	18.29
4	09/29/15	9:12-9:41	10.02	8,475	508,474	11.01	8.08	49.90	29.77	3.08	468.2	279.3	17.57
5	09/29/15	9:42-10:11	10.02	8,504	510,255	11.15	8.01	52.12	31.53	3.22	466.1	282.0	17.55
6	09/29/15	10:12-10:41	10.02	8,212	492,743	10.94	8.18	52.57	31.15	3.14	466.3	276.3	16.96
7	09/29/15	10:58-11:27	9.81	9,469	568,128	11.47	7.87	52.04	32.57	3.58	482.7	302.1	20.23
8	09/29/15	11:28-11:57	9.81	9,491	569,437	11.69	7.54	49.64	31.78	3.43	497.2	318.4	20.89
9	09/29/15	11:58-12:27	9.81	9,493	569,598	11.72	7.46	50.28	32.32	3.47	496.1	318.9	20.85

* Based on Standard
Conditions of:
60 deg. F and
29.92 in. Hg

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**1**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**7:26-7:55**
Test:	**RATA**		

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 1 NOx	Pollutant 2 CO	Diluent 1 O2	Diluent 2 CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.00**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.749**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.00**	**0.00**	**0.03**	**0.00**
J	Upscale Gas Response	**45.29**	**453.0**	**12.05**	**4.19**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.27**	**0.00**	**0.03**	**0.01**
L	Upscale Gas Response	**45.34**	**449.4**	**12.13**	**4.25**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**51.02**	**473.93**	**11.38**	**7.68**

CALCULATIONS

						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.14	0.00	0.03	0.01	(I+K)/2
R	Upscale Response	45.32	451.20	12.09	4.22	(J+L)/2
S	CORRECTED CONC.	50.95	476.66	11.31	7.86	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range					
Low Gas					C'*100/A
Mid Gas	45.2	45.4	48.0	43.2	C*100/A
High Gas	89.9	89.9	88.0	87.5	D*100/A
CALIBRATION ERROR, % of Range					
Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
Initial Low Gas Error					(G'-C')*100/A
Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
Final Low Gas Error					(N'-C')*100/A
Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
LINEARITY, % of Range					
Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D} *100/A
Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range					
Initial Zero Gas Bias	0.00	0.00	0.00	0.10	(I-F)*100/A
Initial Upscale Gas Bias	0.13	-0.15	-0.08	-0.30	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.19	0.00	0.00	0.30	(K-M)*100/A
Final Upscale Gas Bias	0.34	-0.46	-0.08	0.00	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range					
Zero	0.27	0.00	0.00	0.10	(K-I)*100/A
Upscale	0.05	-0.36	0.32	0.60	(L-J)*100/A

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**2**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**7:56-8:25**
Test:	**RATA**		

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 1 NOx	Pollutant 2 CO	Diluent 1 O2	Diluent 2 CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.00**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.75**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.00**	**0.00**	**0.03**	**0.00**
J	Upscale Gas Response	**45.29**	**453.0**	**12.05**	**4.19**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.27**	**0.00**	**0.03**	**0.01**
L	Upscale Gas Response	**45.34**	**449.4**	**12.13**	**4.25**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**52.90**	**470.75**	**11.51**	**7.65**

CALCULATIONS

						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.14	0.00	0.03	0.01	(I+K)/2
R	Upscale Response	45.32	451.20	12.09	4.22	(J+L)/2
S	CORRECTED CONC.	52.83	473.46	11.43	7.83	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range					
Mid Gas	45.2	45.4	48.0	43.2	C*100/A
High Gas	89.9	89.9	88.0	87.5	D*100/A
CALIBRATION ERROR, % of Range					
Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
LINEARITY, % of Range					
Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range					
Initial Zero Gas Bias	0.00	0.00	0.00	0.10	(I-F)*100/A
Initial Upscale Gas Bias	0.13	-0.15	-0.08	-0.30	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.19	0.00	0.00	0.30	(K-M)*100/A
Final Upscale Gas Bias	0.34	-0.46	-0.08	0.00	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range					
Zero	0.27	0.00	0.00	0.10	(K-I)*100/A
Upscale	0.05	-0.36	0.32	0.60	(L-J)*100/A

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**3**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**8:26-8:55**
Test:	**RATA**		

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 1 NOx	Pollutant 2 CO	Diluent 1 O2	Diluent 2 CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.00**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.75**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.00**	**0.00**	**0.03**	**0.00**
J	Upscale Gas Response	**45.29**	**453.0**	**12.05**	**4.19**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.27**	**0.00**	**0.03**	**0.01**
L	Upscale Gas Response	**45.34**	**449.4**	**12.13**	**4.25**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**51.09**	**469.96**	**11.30**	**7.83**

CALCULATIONS

						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.14	0.00	0.03	0.01	(I+K)/2
R	Upscale Response	45.32	451.20	12.09	4.22	(J+L)/2
S	CORRECTED CONC.	51.02	472.66	11.22	8.02	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range					
Mid Gas	45.2	45.4	48.0	43.2	C*100/A
High Gas	89.9	89.9	88.0	87.5	D*100/A
CALIBRATION ERROR, % of Range					
Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
LINEARITY, % of Range					
Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range					
Initial Zero Gas Bias	0.00	0.00	0.00	0.10	(I-F)*100/A
Initial Upscale Gas Bias	0.13	-0.15	-0.08	-0.30	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.19	0.00	0.00	0.30	(K-M)*100/A
Final Upscale Gas Bias	0.34	-0.46	-0.08	0.00	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range					
Zero	0.27	0.00	0.00	0.10	(K-I)*100/A
Upscale	0.05	-0.36	0.32	0.60	(L-J)*100/A

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**4**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**9:12-9:41**
Test:	**RATA**		

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 1 NOx	Pollutant 2 CO	Diluent 1 O2	Diluent 2 CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.0**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.75**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.27**	**0.00**	**0.03**	**0.01**
J	Upscale Gas Response	**45.34**	**449.4**	**12.13**	**4.25**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.40**	**0.10**	**0.03**	**0.02**
L	Upscale Gas Response	**45.66**	**449.1**	**12.10**	**4.24**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**50.15**	**463.48**	**11.11**	**7.92**

CALCULATIONS

						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.34	0.05	0.03	0.02	(I+K)/2
R	Upscale Response	45.50	449.25	12.12	4.25	(J+L)/2
S	CORRECTED CONC.	49.90	468.17	11.01	8.08	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range					
Low Gas					C'*100/A
Mid Gas	45.2	45.4	48.0	43.2	C*100/A
High Gas	89.9	89.9	88.0	87.5	D*100/A
CALIBRATION ERROR, % of Range					
Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
Initial Low Gas Error					(G'-C')*100/A
Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
Final Low Gas Error					(N'-C')*100/A
Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
LINEARITY, % of Range					
Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range					
Initial Zero Gas Bias	0.27	0.00	0.00	0.20	(I-F)*100/A
Initial Upscale Gas Bias	0.18	-0.51	0.24	0.30	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.32	0.01	0.00	0.40	(K-M)*100/A
Final Upscale Gas Bias	0.66	-0.49	-0.20	-0.10	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range					
Zero	0.13	0.01	0.00	0.10	(K-I)*100/A
Upscale	0.32	-0.03	-0.12	-0.10	(L-J)*100/A

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**5**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**9:42-10:11**
Test:	**RATA**		

TEST DATA		Pollutant 1	Pollutant 2	Diluent 1	Diluent 2
VARIABLE	DESCRIPTION	NOx	CO	O2	CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.00**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.75**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.27**	**0.00**	**0.03**	**0.01**
J	Upscale Gas Response	**45.34**	**449.4**	**12.13**	**4.25**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.40**	**0.10**	**0.03**	**0.02**
L	Upscale Gas Response	**45.66**	**449.1**	**12.10**	**4.24**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**52.37**	**461.42**	**11.25**	**7.86**

CALCULATIONS						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.34	0.05	0.03	0.02	(I+K)/2
R	Upscale Response	45.50	449.25	12.12	4.25	(J+L)/2
S	CORRECTED CONC.	52.12	466.09	11.15	8.01	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range					
Low Gas					C'*100/A
Mid Gas	45.2	45.4	48.0	43.2	C*100/A
High Gas	89.9	89.9	88.0	87.5	D*100/A
CALIBRATION ERROR, % of Range					
Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
Initial Low Gas Error					(G'-C')*100/A
Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
Final Low Gas Error					(N'-C')*100/A
Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
LINEARITY, % of Range					
Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range					
Initial Zero Gas Bias	0.27	0.00	0.00	0.20	(I-F)*100/A
Initial Upscale Gas Bias	0.18	-0.51	0.24	0.30	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.32	0.01	0.00	0.40	(K-M)*100/A
Final Upscale Gas Bias	0.66	-0.49	-0.20	-0.10	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range					
Zero	0.13	0.01	0.00	0.10	(K-I)*100/A
Upscale	0.32	-0.03	-0.12	-0.10	(L-J)*100/A

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**6**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**10:12-10:41**
Test:	**RATA**		

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 1 NOx	Pollutant 2 CO	Diluent 1 O2	Diluent 2 CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.00**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.75**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.27**	**0.00**	**0.03**	**0.01**
J	Upscale Gas Response	**45.34**	**449.4**	**12.13**	**4.25**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.40**	**0.10**	**0.03**	**0.02**
L	Upscale Gas Response	**45.66**	**449.1**	**12.10**	**4.24**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**52.82**	**461.66**	**11.04**	**8.02**

CALCULATIONS

						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.34	0.05	0.03	0.02	(I+K)/2
R	Upscale Response	45.50	449.25	12.12	4.25	(J+L)/2
S	CORRECTED CONC.	52.57	466.33	10.94	8.18	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

	CALIBRATION GAS SELECTION, % of Range					
	Low Gas					C'*100/A
	Mid Gas	45.2	45.4	48.0	43.2	C*100/A
	High Gas	89.9	89.9	88.0	87.5	D*100/A
	CALIBRATION ERROR, % of Range					
	Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
	Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
	Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
	Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
	Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
	Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
	LINEARITY, % of Range					
	Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D}*100/A
	Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
	SAMPLING SYSTEM BIAS, % of Range					
	Initial Zero Gas Bias	0.27	0.00	0.00	0.20	(I-F)*100/A
	Initial Upscale Gas Bias	0.18	-0.51	0.24	0.30	(J-G[or G', or H]*100/A
	Final Zero Gas Bias	0.32	0.01	0.00	0.40	(K-M)*100/A
	Final Upscale Gas Bias	0.66	-0.49	-0.20	-0.10	(L-N[or N', or O]*100/A
	CALIBRATION DRIFT, % of Range					
	Zero	0.13	0.01	0.00	0.10	(K-I)*100/A
	Upscale	0.32	-0.03	-0.12	-0.10	(L-J)*100/A

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**7**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**10:58-11:27**
Test:	**RATA**		

TEST DATA		Pollutant 1	Pollutant 2	Diluent 1	Diluent 2
VARIABLE	DESCRIPTION	NOx	CO	O2	CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.00**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.75**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.40**	**0.10**	**0.03**	**0.02**
J	Upscale Gas Response	**45.66**	**449.1**	**12.10**	**4.24**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.14**	**0.10**	**0.03**	**-0.01**
L	Upscale Gas Response	**45.36**	**448.8**	**12.06**	**4.11**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**52.31**	**477.50**	**11.54**	**7.60**

CALCULATIONS						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.27	0.10	0.03	0.01	(I+K)/2
R	Upscale Response	45.51	448.95	12.08	4.18	(J+L)/2
S	CORRECTED CONC.	52.04	482.67	11.47	7.87	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range					
Low Gas					C'*100/A
Mid Gas	45.2	45.4	48.0	43.2	C*100/A
High Gas	89.9	89.9	88.0	87.5	D*100/A
CALIBRATION ERROR, % of Range					
Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
Initial Low Gas Error					(G'-C')*100/A
Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
Final Low Gas Error					(N'-C')*100/A
Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
LINEARITY, % of Range					
Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range					
Initial Zero Gas Bias	0.40	0.01	0.00	0.30	(I-F)*100/A
Initial Upscale Gas Bias	0.50	-0.54	0.12	0.20	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.06	0.01	0.00	0.10	(K-M)*100/A
Final Upscale Gas Bias	0.36	-0.52	-0.36	-1.40	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range					
Zero	-0.26	0.00	0.00	-0.30	(K-I)*100/A
Upscale	-0.30	-0.03	-0.16	-1.30	(L-J)*100/A

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**8**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**11:28-11:57**
Test:	**RATA**		

TEST DATA		Pollutant 1	Pollutant 2	Diluent 1	Diluent 2
VARIABLE	DESCRIPTION	NOx	CO	O2	CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.00**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.75**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.40**	**0.10**	**0.03**	**0.02**
J	Upscale Gas Response	**45.66**	**449.1**	**12.10**	**4.24**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.14**	**0.10**	**0.03**	**-0.01**
L	Upscale Gas Response	**45.36**	**448.8**	**12.06**	**4.11**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**49.91**	**491.86**	**11.75**	**7.29**

CALCULATIONS						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.27	0.10	0.03	0.01	(I+K)/2
R	Upscale Response	45.51	448.95	12.08	4.18	(J+L)/2
S	CORRECTED CONC.	49.64	497.18	11.69	7.54	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS						
	CALIBRATION GAS SELECTION, % of Range					
	Mid Gas	45.2	45.4	48.0	43.2	C*100/A
	High Gas	89.9	89.9	88.0	87.5	D*100/A
	CALIBRATION ERROR, % of Range					
	Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
	Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
	Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
	Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
	Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
	Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
	LINEARITY, % of Range					
	Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D}*100/A
	Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
	SAMPLING SYSTEM BIAS, % of Range					
	Initial Zero Gas Bias	0.40	0.01	0.00	0.30	(I-F)*100/A
	Initial Upscale Gas Bias	0.50	-0.54	0.12	0.20	(J-G[or G', or H]*100/A
	Final Zero Gas Bias	0.06	0.01	0.00	0.10	(K-M)*100/A
	Final Upscale Gas Bias	0.36	-0.52	-0.36	-1.40	(L-N[or N', or O]*100/A
	CALIBRATION DRIFT, % of Range					
	Zero	-0.26	0.00	0.00	-0.30	(K-I)*100/A
	Upscale	-0.30	-0.03	-0.16	-1.30	(L-J)*100/A

Almega ENVIRONMENTAL

Facility:	**OCSD, Plant No. 2**	Run No.:	**9**
City:	**Huntington Beach, CA**	Test Date:	**09/29/15**
Source:	**Engine 1**	Run Time:	**11:58-12:27**
Test:	**RATA**		

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 1 NOx	Pollutant 2 CO	Diluent 1 O2	Diluent 2 CO2
A	ANALYTICAL RANGE	**100**	**1000**	**25**	**10**
	Unit of Measurement	**ppmd**	**ppmd**	**% dry**	**% dry**
	CALIBRATION GAS INFORMATION				
B	Zero Gas	**0.00**	**0.00**	**0.00**	**0.00**
C	Mid Gas Concentration	**45.24**	**453.8**	**12.01**	**4.32**
	Mid Gas Cylinder S/N:	CC147621	CC39463	CC248731	CC248731
D	High Gas Concentration	**89.91**	**899**	**21.99**	**8.75**
	High Gas Cylinder S/N:	CC199782	CC259973	CC408131	CC408131
	Primary Gas Cylinder S/N:				
E	UPSCALE CALIBRATION GAS USED	**45.24**	**453.8**	**12.01**	**4.32**
	L=Low, M=Mid, H=High	**M**	**M**	**M**	**M**
	INITIAL CALIBRATION ERROR TEST				
F	Zero Gas Response	**0.00**	**0.00**	**0.03**	**-0.01**
G	Mid Gas Response	**45.16**	**454.5**	**12.07**	**4.22**
H	High Gas Reponse	**89.93**	**898.2**	**21.95**	**8.67**
	INITIAL SYSTEM CALIBRATION CHECK				
I	Zero Gas Response	**0.40**	**0.10**	**0.03**	**0.02**
J	Upscale Gas Response	**45.66**	**449.1**	**12.10**	**4.24**
	FINAL SYSTEM CALIBRATION CHECK				
K	Zero Gas Response	**0.14**	**0.10**	**0.03**	**-0.01**
L	Upscale Gas Response	**45.36**	**448.8**	**12.06**	**4.11**
	FINAL CALIBRATION ERROR CHECK				
M	Zero Gas Response	**0.08**	**0.00**	**0.03**	**-0.02**
N	Mid Gas Response	**45.00**	**454.0**	**12.15**	**4.25**
O	High Gas Reponse	**89.80**	**897.3**	**21.97**	**8.70**
P	AS MEASURED FLUE GAS CONCENTRATION	**50.55**	**490.81**	**11.79**	**7.21**

CALCULATIONS

						FORMULA
	AVERAGE SYSTEM CALIBRATION					
Q	Zero Response	0.27	0.10	0.03	0.01	(I+K)/2
R	Upscale Response	45.51	448.95	12.08	4.18	(J+L) 2
S	CORRECTED CONC.	50.28	496.12	11.72	7.46	E*(P-Q)/(R-Q)

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range					
Low Gas					C'*100/A
Mid Gas	45.2	45.4	48.0	43.2	C*100/A
High Gas	89.9	89.9	88.0	87.5	D*100/A
CALIBRATION ERROR, % of Range					
Initial Zero Gas Error	0.00	0.00	0.12	-0.10	(F-B)*100/A
Initial Low Gas Error					(G'-C')*100/A
Initial Mid Gas Error	-0.08	0.07	0.24	-1.00	(G-C)*100/A
Initial High Gas Error	0.02	-0.08	-0.16	-0.79	(H-D)*100/A
Final Zero Gas Error	0.08	0.00	0.12	-0.20	(M-B)*100/A
Final Low Gas Error					(N'-C')*100/A
Final Mid Gas Error	-0.24	0.02	0.56	-0.70	(N-C)*100/A
Final High Gas Error	-0.11	-0.17	-0.08	-0.49	(O-D)*100/A
LINEARITY, % of Range					
Initial	-0.09	0.11	0.27	-0.56	{(G-F)-[(H-F)*C]/D}*100/A
Final	-0.22	0.11	0.55	-0.36	{(N-M)-[(O-M)*C]/D}*100/A
SAMPLING SYSTEM BIAS, % of Range					
Initial Zero Gas Bias	0.40	0.01	0.00	0.30	(I-F)*100/A
Initial Upscale Gas Bias	0.50	-0.54	0.12	0.20	(J-G[or G', or H]*100/A
Final Zero Gas Bias	0.06	0.01	0.00	0.10	(K-M)*100/A
Final Upscale Gas Bias	0.36	-0.52	-0.36	-1.40	(L-N[or N', or O]*100/A
CALIBRATION DRIFT, % of Range					
Zero	-0.26	0.00	0.00	-0.30	(K-I)*100/A
Upscale	-0.30	-0.03	-0.16	-1.30	(L-J)*100/A

AETS CEMS Data -- Run-by-Run Basis

	RUN 1.0					RUN 2.0				
	Time	NOx	CO	O2	CO2	Time	NOx	CO	O2	CO2
#	AVG	51.02	473.93	11.38	7.68	AVG	52.90	470.75	11.51	7.65
1	7:26:00	50.87	473.90	11.17	7.70	7:56:00	51.98	471.00	11.48	7.65
2	7:27:00	50.13	472.80	11.22	7.70	7:57:00	50.90	471.90	11.50	7.65
3	7:28:00	49.62	474.50	11.28	7.70	7:58:00	51.04	472.50	11.51	7.65
4	7:29:00	48.61	477.10	11.29	7.70	7:59:00	50.18	473.20	11.52	7.65
5	7:30:00	48.15	476.80	11.29	7.70	8:00:00	51.21	472.10	11.51	7.65
6	7:31:00	47.27	478.10	11.34	7.68	8:01:00	51.82	471.20	11.49	7.65
7	7:32:00	48.48	477.00	11.33	7.68	8:02:00	52.76	470.20	11.49	7.65
8	7:33:00	49.78	477.60	11.35	7.68	8:03:00	51.93	470.00	11.51	7.65
9	7:34:00	49.76	481.20	11.37	7.68	8:04:00	53.94	468.60	11.46	7.64
10	7:35:00	49.97	479.20	11.38	7.68	8:05:00	54.13	468.40	11.49	7.64
11	7:36:00	51.53	475.60	11.36	7.68	8:06:00	53.09	472.00	11.51	7.64
12	7:37:00	52.38	475.60	11.33	7.69	8:07:00	53.19	470.90	11.51	7.64
13	7:38:00	52.41	475.90	11.37	7.69	8:08:00	53.08	469.60	11.51	7.64
14	7:39:00	52.84	475.40	11.36	7.70	8:09:00	52.57	471.40	11.50	7.64
15	7:40:00	52.82	475.40	11.42	7.69	8:10:00	53.43	471.40	11.49	7.66
16	7:41:00	52.70	473.20	11.39	7.67	8:11:00	53.99	467.80	11.49	7.66
17	7:42:00	52.99	472.00	11.42	7.68	8:12:00	53.60	469.50	11.50	7.66
18	7:43:00	52.26	467.60	11.40	7.68	8:13:00	52.95	471.50	11.53	7.64
19	7:44:00	51.92	471.70	11.40	7.68	8:14:00	53.30	471.30	11.51	7.63
20	7:45:00	51.41	473.50	11.40	7.68	8:15:00	53.99	469.10	11.50	7.65
21	7:46:00	51.40	471.00	11.42	7.68	8:16:00	53.52	470.80	11.52	7.65
22	7:47:00	51.50	472.20	11.41	7.68	8:17:00	53.70	471.10	11.50	7.65
23	7:48:00	51.22	470.00	11.45	7.68	8:18:00	53.30	471.10	11.51	7.65
24	7:49:00	50.86	470.90	11.49	7.64	8:19:00	53.65	468.80	11.49	7.65
25	7:50:00	51.46	472.50	11.46	7.65	8:20:00	53.72	468.90	11.51	7.65
26	7:51:00	51.57	474.60	11.47	7.65	8:21:00	53.52	468.80	11.50	7.65
27	7:52:00	51.86	470.30	11.46	7.65	8:22:00	53.82	469.50	11.51	7.65
28	7:53:00	51.96	470.70	11.49	7.65	8:23:00	52.97	472.10	11.55	7.65
29	7:54:00	51.52	469.60	11.49	7.65	8:24:00	52.65	473.80	11.56	7.65
30	7:55:00	51.42	472.10	11.49	7.65	8:25:00	53.04	474.00	11.56	7.65

AETS CEMS Data -- Run-by-Run Basis

	RUN 3.0				
	Time	NOx	CO	O2	CO2
#	AVG	51.09	469.96	11.30	7.83
1	8:26:00	52.82	475.40	11.57	7.65
2	8:27:00	52.15	476.50	11.56	7.65
3	8:28:00	52.57	474.20	11.54	7.65
4	8:29:00	52.51	475.80	11.50	7.65
5	8:30:00	53.15	472.00	11.51	7.66
6	8:31:00	53.52	472.40	11.52	7.66
7	8:32:00	53.15	471.20	11.55	7.66
8	8:33:00	53.24	472.90	11.55	7.66
9	8:34:00	53.67	472.80	11.54	7.66
10	8:35:00	54.12	471.20	11.55	7.66
11	8:36:00	53.68	470.20	11.56	7.65
12	8:37:00	53.63	472.30	11.57	7.64
13	8:38:00	52.17	475.50	11.59	7.63
14	8:39:00	47.04	485.50	11.63	7.58
15	8:40:00	43.62	494.00	11.58	7.57
16	8:41:00	44.10	492.90	11.35	7.72
17	8:42:00	46.01	477.40	11.12	7.91
18	8:43:00	47.92	469.60	11.00	8.00
19	8:44:00	49.76	462.90	10.95	8.07
20	8:45:00	50.32	461.90	10.94	8.09
21	8:46:00	51.38	460.20	10.95	8.10
22	8:47:00	51.43	459.30	10.97	8.10
23	8:48:00	50.95	460.90	11.03	8.09
24	8:49:00	51.05	458.90	11.08	8.01
25	8:50:00	51.50	460.30	11.01	8.02
26	8:51:00	51.65	461.50	11.04	8.02
27	8:52:00	51.93	461.20	11.03	8.02
28	8:53:00	51.32	460.60	11.04	8.02
29	8:54:00	51.17	459.50	11.03	8.02
30	8:55:00	51.21	459.70	11.04	8.02

	RUN 4.0				
	Time	NOx	CO	O2	CO2
#	AVG	50.15	463.48	11.11	7.92
1	9:12:00	48.78	465.10	11.07	7.83
2	9:13:00	48.20	465.50	11.15	7.83
3	9:14:00	48.48	467.10	11.18	7.83
4	9:15:00	49.48	463.40	11.18	7.83
5	9:16:00	49.52	462.90	11.20	7.83
6	9:17:00	48.91	463.80	11.20	7.83
7	9:18:00	48.07	464.60	11.24	7.83
8	9:19:00	48.18	466.40	11.21	7.83
9	9:20:00	47.49	467.90	11.21	7.83
10	9:21:00	47.13	467.50	11.20	7.83
11	9:22:00	46.96	466.70	11.20	7.85
12	9:23:00	46.94	468.10	11.19	7.85
13	9:24:00	46.99	468.10	11.20	7.86
14	9:25:01	47.20	467.60	11.18	7.88
15	9:26:00	48.52	467.80	11.17	7.89
16	9:27:00	49.34	467.10	11.16	7.90
17	9:28:00	49.52	466.10	11.14	7.93
18	9:29:00	49.46	464.80	11.15	7.92
19	9:30:00	49.94	466.50	11.06	7.96
20	9:31:00	50.57	462.30	11.03	7.98
21	9:32:00	51.63	460.10	10.99	8.01
22	9:33:00	52.13	461.00	10.98	8.02
23	9:34:00	53.08	458.60	10.95	8.04
24	9:35:00	53.70	458.90	10.96	8.06
25	9:36:00	53.81	456.40	11.01	8.04
26	9:37:00	54.12	457.10	10.97	8.01
27	9:38:00	53.97	459.00	11.00	8.05
28	9:39:00	54.03	459.10	11.01	8.05
29	9:40:00	54.19	457.60	11.01	8.05
30	9:41:00	54.28	457.20	11.04	8.05

AETS CEMS Data -- Run-by-Run Basis

	RUN 5.0					RUN 6.0				
	Time	NOx	CO	O2	CO2	Time	NOx	CO	O2	CO2
#	AVG	52.37	461.42	11.25	7.86	AVG	52.82	461.66	11.04	8.02
1	9:42:00	53.92	458.50	11.12	8.02	10:12:00	51.05	463.30	11.16	7.91
2	9:43:00	53.37	459.50	11.14	7.98	10:13:00	52.29	460.70	11.10	7.96
3	9:44:00	53.97	457.10	11.17	7.93	10:14:00	52.43	461.50	11.08	7.96
4	9:45:00	53.13	459.00	11.18	7.92	10:15:00	52.28	461.20	11.08	7.98
5	9:46:00	53.90	458.90	11.16	7.92	10:16:00	52.41	461.70	11.07	7.98
6	9:47:00	54.03	459.30	11.18	7.92	10:17:00	52.78	461.70	11.05	7.98
7	9:48:00	54.01	461.00	11.19	7.92	10:18:00	53.69	459.90	11.04	7.98
8	9:49:00	53.98	460.90	11.20	7.91	10:19:00	53.62	459.30	11.10	7.98
9	9:50:00	54.28	460.40	11.20	7.91	10:20:00	52.90	459.80	11.11	7.98
10	9:51:00	53.73	459.60	11.25	7.89	10:21:00	53.05	461.40	11.08	7.98
11	9:52:00	53.50	459.00	11.25	7.87	10:22:00	53.48	461.00	11.00	7.99
12	9:53:00	53.22	457.50	11.27	7.87	10:23:00	53.41	458.80	10.97	8.01
13	9:54:00	53.33	458.60	11.29	7.86	10:24:00	53.89	460.90	10.94	8.05
14	9:55:00	52.32	459.90	11.33	7.83	10:25:00	53.77	460.90	10.97	8.07
15	9:56:00	51.79	463.60	11.35	7.81	10:26:00	53.36	461.30	11.01	8.07
16	9:57:00	51.43	462.50	11.36	7.76	10:31:17	52.75	463.80	11.03	8.07
17	9:58:00	51.32	461.30	11.34	7.75	10:31:19	52.56	464.00	11.03	8.07
18	9:59:00	51.70	462.80	11.32	7.79	10:31:21	52.56	464.00	11.03	8.07
19	10:00:00	50.96	465.40	11.32	7.79	10:31:22	52.34	465.00	10.95	8.06
20	10:01:00	50.82	465.30	11.32	7.79	10:31:22	52.34	465.00	10.95	8.06
21	10:02:00	51.39	464.20	11.29	7.79	10:32:00	53.37	464.60	10.94	8.07
22	10:03:00	50.94	462.80	11.30	7.79	10:33:00	53.00	462.60	10.95	8.08
23	10:04:00	51.92	461.40	11.27	7.81	10:34:00	53.17	461.20	10.96	8.08
24	10:05:00	51.41	465.10	11.29	7.82	10:35:00	53.11	460.40	11.00	8.08
25	10:06:00	50.71	464.50	11.31	7.82	10:36:00	52.64	459.50	11.05	8.07
26	10:07:00	50.60	465.00	11.25	7.83	10:37:00	52.59	461.00	11.09	8.05
27	10:08:00	51.32	461.70	11.24	7.85	10:38:00	52.80	459.50	11.11	8.02
28	10:09:00	51.34	460.80	11.21	7.85	10:39:00	52.55	463.00	11.10	8.02
29	10:10:00	51.40	463.80	11.17	7.88	10:40:00	52.47	461.10	11.14	8.00
30	10:11:00	51.30	463.20	11.17	7.90	10:41:00	52.00	461.60	11.15	7.99

AETS CEMS Data -- Run-by-Run Basis

	RUN 7.0				
	Time	NOx	CO	O2	CO2
#	AVG	52.31	477.50	11.54	7.60
1	10:58:00	53.55	467.8	11.17	7.70
2	10:59:00	54.24	466.2	11.23	7.71
3	11:00:00	55.24	462.7	11.31	7.71
4	11:01:00	53.74	463.9	11.40	7.68
5	11:02:00	53	468.7	11.47	7.65
6	11:03:00	54.19	464.1	11.47	7.64
7	11:04:00	51.81	469.5	11.54	7.61
8	11:05:00	51.29	472.7	11.56	7.60
9	11:06:00	50.54	479.0	11.56	7.60
10	11:07:00	52.51	478.6	11.54	7.60
11	11:08:00	52.78	477.1	11.54	7.60
12	11:09:00	51.84	479.2	11.56	7.60
13	11:10:00	50.86	479.2	11.57	7.60
14	11:11:00	51.19	481.5	11.53	7.60
15	11:12:00	52.48	478.3	11.52	7.60
16	11:13:00	53.26	476.2	11.53	7.60
17	11:14:00	53.5	476.1	11.57	7.60
18	11:15:00	52.09	480.2	11.60	7.60
19	11:16:00	51.19	484.7	11.61	7.59
20	11:17:00	50.76	486.8	11.62	7.57
21	11:18:00	52.1	482.2	11.58	7.55
22	11:19:00	52.69	479.8	11.57	7.60
23	11:20:00	52.78	480.4	11.58	7.60
24	11:21:00	53.54	476.6	11.62	7.53
25	11:22:00	53.23	479.4	11.61	7.56
26	11:23:00	52.06	482.0	11.66	7.56
27	11:24:00	50.99	486.7	11.69	7.55
28	11:25:00	50.38	486.2	11.70	7.54
29	11:26:00	50.3	490.4	11.70	7.53
30	11:27:00	51.03	488.9	11.67	7.53

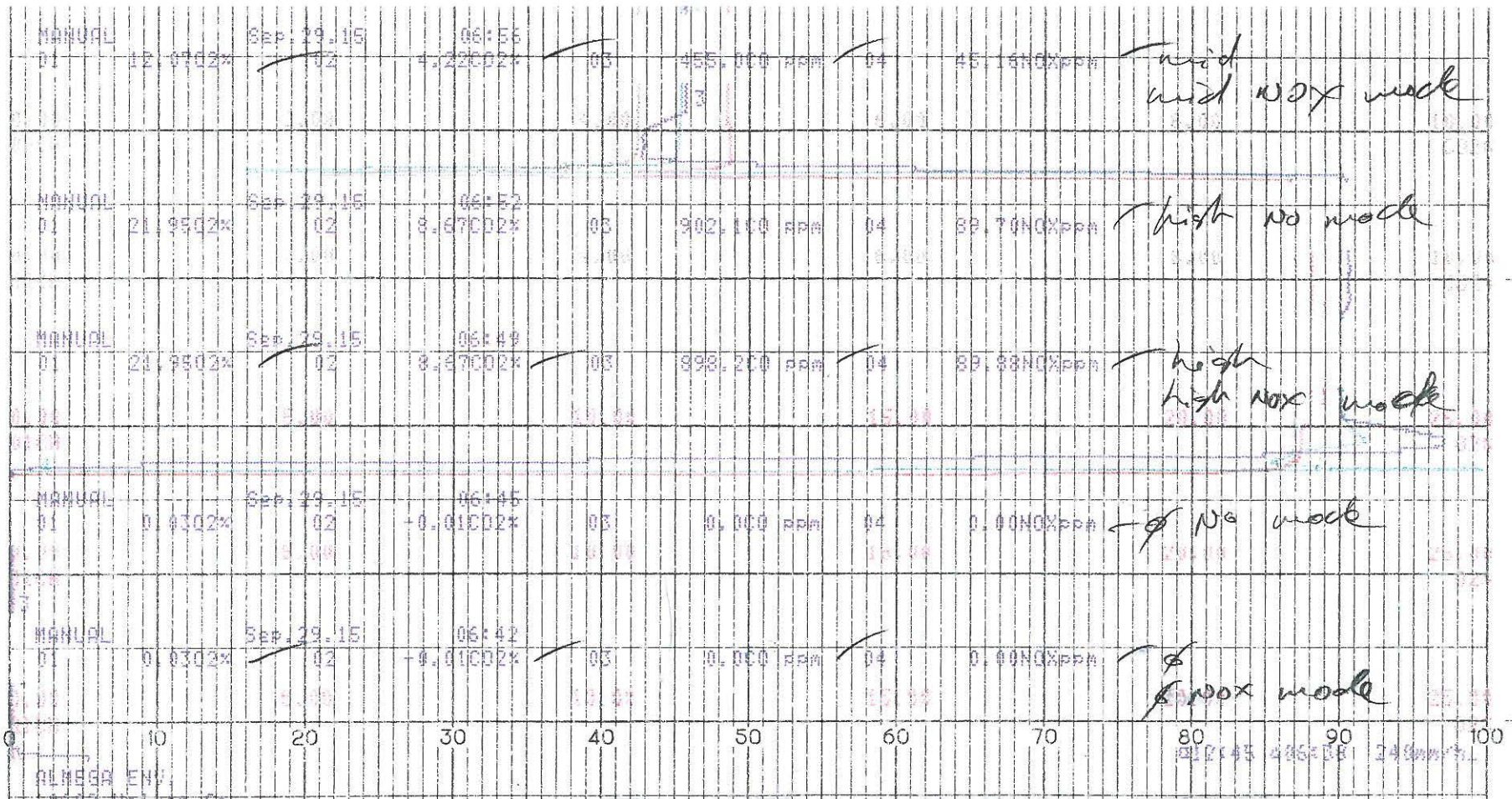
	RUN 8.0				
	Time	NOx	CO	O2	CO2
#	AVG	49.91	491.86	11.75	7.29
1	11:28:00	51.27	484.80	11.70	7.49
2	11:29:00	50.77	486.90	11.67	7.47
3	11:30:00	50.89	492.40	11.86	7.17
4	11:31:00	48.98	505.90	11.81	7.19
5	11:32:00	49.17	497.40	11.79	7.27
6	11:33:00	49.68	496.00	11.77	7.27
7	11:34:00	49.80	491.60	11.81	7.26
8	11:35:00	47.79	499.90	11.80	7.26
9	11:36:00	46.96	498.30	11.76	7.29
10	11:37:00	48.18	496.10	11.73	7.32
11	11:38:00	48.01	490.80	11.80	7.25
12	11:39:00	46.65	496.80	11.81	7.21
13	11:40:00	46.95	499.10	11.80	7.19
14	11:41:00	47.83	493.00	11.76	7.25
15	11:42:00	49.41	492.50	11.72	7.31
16	11:43:00	50.56	486.40	11.70	7.32
17	11:44:00	51.32	486.90	11.72	7.32
18	11:45:00	51.86	485.90	11.74	7.31
19	11:46:00	51.76	488.30	11.75	7.28
20	11:47:00	50.17	490.20	11.80	7.22
21	11:48:00	51.17	496.90	11.76	7.23
22	11:49:00	51.57	490.70	11.72	7.28
23	11:50:00	51.59	487.90	11.72	7.30
24	11:51:00	52.81	487.60	11.71	7.33
25	11:52:00	53.03	484.60	11.72	7.32
26	11:53:00	50.81	487.20	11.74	7.32
27	11:54:00	50.61	486.40	11.73	7.32
28	11:55:00	49.91	490.20	11.72	7.32
29	11:56:00	49.24	491.50	11.75	7.27
30	11:57:00	48.53	493.60	11.77	7.22

AETS CEMS Data -- Run-by-Run Basis

	RUN 9.0				
	Time	NOx	CO	O2	CO2
#	AVG	50.55	490.81	11.79	7.21
1	11:58:00	50.72	490.10	11.70	7.28
2	11:59:00	51.70	480.50	11.73	7.29
3	12:00:00	51.33	485.40	11.74	7.29
4	12:01:00	49.81	490.20	11.76	7.28
5	12:02:00	49.56	488.90	11.76	7.27
6	12:03:00	50.26	488.80	11.74	7.29
7	12:04:00	48.87	494.20	11.82	7.21
8	12:05:00	49.76	496.20	11.82	7.20
9	12:06:00	50.43	490.90	11.75	7.25
10	12:07:00	50.55	488.20	11.75	7.27
11	12:08:00	50.18	489.30	11.75	7.27
12	12:09:00	50.44	490.20	11.74	7.28
13	12:10:00	50.45	487.40	11.74	7.30
14	12:11:00	50.76	486.90	11.77	7.29
15	12:12:00	50.36	488.20	11.78	7.26
16	12:13:00	50.69	489.80	11.77	7.26
17	12:14:00	51.07	489.20	11.76	7.26
18	12:15:00	50.37	486.60	11.76	7.26
19	12:16:00	49.18	488.20	11.75	7.27
20	12:17:00	49.86	484.60	11.70	7.33
21	12:18:00	51.46	481.60	11.75	7.28
22	12:19:00	49.88	492.60	11.79	7.23
23	12:20:00	50.11	493.60	11.78	7.22
24	12:21:00	51.26	490.80	11.78	7.21
25	12:22:00	51.73	487.20	11.80	7.21
26	12:23:00	51.69	489.70	11.85	7.13
27	12:24:00	50.69	501.30	12.00	6.91
28	12:25:00	50.65	507.40	11.97	6.90
29	12:26:00	50.85	504.60	11.95	6.90
30	12:27:00	51.86	501.70	11.91	6.91

Appendix D2

CEMS – Strip Chart



Sep.29 06:54
INTVL 1

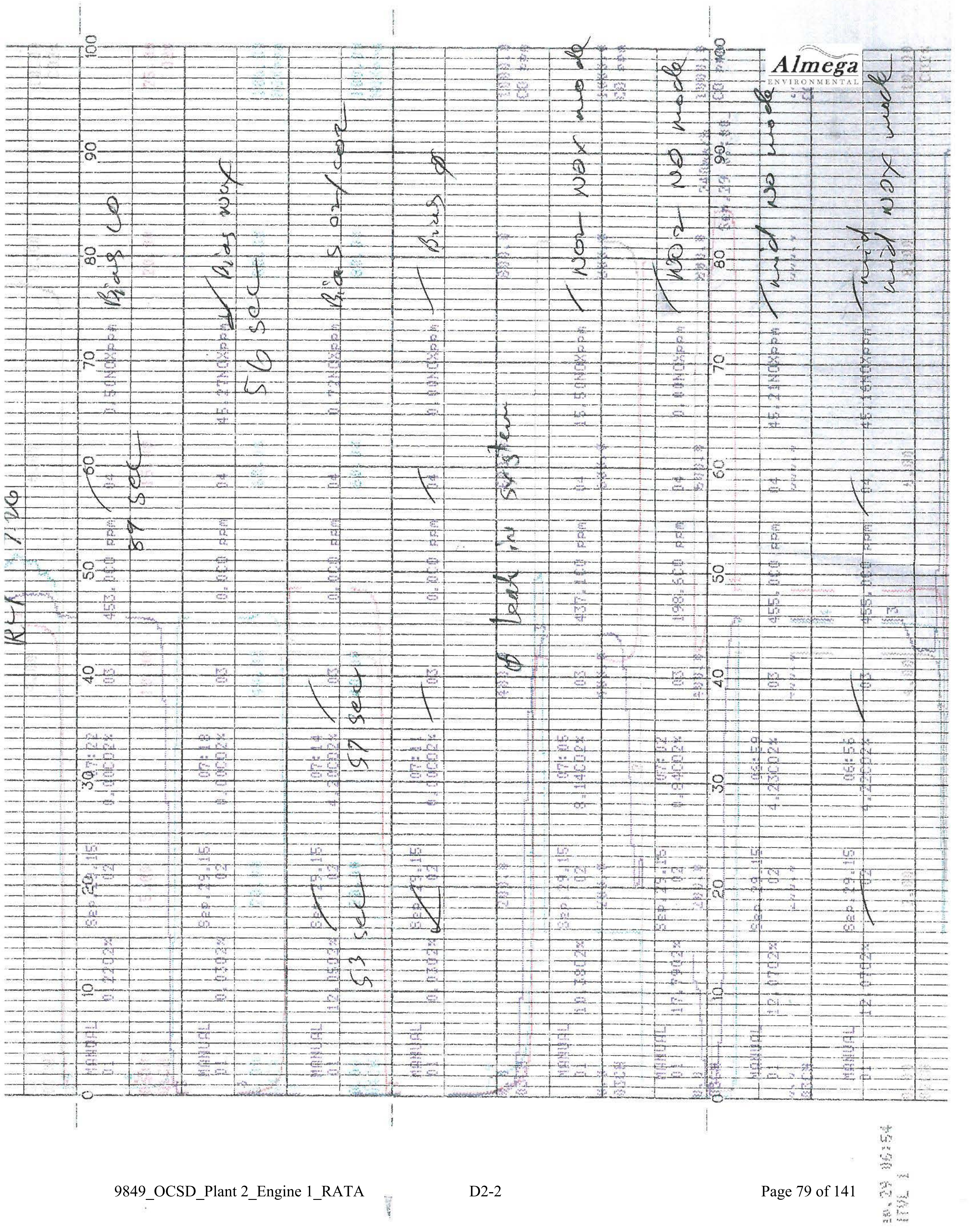
Almega ENVIRONMENTAL

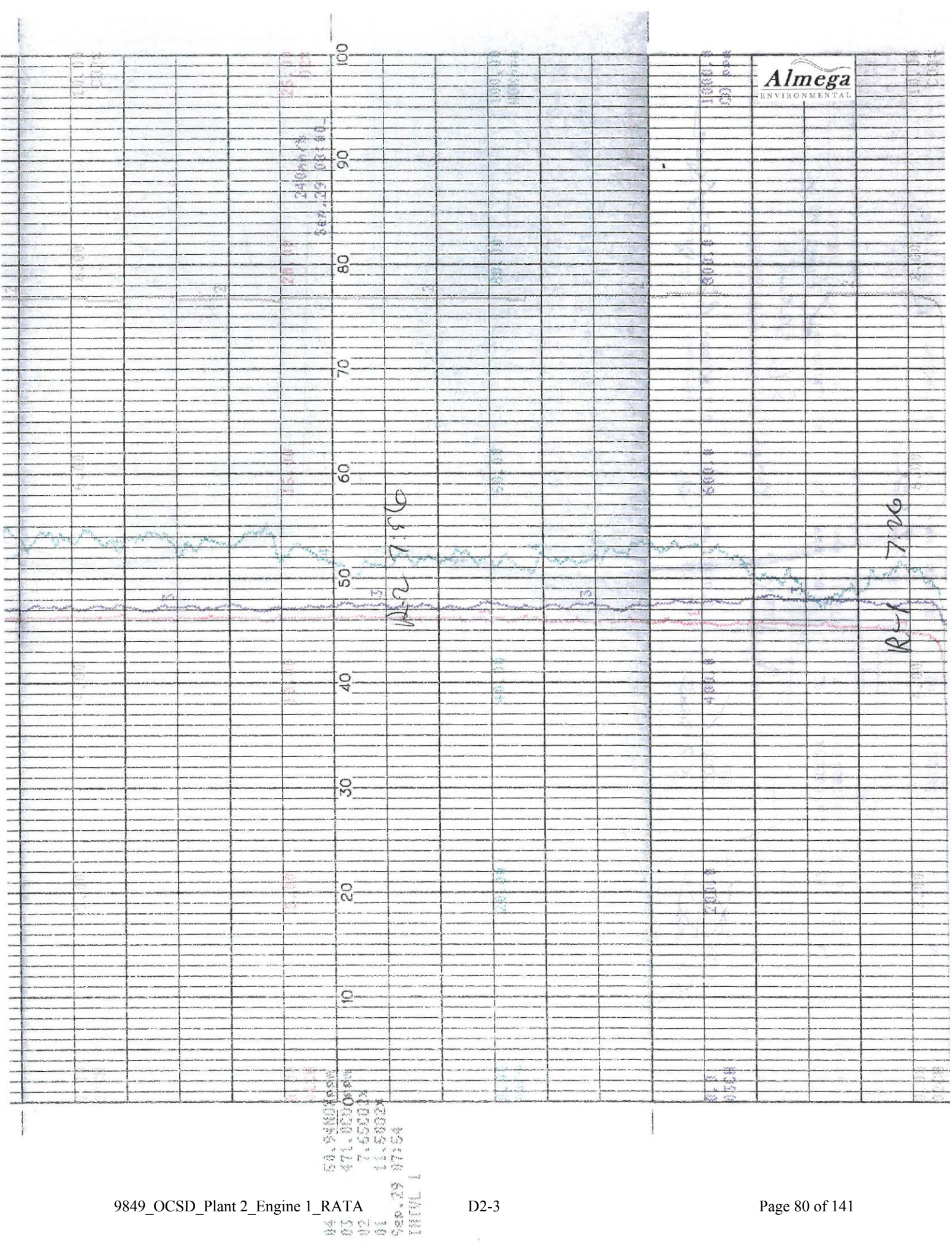
Project No.	9849	Date:	09/29/15
Facility:	Orange County Sanitation District	Location:	Huntington Beach, CA
Unit:	Plant 2 - Engine 1	Test Team:	T.Tr./L.B.
Test:	NOx, CO, O2 & Flow RATAs - Rule 218/218.1		

Cal Gas Information

Type	Range	Conc.	Unit	Cyl. #	Exp. Date
O2 (M)	25	12.01	%	CC248731	08/05/23
O2 (H)	25	21.99	%	CC408131	10/21/22
CO2 (M)	10	4.32	%	CC248731	08/05/23
CO2 (H)	10	8.749	%	CC408131	10/21/22
NOx (M)	100	45.24	PPM	CC147621	06/14/17
NOx (H)	100	89.91	PPM	CC199782	06/07/21
CO (M)	1000	453.8	PPM	CC39463	12/02/22
CO (H)	1000	899	PPM	CC259973	04/19/20
NOx Converter Check					
NO2	-	16.46	PPM	CC502676	04/03/17

Almega ENVIRONMENTAL

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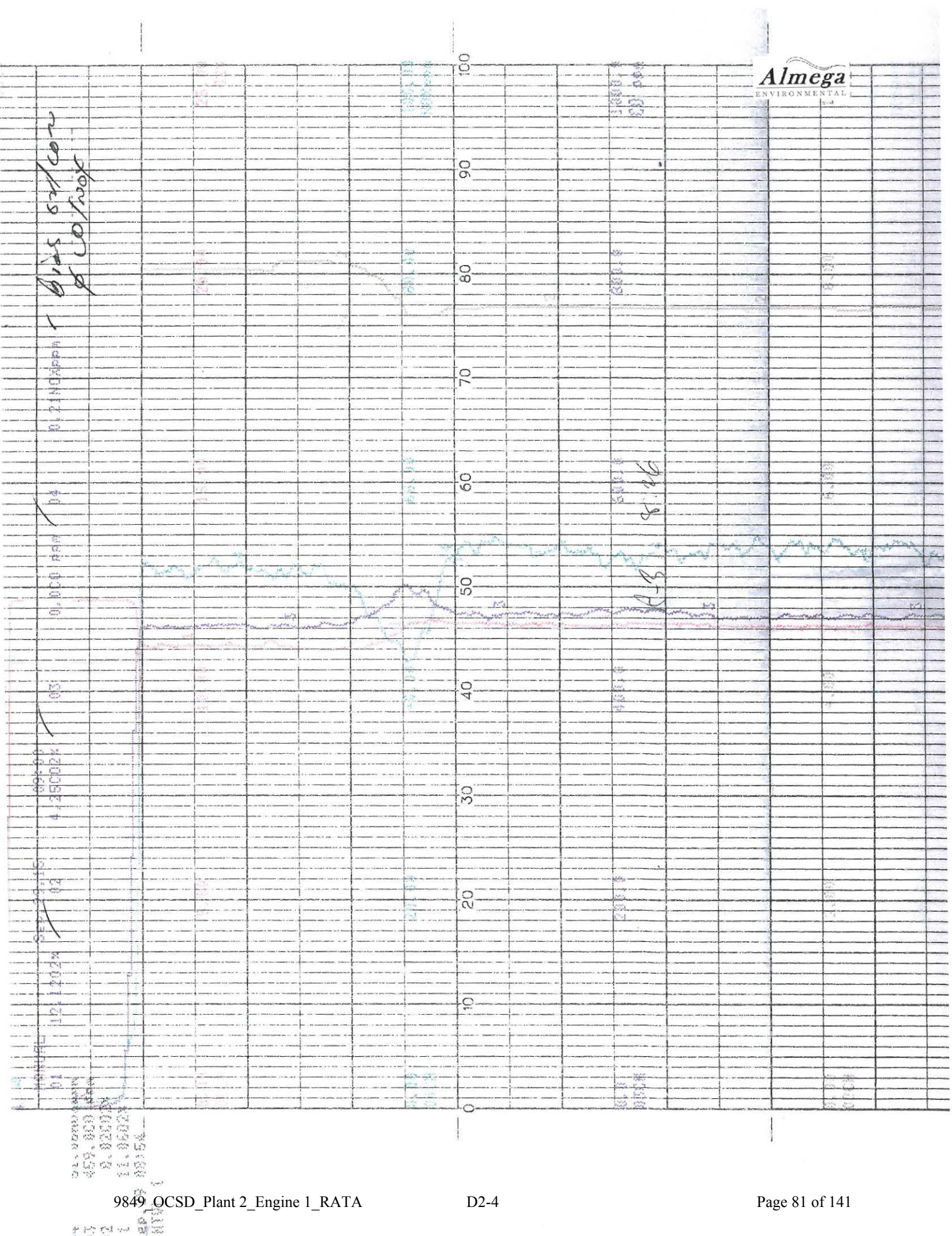
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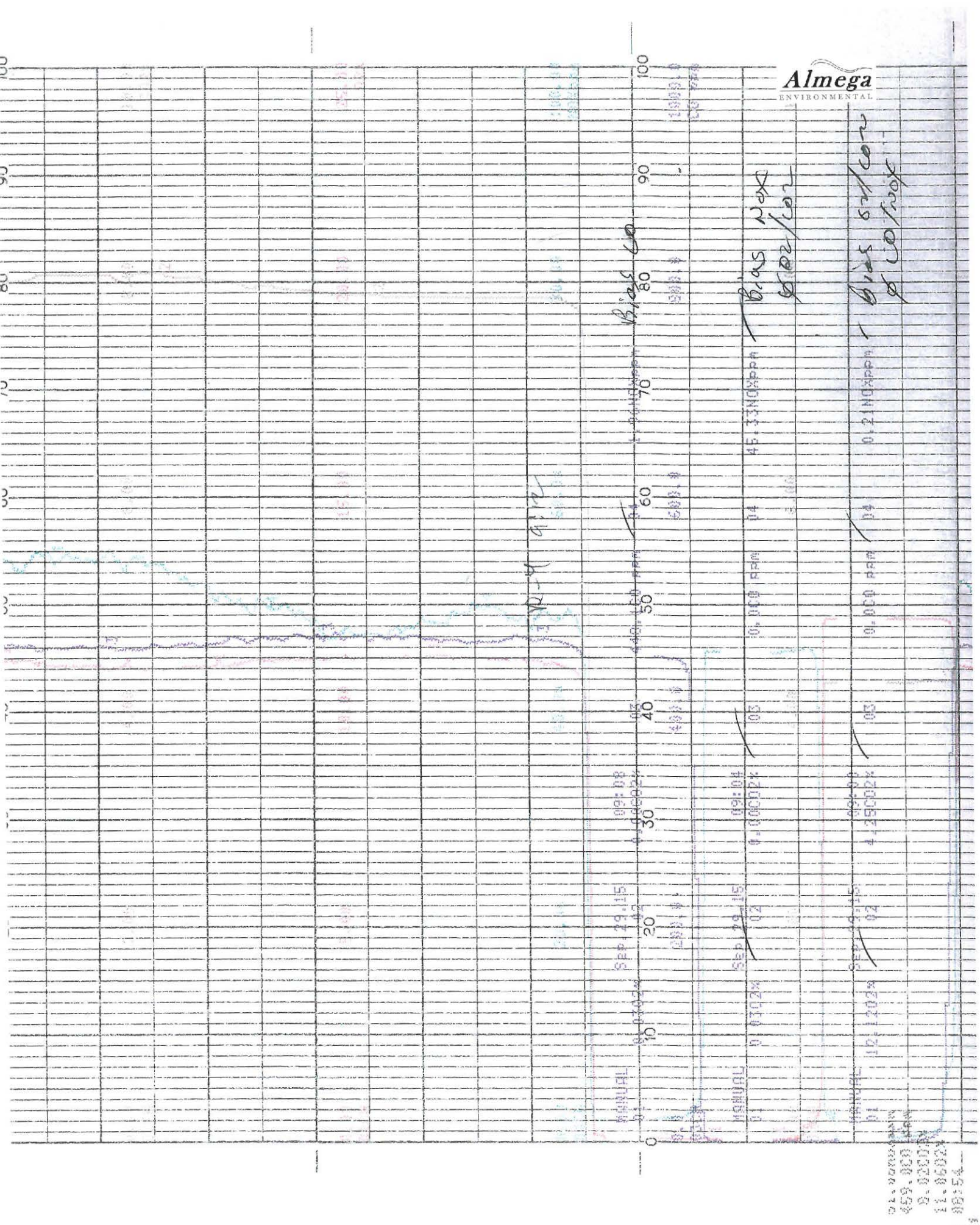
Almega
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Bias High
Zero Gas
Span Gas
Manual
Method 7E
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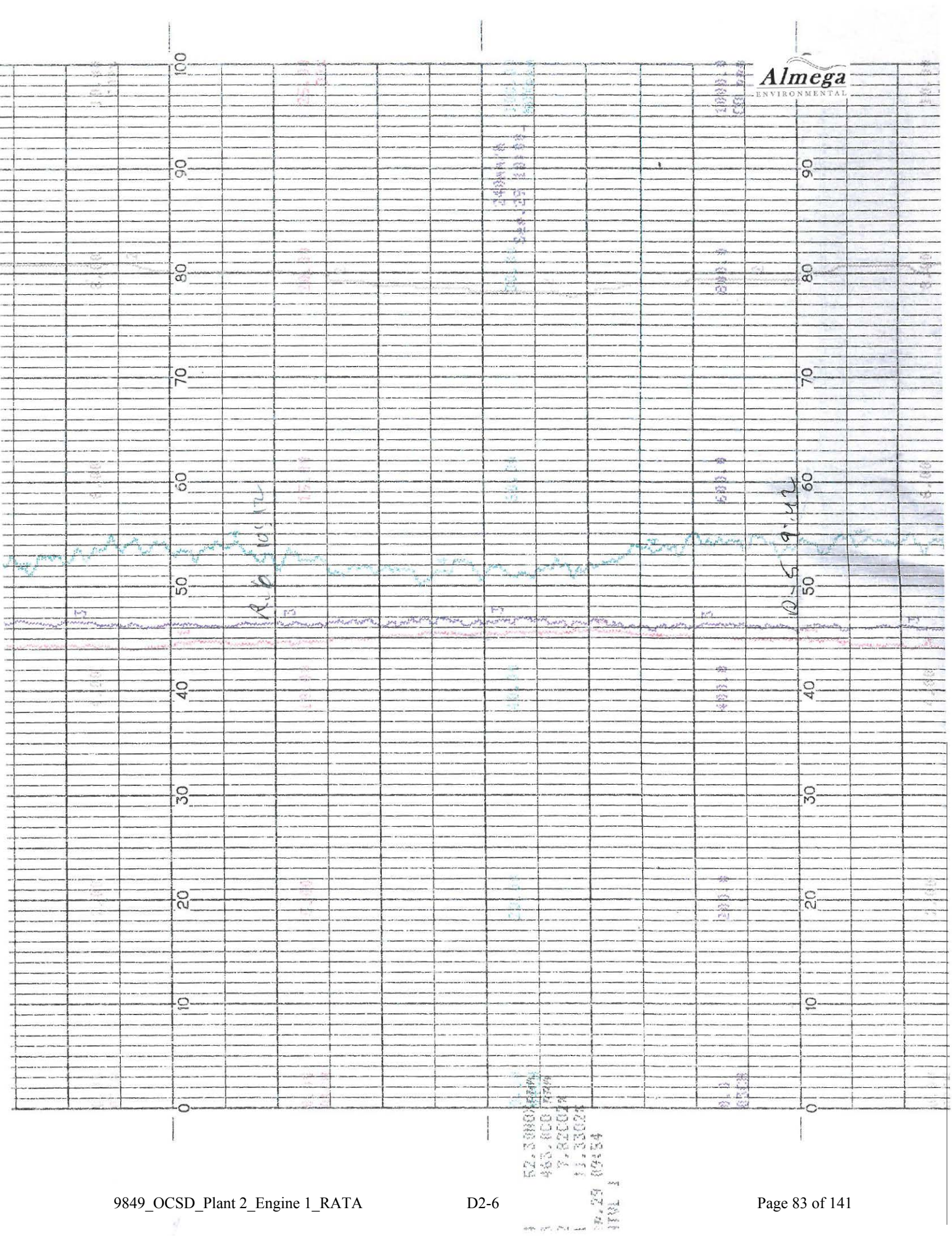
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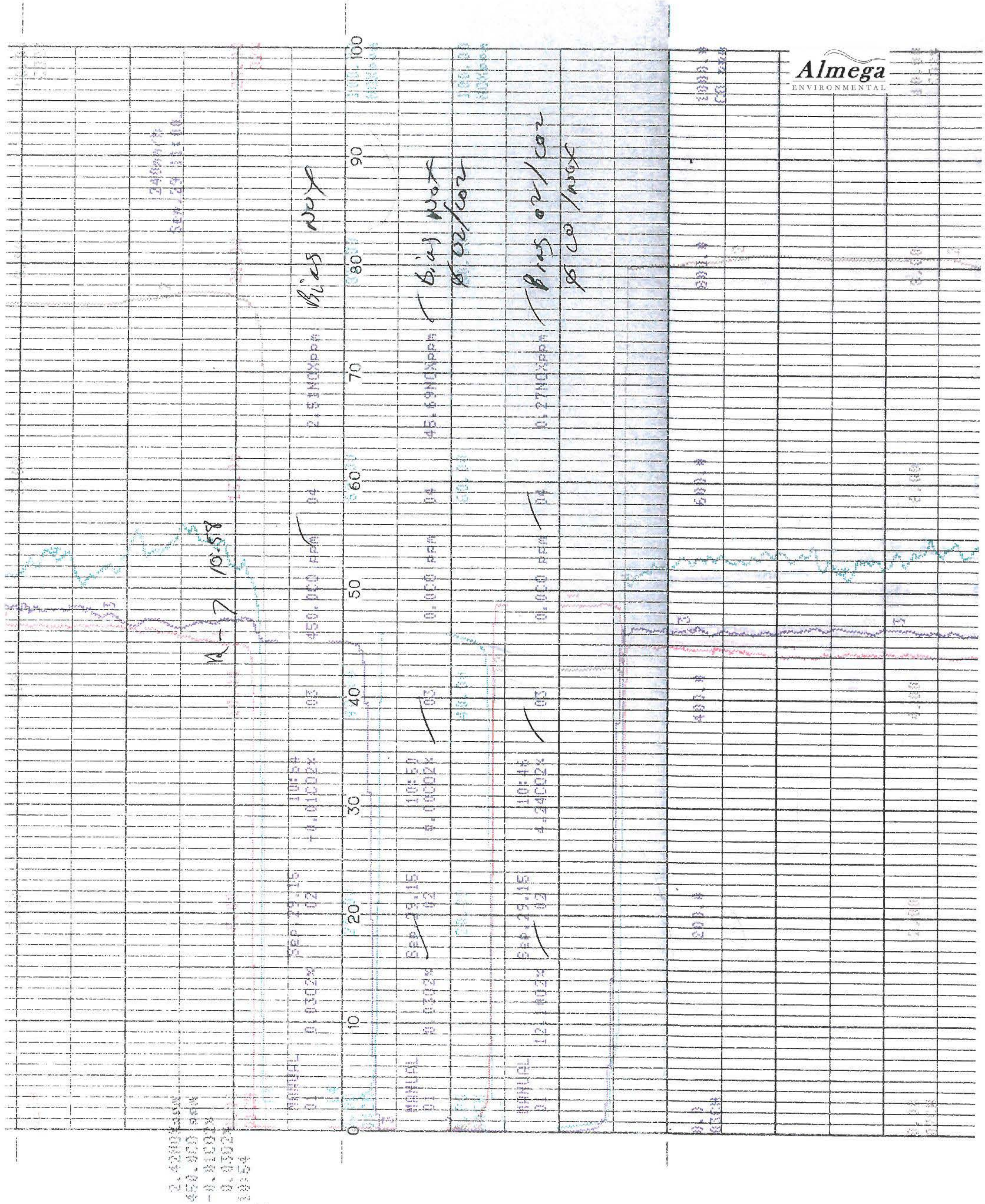

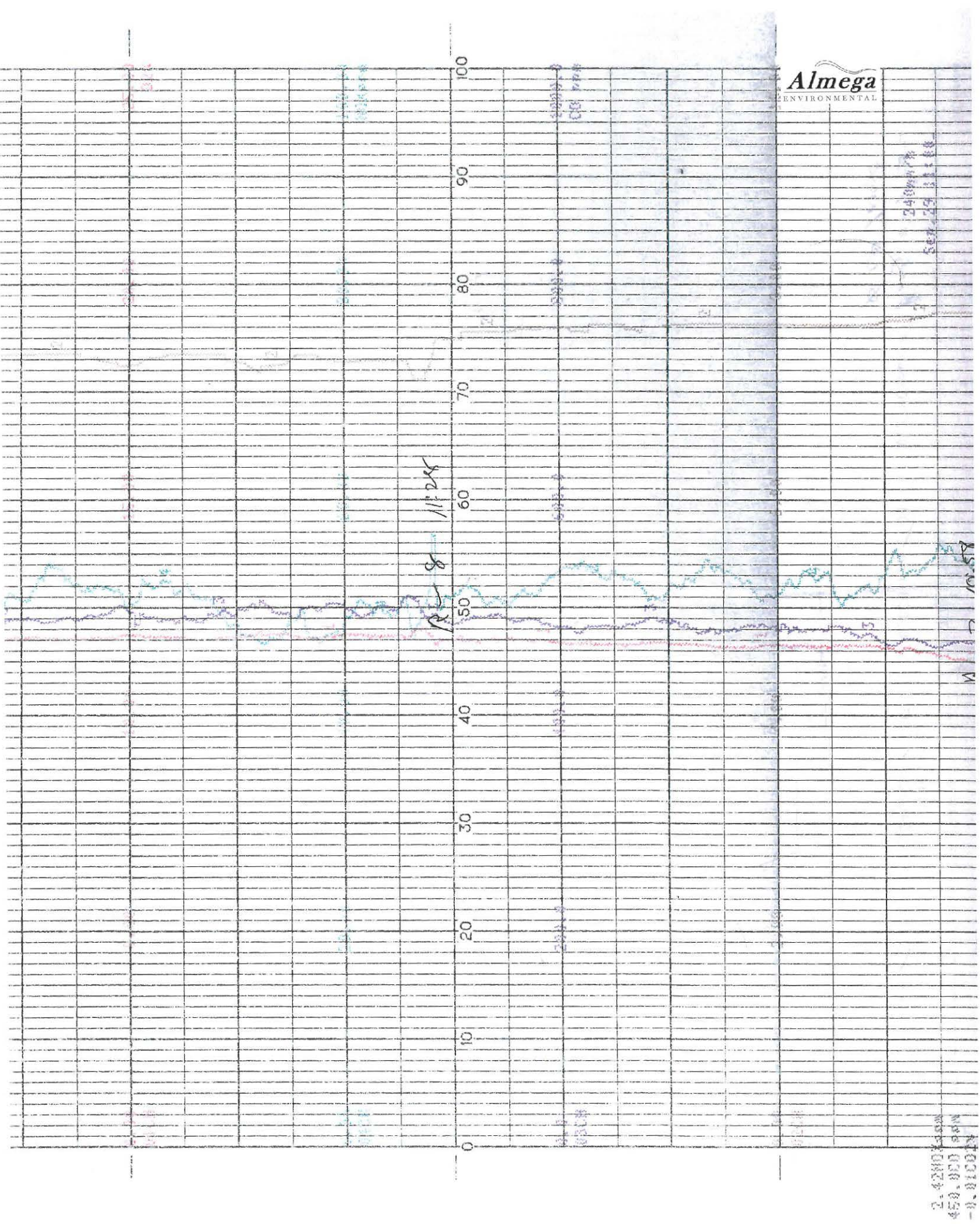
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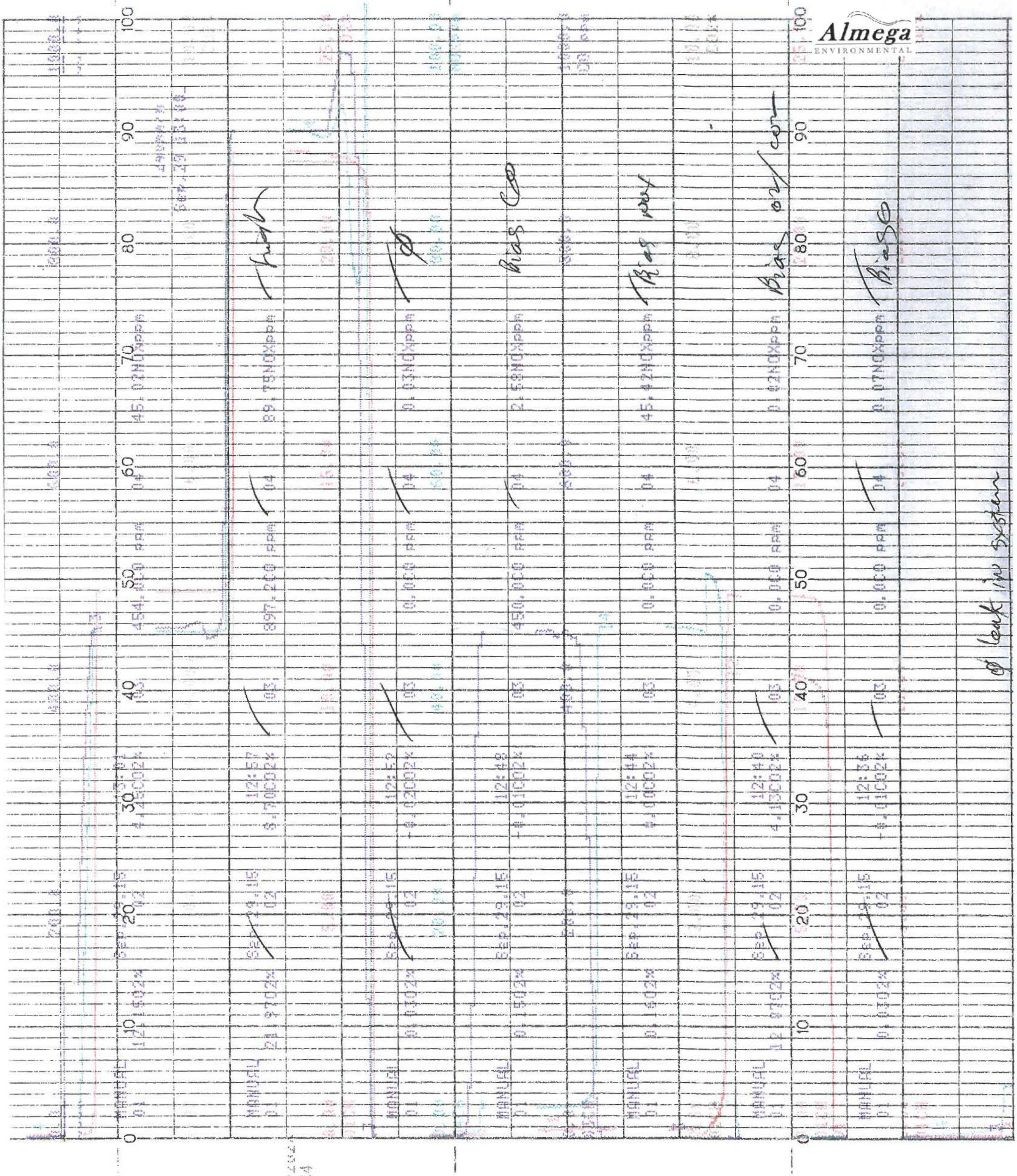
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Appendix D3

CEMS –DAS One-Minute Data

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	6:40:00	0.03	0	4.8	0	
9/29/2015	6:41:00	0.03	-0.01	0	0	
9/29/2015	6:42:00	0.03	-0.01	0	0	zero
9/29/2015	6:43:00	0.03	-0.01	0	0	zero nox mode
9/29/2015	6:44:00	0.03	-0.01	0	0	
9/29/2015	6:45:00	0.03	-0.01	0	0	zero no mode
9/29/2015	6:46:00	13.77	5.5	83.8	47.47	
9/29/2015	6:47:00	21.78	8.67	886.3	88.76	
9/29/2015	6:48:00	21.87	8.67	925.9	90.39	
9/29/2015	6:49:00	21.95	8.67	898.2	89.93	high
9/29/2015	6:50:00	21.95	8.67	900.3	89.82	high nox mode
9/29/2015	6:51:00	21.95	8.67	903.4	89.73	
9/29/2015	6:52:00	21.95	8.67	903.4	89.68	high no mode
9/29/2015	6:53:00	15.17	5.13	763.4	62.31	
9/29/2015	6:54:00	12.12	4.2	430.1	44.87	
9/29/2015	6:55:00	12.1	4.22	433.5	45.06	
9/29/2015	6:56:00	12.07	4.22	454.5	45.16	mid
9/29/2015	6:57:00	12.07	4.22	454.9	45.15	mid nox mode
9/29/2015	6:58:00	12.07	4.22	455.1	45.18	
9/29/2015	6:59:00	12.07	4.22	455	45.2	mid no mode
9/29/2015	7:00:00	15.2	2.49	450	17.99	
9/29/2015	7:01:00	21.05	0.11	115.3	0	
9/29/2015	7:02:00	12.8	6.54	55.9	0	NO2 no mode
9/29/2015	7:03:00	13.62	5.32	202.1	10.02	
9/29/2015	7:04:00	10.37	8.1	395.1	15.52	
9/29/2015	7:05:00	10.37	8.14	439.1	15.5	NO2 nox mode
9/29/2015	7:06:00	10.33	7.82	426.9	35.8	
9/29/2015	7:07:00	1.2	0.5	225.7	7.66	
9/29/2015	7:08:00	0.2	0.09	7.8	2.26	
9/29/2015	7:09:00	0.07	0.02	1.6	1.18	
9/29/2015	7:10:00	0.03	0.01	0	0	
9/29/2015	7:11:00	0.03	0	0	0	bias zero
9/29/2015	7:12:00	0.03	0	0	0	
9/29/2015	7:13:00	9.15	3.3	0	0	
9/29/2015	7:14:00	12.05	4.19	0.1	0.62	bias O2/CO2
9/29/2015	7:15:00	12.05	4.2	0	0.71	
9/29/2015	7:16:00	2.5	0.76	0	33.72	
9/29/2015	7:17:00	0.09	0.04	0	45.7	
9/29/2015	7:18:00	0.03	0	0	45.29	bias nox

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	7:19:00	0.04	0	0.5	44.37	
9/29/2015	7:20:00	0.18	0	226.8	4.15	
9/29/2015	7:21:00	0.27	0	450.2	0.58	
9/29/2015	7:22:00	0.27	0	453	0.5	**bias CO**
9/29/2015	7:23:00	0.68	0.69	453.7	2.19	
9/29/2015	7:24:00	10.46	7.47	465.9	46.43	
9/29/2015	7:25:00	11.11	7.67	475.2	50.06	
9/29/2015	7:26:00	11.17	7.7	473.9	50.87	**R 1**
9/29/2015	7:27:00	11.22	7.7	472.8	50.13	
9/29/2015	7:28:00	11.28	7.7	474.5	49.62	
9/29/2015	7:29:00	11.29	7.7	477.1	48.61	
9/29/2015	7:30:00	11.29	7.7	476.8	48.15	
9/29/2015	7:31:00	11.34	7.68	478.1	47.27	
9/29/2015	7:32:00	11.33	7.68	477	48.48	
9/29/2015	7:33:00	11.35	7.68	477.6	49.78	
9/29/2015	7:34:00	11.37	7.68	481.2	49.76	
9/29/2015	7:35:00	11.38	7.68	479.2	49.97	
9/29/2015	7:36:00	11.36	7.68	475.6	51.53	
9/29/2015	7:37:00	11.33	7.69	475.6	52.38	
9/29/2015	7:38:00	11.37	7.69	475.9	52.41	
9/29/2015	7:39:00	11.36	7.7	475.4	52.84	
9/29/2015	7:40:00	11.42	7.69	475.4	52.82	
9/29/2015	7:41:00	11.39	7.67	473.2	52.7	
9/29/2015	7:42:00	11.42	7.68	472	52.99	
9/29/2015	7:43:00	11.4	7.68	467.6	52.26	
9/29/2015	7:44:00	11.4	7.68	471.7	51.92	
9/29/2015	7:45:00	11.4	7.68	473.5	51.41	
9/29/2015	7:46:00	11.42	7.68	471	51.4	
9/29/2015	7:47:00	11.41	7.68	472.2	51.5	
9/29/2015	7:48:00	11.45	7.68	470	51.22	
9/29/2015	7:49:00	11.49	7.64	470.9	50.86	
9/29/2015	7:50:00	11.46	7.65	472.5	51.46	
9/29/2015	7:51:00	11.47	7.65	474.6	51.57	
9/29/2015	7:52:00	11.46	7.65	470.3	51.86	
9/29/2015	7:53:00	11.49	7.65	470.7	51.96	
9/29/2015	7:54:00	11.49	7.65	469.6	51.52	
9/29/2015	7:55:00	11.49	7.65	472.1	51.42	
9/29/2015	7:56:00	11.48	7.65	471	51.98	**R 2**
9/29/2015	7:57:00	11.5	7.65	471.9	50.9	

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	7:58:00	11.51	7.65	472.5	51.04	
9/29/2015	7:59:00	11.52	7.65	473.2	50.18	
9/29/2015	8:00:00	11.51	7.65	472.1	51.21	
9/29/2015	8:01:00	11.49	7.65	471.2	51.82	
9/29/2015	8:02:00	11.49	7.65	470.2	52.76	
9/29/2015	8:03:00	11.51	7.65	470	51.93	
9/29/2015	8:04:00	11.46	7.64	468.6	53.94	
9/29/2015	8:05:00	11.49	7.64	468.4	54.13	
9/29/2015	8:06:00	11.51	7.64	472	53.09	
9/29/2015	8:07:00	11.51	7.64	470.9	53.19	
9/29/2015	8:08:00	11.51	7.64	469.6	53.08	
9/29/2015	8:09:00	11.5	7.64	471.4	52.57	
9/29/2015	8:10:00	11.49	7.66	471.4	53.43	
9/29/2015	8:11:00	11.49	7.66	467.8	53.99	
9/29/2015	8:12:00	11.5	7.66	469.5	53.6	
9/29/2015	8:13:00	11.53	7.64	471.5	52.95	
9/29/2015	8:14:00	11.51	7.63	471.3	53.3	
9/29/2015	8:15:00	11.5	7.65	469.1	53.99	
9/29/2015	8:16:00	11.52	7.65	470.8	53.52	
9/29/2015	8:17:00	11.5	7.65	471.1	53.7	
9/29/2015	8:18:00	11.51	7.65	471.1	53.3	
9/29/2015	8:19:00	11.49	7.65	468.8	53.65	
9/29/2015	8:20:00	11.51	7.65	468.9	53.72	
9/29/2015	8:21:00	11.5	7.65	468.8	53.52	
9/29/2015	8:22:00	11.51	7.65	469.5	53.82	
9/29/2015	8:23:00	11.55	7.65	472.1	52.97	
9/29/2015	8:24:00	11.56	7.65	473.8	52.65	
9/29/2015	8:25:00	11.56	7.65	474	53.04	
9/29/2015	8:26:00	11.57	7.65	475.4	52.82	**R 3**
9/29/2015	8:27:00	11.56	7.65	476.5	52.15	
9/29/2015	8:28:00	11.54	7.65	474.2	52.57	
9/29/2015	8:29:00	11.5	7.65	475.8	52.51	
9/29/2015	8:30:00	11.51	7.66	472	53.15	
9/29/2015	8:31:00	11.52	7.66	472.4	53.52	
9/29/2015	8:32:00	11.55	7.66	471.2	53.15	
9/29/2015	8:33:00	11.55	7.66	472.9	53.24	
9/29/2015	8:34:00	11.54	7.66	472.8	53.67	
9/29/2015	8:35:00	11.55	7.66	471.2	54.12	
9/29/2015	8:36:00	11.56	7.65	470.2	53.68	
9/29/2015	8:37:00	11.57	7.64	472.3	53.63	

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Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	8:38:00	11.59	7.63	475.5	52.17	
9/29/2015	8:39:00	11.63	7.58	485.5	47.04	
9/29/2015	8:40:00	11.58	7.57	494	43.62	
9/29/2015	8:41:00	11.35	7.72	492.9	44.1	
9/29/2015	8:42:00	11.12	7.91	477.4	46.01	
9/29/2015	8:43:00	11	8	469.6	47.92	
9/29/2015	8:44:00	10.95	8.07	462.9	49.76	
9/29/2015	8:45:00	10.94	8.09	461.9	50.32	
9/29/2015	8:46:00	10.95	8.1	460.2	51.38	
9/29/2015	8:47:00	10.97	8.1	459.3	51.43	
9/29/2015	8:48:00	11.03	8.09	460.9	50.95	
9/29/2015	8:49:00	11.08	8.01	458.9	51.05	
9/29/2015	8:50:00	11.01	8.02	460.3	51.5	
9/29/2015	8:51:00	11.04	8.02	461.5	51.65	
9/29/2015	8:52:00	11.03	8.02	461.2	51.93	
9/29/2015	8:53:00	11.04	8.02	460.6	51.32	
9/29/2015	8:54:00	11.03	8.02	459.5	51.17	
9/29/2015	8:55:00	11.04	8.02	459.7	51.21	
9/29/2015	8:56:00	10.75	7.61	459.9	50.94	
9/29/2015	8:57:00	11.77	4.27	236.5	9.16	
9/29/2015	8:58:01	12.12	4.27	5.6	0.76	
9/29/2015	8:59:00	12.13	4.25	0.7	0.43	
9/29/2015	9:00:00	12.13	4.25	0	0.27	**bias O2/CO2**
9/29/2015	9:01:00	12.11	4.23	0.1	1.69	**zero CO/nox**
9/29/2015	9:02:00	1.8	0.5	0	37.95	
9/29/2015	9:03:00	0.15	0.05	0	45.54	
9/29/2015	9:04:00	0.03	0.01	0	45.34	**bias nox**
9/29/2015	9:05:00	0.03	0	0	45.34	**zero O2/CO2**
9/29/2015	9:06:00	0.03	0	163	10.88	
9/29/2015	9:07:00	0.03	0	442.5	2.26	
9/29/2015	9:08:00	0.03	0	449.4	2.04	**bias CO**
9/29/2015	9:09:00	0.22	0.17	448.1	2.04	
9/29/2015	9:10:00	10.01	7.29	453	42.07	
9/29/2015	9:11:00	10.99	7.8	462	48.71	
9/29/2015	9:12:00	11.07	7.83	465.1	48.78	**R 4**
9/29/2015	9:13:00	11.15	7.83	465.5	48.2	
9/29/2015	9:14:00	11.18	7.83	467.1	48.48	
9/29/2015	9:15:00	11.18	7.83	463.4	49.48	
9/29/2015	9:16:00	11.2	7.83	462.9	49.52	

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	9:17:00	11.2	7.83	463.8	48.91	
9/29/2015	9:18:00	11.24	7.83	464.6	48.07	
9/29/2015	9:19:00	11.21	7.83	466.4	48.18	
9/29/2015	9:20:00	11.21	7.83	467.9	47.49	
9/29/2015	9:21:00	11.2	7.83	467.5	47.13	
9/29/2015	9:22:00	11.2	7.85	466.7	46.96	
9/29/2015	9:23:00	11.19	7.85	468.1	46.94	
9/29/2015	9:24:00	11.2	7.86	468.1	46.99	
9/29/2015	9:25:01	11.18	7.88	467.6	47.2	
9/29/2015	9:26:00	11.17	7.89	467.8	48.52	
9/29/2015	9:27:00	11.16	7.9	467.1	49.34	
9/29/2015	9:28:00	11.14	7.93	466.1	49.52	
9/29/2015	9:29:00	11.15	7.92	464.8	49.46	
9/29/2015	9:30:00	11.06	7.96	466.5	49.94	
9/29/2015	9:31:00	11.03	7.98	462.3	50.57	
9/29/2015	9:32:00	10.99	8.01	460.1	51.63	
9/29/2015	9:33:00	10.98	8.02	461	52.13	
9/29/2015	9:34:00	10.95	8.04	458.6	53.08	
9/29/2015	9:35:00	10.96	8.06	458.9	53.7	
9/29/2015	9:36:00	11.01	8.04	456.4	53.81	
9/29/2015	9:37:00	10.97	8.01	457.1	54.12	
9/29/2015	9:38:00	11	8.05	459	53.97	
9/29/2015	9:39:00	11.01	8.05	459.1	54.03	
9/29/2015	9:40:00	11.01	8.05	457.6	54.19	
9/29/2015	9:41:00	11.04	8.05	457.2	54.28	
9/29/2015	9:42:00	11.12	8.02	458.5	53.92	**R 5**
9/29/2015	9:43:00	11.14	7.98	459.5	53.37	
9/29/2015	9:44:00	11.17	7.93	457.1	53.97	
9/29/2015	9:45:00	11.18	7.92	459	53.13	
9/29/2015	9:46:00	11.16	7.92	458.9	53.9	
9/29/2015	9:47:00	11.18	7.92	459.3	54.03	
9/29/2015	9:48:00	11.19	7.92	461	54.01	
9/29/2015	9:49:00	11.2	7.91	460.9	53.98	
9/29/2015	9:50:00	11.2	7.91	460.4	54.28	
9/29/2015	9:51:00	11.25	7.89	459.6	53.73	
9/29/2015	9:52:00	11.25	7.87	459	53.5	
9/29/2015	9:53:00	11.27	7.87	457.5	53.22	
9/29/2015	9:54:00	11.29	7.86	458.6	53.33	
9/29/2015	9:55:00	11.33	7.83	459.9	52.32	
9/29/2015	9:56:00	11.35	7.81	463.6	51.79	

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	9:57:00	11.36	7.76	462.5	51.43	
9/29/2015	9:58:00	11.34	7.75	461.3	51.32	
9/29/2015	9:59:00	11.32	7.79	462.8	51.7	
9/29/2015	10:00:00	11.32	7.79	465.4	50.96	
9/29/2015	10:01:00	11.32	7.79	465.3	50.82	
9/29/2015	10:02:00	11.29	7.79	464.2	51.39	
9/29/2015	10:03:00	11.3	7.79	462.8	50.94	
9/29/2015	10:04:00	11.27	7.81	461.4	51.92	
9/29/2015	10:05:00	11.29	7.82	465.1	51.41	
9/29/2015	10:06:00	11.31	7.82	464.5	50.71	
9/29/2015	10:07:00	11.25	7.83	465	50.6	
9/29/2015	10:08:00	11.24	7.85	461.7	51.32	
9/29/2015	10:09:00	11.21	7.85	460.8	51.34	
9/29/2015	10:10:00	11.17	7.88	463.8	51.4	
9/29/2015	10:11:00	11.17	7.9	463.2	51.3	
9/29/2015	10:12:00	11.16	7.91	463.3	51.05	**R 6**
9/29/2015	10:13:00	11.1	7.96	460.7	52.29	
9/29/2015	10:14:00	11.08	7.96	461.5	52.43	
9/29/2015	10:15:00	11.08	7.98	461.2	52.28	
9/29/2015	10:16:00	11.07	7.98	461.7	52.41	
9/29/2015	10:17:00	11.05	7.98	461.7	52.78	
9/29/2015	10:18:00	11.04	7.98	459.9	53.69	
9/29/2015	10:19:00	11.1	7.98	459.3	53.62	
9/29/2015	10:20:00	11.11	7.98	459.8	52.9	
9/29/2015	10:21:00	11.08	7.98	461.4	53.05	
9/29/2015	10:22:00	11	7.99	461	53.48	
9/29/2015	10:23:00	10.97	8.01	458.8	53.41	
9/29/2015	10:24:00	10.94	8.05	460.9	53.89	
9/29/2015	10:25:00	10.97	8.07	460.9	53.77	
9/29/2015	10:26:00	11.01	8.07	461.3	53.36	
9/29/2015	10:31:17	11.03	8.07	463.8	52.75	
9/29/2015	10:31:19	11.03	8.07	464	52.56	
9/29/2015	10:31:21	11.03	8.07	464	52.56	
9/29/2015	10:31:22	10.95	8.06	465	52.34	
9/29/2015	10:31:22	10.95	8.06	465	52.34	
9/29/2015	10:32:00	10.94	8.07	464.6	53.37	
9/29/2015	10:33:00	10.95	8.08	462.6	53	
9/29/2015	10:34:00	10.96	8.08	461.2	53.17	
9/29/2015	10:35:00	11	8.08	460.4	53.11	
9/29/2015	10:36:00	11.05	8.07	459.5	52.64	

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	10:37:00	11.09	8.05	461	52.59	
9/29/2015	10:38:00	11.11	8.02	459.5	52.8	
9/29/2015	10:39:00	11.1	8.02	463	52.55	
9/29/2015	10:40:00	11.14	8	461.1	52.47	
9/29/2015	10:41:00	11.15	7.99	461.6	52	
9/29/2015	10:42:00	11.18	7.97	462.4	51.33	
9/29/2015	10:43:00	10.98	6.14	443.8	36.48	
9/29/2015	10:44:00	12.13	4.26	84.5	2.91	
9/29/2015	10:45:00	12.1	4.26	2.1	0.63	
9/29/2015	10:46:00	12.1	4.24	0.1	0.4	**bias O2/CO2**
9/29/2015	10:47:00	12.1	4.24	0	0.99	**zero CO/nox**
9/29/2015	10:48:00	5.06	1.74	0	24.37	
9/29/2015	10:49:00	0.05	0.08	0	44.98	
9/29/2015	10:50:00	0.03	0.02	0	45.66	**bias nox**
9/29/2015	10:51:00	0.03	0	0	45.72	**zero O2/CO2**
9/29/2015	10:52:00	0.03	0	163.3	10.92	
9/29/2015	10:53:00	0.03	0	442.4	2.74	
9/29/2015	10:54:00	0.03	-0.01	449.1	2.56	**bias CO**
9/29/2015	10:55:00	0.03	0.38	449.6	3	
9/29/2015	10:56:00	4.33	7.26	460.1	45.93	
9/29/2015	10:57:00	11.14	7.64	469.3	51.79	
9/29/2015	10:58:00	11.17	7.7	467.8	53.55	**R 7**
9/29/2015	10:59:00	11.23	7.71	466.2	54.24	
9/29/2015	11:00:00	11.31	7.71	462.7	55.24	
9/29/2015	11:01:00	11.4	7.68	463.9	53.74	
9/29/2015	11:02:00	11.47	7.65	468.7	53	
9/29/2015	11:03:00	11.47	7.64	464.1	54.19	
9/29/2015	11:04:00	11.54	7.61	469.5	51.81	
9/29/2015	11:05:00	11.56	7.6	472.7	51.29	
9/29/2015	11:06:00	11.56	7.6	479	50.54	
9/29/2015	11:07:00	11.54	7.6	478.6	52.51	
9/29/2015	11:08:00	11.54	7.6	477.1	52.78	
9/29/2015	11:09:00	11.56	7.6	479.2	51.84	
9/29/2015	11:10:00	11.57	7.6	479.2	50.86	
9/29/2015	11:11:00	11.53	7.6	481.5	51.19	
9/29/2015	11:12:00	11.52	7.6	478.3	52.48	
9/29/2015	11:13:00	11.53	7.6	476.2	53.26	
9/29/2015	11:14:00	11.57	7.6	476.1	53.5	
9/29/2015	11:15:00	11.6	7.6	480.2	52.09	

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	11:16:00	11.61	7.59	484.7	51.19	
9/29/2015	11:17:00	11.62	7.57	486.8	50.76	
9/29/2015	11:18:00	11.58	7.55	482.2	52.1	
9/29/2015	11:19:00	11.57	7.6	479.8	52.69	
9/29/2015	11:20:00	11.58	7.6	480.4	52.78	
9/29/2015	11:21:00	11.62	7.53	476.6	53.54	
9/29/2015	11:22:00	11.61	7.56	479.4	53.23	
9/29/2015	11:23:00	11.66	7.56	482	52.06	
9/29/2015	11:24:00	11.69	7.55	486.7	50.99	
9/29/2015	11:25:00	11.7	7.54	486.2	50.38	
9/29/2015	11:26:00	11.7	7.53	490.4	50.3	
9/29/2015	11:27:00	11.67	7.53	488.9	51.03	
9/29/2015	11:28:00	11.7	7.49	484.8	51.27	**R 8**
9/29/2015	11:29:00	11.67	7.47	486.9	50.77	
9/29/2015	11:30:00	11.86	7.17	492.4	50.89	
9/29/2015	11:31:00	11.81	7.19	505.9	48.98	
9/29/2015	11:32:00	11.79	7.27	497.4	49.17	
9/29/2015	11:33:00	11.77	7.27	496	49.68	
9/29/2015	11:34:00	11.81	7.26	491.6	49.8	
9/29/2015	11:35:00	11.8	7.26	499.9	47.79	
9/29/2015	11:36:00	11.76	7.29	498.3	46.96	
9/29/2015	11:37:00	11.73	7.32	496.1	48.18	
9/29/2015	11:38:00	11.8	7.25	490.8	48.01	
9/29/2015	11:39:00	11.81	7.21	496.8	46.65	
9/29/2015	11:40:00	11.8	7.19	499.1	46.95	
9/29/2015	11:41:00	11.76	7.25	493	47.83	
9/29/2015	11:42:00	11.72	7.31	492.5	49.41	
9/29/2015	11:43:00	11.7	7.32	486.4	50.56	
9/29/2015	11:44:00	11.72	7.32	486.9	51.32	
9/29/2015	11:45:00	11.74	7.31	485.9	51.86	
9/29/2015	11:46:00	11.75	7.28	488.3	51.76	
9/29/2015	11:47:00	11.8	7.22	490.2	50.17	
9/29/2015	11:48:00	11.76	7.23	496.9	51.17	
9/29/2015	11:49:00	11.72	7.28	490.7	51.57	
9/29/2015	11:50:00	11.72	7.3	487.9	51.59	
9/29/2015	11:51:00	11.71	7.33	487.6	52.81	
9/29/2015	11:52:00	11.72	7.32	484.6	53.03	
9/29/2015	11:53:00	11.74	7.32	487.2	50.81	
9/29/2015	11:54:00	11.73	7.32	486.4	50.61	
9/29/2015	11:55:00	11.72	7.32	490.2	49.91	

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	11:56:00	11.75	7.27	491.5	49.24	
9/29/2015	11:57:00	11.77	7.22	493.6	48.53	
9/29/2015	11:58:00	11.7	7.28	490.1	50.72	**R 9**
9/29/2015	11:59:00	11.73	7.29	480.5	51.7	
9/29/2015	12:00:00	11.74	7.29	485.4	51.33	
9/29/2015	12:01:00	11.76	7.28	490.2	49.81	
9/29/2015	12:02:00	11.76	7.27	488.9	49.56	
9/29/2015	12:03:00	11.74	7.29	488.8	50.26	
9/29/2015	12:04:00	11.82	7.21	494.2	48.87	
9/29/2015	12:05:00	11.82	7.2	496.2	49.76	
9/29/2015	12:06:00	11.75	7.25	490.9	50.43	
9/29/2015	12:07:00	11.75	7.27	488.2	50.55	
9/29/2015	12:08:00	11.75	7.27	489.3	50.18	
9/29/2015	12:09:00	11.74	7.28	490.2	50.44	
9/29/2015	12:10:00	11.74	7.3	487.4	50.45	
9/29/2015	12:11:00	11.77	7.29	486.9	50.76	
9/29/2015	12:12:00	11.78	7.26	488.2	50.36	
9/29/2015	12:13:00	11.77	7.26	489.8	50.69	
9/29/2015	12:14:00	11.76	7.26	489.2	51.07	
9/29/2015	12:15:00	11.76	7.26	486.6	50.37	
9/29/2015	12:16:00	11.75	7.27	488.2	49.18	
9/29/2015	12:17:00	11.7	7.33	484.6	49.86	
9/29/2015	12:18:00	11.75	7.28	481.6	51.46	
9/29/2015	12:19:00	11.79	7.23	492.6	49.88	
9/29/2015	12:20:00	11.78	7.22	493.6	50.11	
9/29/2015	12:21:00	11.78	7.21	490.8	51.26	
9/29/2015	12:22:00	11.8	7.21	487.2	51.73	
9/29/2015	12:23:00	11.85	7.13	489.7	51.69	
9/29/2015	12:24:00	12	6.91	501.3	50.69	
9/29/2015	12:25:00	11.97	6.9	507.4	50.65	
9/29/2015	12:26:00	11.95	6.9	504.6	50.85	
9/29/2015	12:27:00	11.91	6.91	501.7	51.86	
9/29/2015	12:28:00	11.92	6.91	496.9	52.17	
9/29/2015	12:29:00	2.2	1.06	338.1	16.78	
9/29/2015	12:30:00	0.37	0.08	13.6	5.32	
9/29/2015	12:31:00	0.31	0.01	1.1	4.69	
9/29/2015	12:32:00	0.08	0	0	0.99	
9/29/2015	12:33:00	0.03	0	0	0.46	
9/29/2015	12:34:00	0.03	0	0.1	0.3	

Datalogger Printout

Almega ENVIRONMENTAL

Client	**OCSD**
Location	**Plant 2 - Huntington Beach**
Unit	**ICE 1**
Date/Time	**9/29/2015**
Job Number	**9849**

Date	Time	O2%	CO2%	CO ppm	NOXppm	
9/29/2015	12:35:00	0.03	-0.01	0	0.21	
9/29/2015	12:36:00	0.03	-0.01	0.1	0.14	bias zero
9/29/2015	12:37:00	0.03	-0.01	0.1	0.08	
9/29/2015	12:38:00	0.87	0.31	0.1	0.07	
9/29/2015	12:39:00	11.58	3.94	0.1	0.04	
9/29/2015	12:40:00	12.06	4.11	0	0.02	bias O2/CO2
9/29/2015	12:41:00	12.03	4.1	0.2	1.75	
9/29/2015	12:42:00	1.45	0.46	0	42.22	
9/29/2015	12:43:00	0.22	0.03	0	45.89	
9/29/2015	12:44:00	0.19	0	0	45.36	bias nox
9/29/2015	12:45:00	0.17	0	0	45.42	
9/29/2015	12:46:00	0.19	-0.01	99.5	17.42	
9/29/2015	12:47:00	0.18	-0.01	431.4	2.82	
9/29/2015	12:48:00	0.15	-0.01	448.8	2.65	bias CO
9/29/2015	12:49:00	0.15	-0.01	450.8	2.6	
9/29/2015	12:50:00	0.04	-0.02	230.2	0.91	
9/29/2015	12:51:00	0.03	-0.02	1.1	0.16	
9/29/2015	12:52:00	0.03	-0.02	0	0.08	zero
9/29/2015	12:53:00	13.83	4.75	160.2	68.83	
9/29/2015	12:54:00	21.77	8.68	935.3	83.56	
9/29/2015	12:55:00	21.88	8.69	925.3	89.95	
9/29/2015	12:56:00	21.93	8.7	897.9	89.47	
9/29/2015	12:57:00	21.97	8.7	897.3	89.8	high
9/29/2015	12:58:00	15.69	5.75	788.8	75.37	
9/29/2015	12:59:00	12.16	4.25	448.5	45.02	
9/29/2015	13:00:00	12.15	4.25	457.4	44.97	
9/29/2015	13:01:00	12.15	4.25	454	45	mid
9/29/2015	13:02:00	12.15	4.25	454	45.01	
9/29/2015	13:03:00	2.73	0.67	398.4	29.98	
9/29/2015	13:04:00	0.03	-0.02	64.1	0.28	
9/29/2015	13:05:00	0.03	-0.02	0	0	
9/29/2015	13:06:00	0.03	-0.03	0	0	
9/29/2015	13:07:00	0.03	-0.03	0	0	
9/29/2015	13:08:00	0.03	-0.03	0	0	
9/29/2015	13:09:00	0.03	-0.03	0	0	
9/29/2015	13:10:00	0.03	-0.03	0	0	
9/29/2015	13:11:00	0.03	-0.03	0	0	
9/29/2015	13:12:00	0.03	-0.03	0	0	
9/29/2015	13:13:00	0.03	-0.03	0	0	

APPENDIX E

QUALITY ASSURANCE AND QUALITY CONTROL (QA/QC)

Appendix E1

Test Equipment Calibration Data

Almega ENVIRONMENTAL

Semi-Annual Field Dry Gas Meter Calibration* Calibration Date 8/7/2015

Orifice Series: 33-73

Serial Number: AE_1/AE_2

Cal Type: Semi-Annual

Calibrated by: MC

(signature): Matt Clark

Reviewed by: Susan

DRY GAS METER CALIBRATION FACTOR Y	ORIFICE CALIBRATION FACTOR dH@
Yds = 0.9871	dH@ = 1.987

DRY GAS METER READINGS								QUALITY CONTROL CHECKS			
DGM INLET		DGM OUTLET		Meter Reading		Orifice Reading		$(Y_{fm,max} - Y_{fm,min})$ <	0.98 < (Y_{fm}/Y_{fm})	Average Coeff (Y)	$dH@_{i,avg}$ < (dH@
Initial (°F)	Final (°F)	Initial (°F)	Final (°F)	Initial (cu.ft.)	Final (cu.ft.)	Initial (in.H2O)	Final (in H2O)	0.010 **	1.02	(0.95<Y<1.05)	± 0 15)
76.0	76.0	76.0	76.0	828.305	834.155	0.150	0 150				
76.0	76.0	76.0	76.0	834.155	840.010	0.150	0.150	0.0013	0.999	0.986	2.049
76.0	76 0	76.0	76.0	840.010	845.868	0.150	0.150	PASS	PASS	PASS	PASS
76.0	77.0	77.0	77.0	847.300	853.420	0.840	0.840				
77.0	77.0	77.0	77.0	853.420	859.540	0.840	0.840	0 0025	0.997	0.984	1.941
77.0	78.0	77.0	77.0	859.540	865.650	0.840	0.840	PASS	PASS	PASS	PASS
78.0	80.0	77.0	77.0	867.700	873.245	2.100	2.100				
80.0	81.0	77.0	77.0	873.245	878.815	2.100	2.100	0.0045	1.000	0.987	1.997
81.0	82.0	77.0	77.0	878.815	884.365	2.100	2.100	PASS	PASS	PASS	PASS
83.0	86.0	77.0	78.0	889.000	895.555	3.900	3.900				
86.0	87.0	78.0	78.0	895.555	902.100	3.900	3.900	0.0056	1.003	0.990	1.962
87.0	87.0	78.0	78.0	902.100	908.636	3.900	3.900	PASS	PASS	PASS	PASS

DGM ID. MB-002

Serial #. 2241676

Calibration Interval:

Semi-Annual: x

Bi-monthly:

Other

Standard Temperature (deg F)

Tstd = 60

Barometric Pressure (in.Hg)

Initial: 29.89

Final: 29.88

$Pbar_{avg}$: 29.89

Orifice Series No.	Run Time (min)	CRITICAL ORIFICE					DRY GAS METER					CALCULATIONS	
		Orifice K-factor	Tested Vacuum (in.Hg)	Ambient Temp. (°F)	Corrected Flowrate Q'rm (SCFM)	Corrected Volume (cu.ft.)	Orifice dH (in.H2O)	AVG Temp (°F)	NET Volume (cu.ft.)	Corrected Flowrate Q'fm (SCFM)	Corrected Volume (SCF)	Coefficient $Y_{fm,i}$ (0.95 < $Y_{fm,i}$ < 1.05)	Orifice dH@, (in.H2O)
33	28	0.1549	26.50	76.0	0.2000	5.600	0.150	76 00	5.850	0.203	5.674	0.9870	2.049
33	28	0.1549	26.50	76.0	0.200	5.600	0.150	76 00	5.855	0.203	5.679	0.9861	2 049
33	28	0.1549	26.50	76.0	0.200	5.600	0.150	76 00	5.858	0.203	5.682	0.9856	2.049
52	12	0.3769	22.50	76.0	0.487	5.840	0.840	76 75	6.120	0.495	5.938	0 9835	1 942
52	12	0.3769	22.50	76.0	0.487	5.840	0.840	77.00	6.120	0.495	5.935	0.9840	1.941
52	12	0.3769	22.50	76.0	0.487	5.840	0.840	77.25	6.110	0.494	5.923	0.9860	1.940
63	7	0.5890	20.50	77.0	0.760	5.319	2 100	78.00	5.545	0.769	5.384	0.9879	1.999
63	7	0.5890	20.50	77.0	0.760	5.319	2.100	78.75	5.570	0.772	5.401	0.9848	1.996
63	7	0.5890	20.50	77.0	0.760	5.319	2.100	79.25	5.550	0.768	5.376	0.9893	1.995
73	6	0.8109	18 00	77.0	1 046	6.276	3.900	81.00	6.555	1.060	6.357	0.9873	1.965
73	6	0.8109	18.00	77.0	1.046	6.276	3.900	82.25	6.545	1.055	6.333	0.9911	1.961
73	6	0.8109	18.00	77 0	1.046	6.276	3.900	82.50	6.536	1.054	6 321	0.9929	1.960

* Critical Orifice used.

Almega ENVIRONMENTAL

Bi-Monthly Field Dry Gas Meter Calibration*

Calibration Date: 10/7/2015

Orifice Series: 52,63

Serial Number: AE_1/AE_2

Cal Type: Bi-Monthly

Calibrated by: DJ

(signature):

Reviewed by:

SEMI TO BI CHECK		DRY GAS METER	ORIFICE
(+2% of Y)	(-2% of Y)	CALIBRATION FACTOR	CALIBRATION FACTOR
1.0068	0.9674	Y	dH@
PASS		Yds = 0.9675	dH@ = 1.975

DRY GAS METER READINGS								QUALITY CONTROL CHECKS				DGM ID: MB-002
DGM INLET		DGM OUTLET		Meter Reading		Orifice Reading						Serial #:
Initial (°F)	Final (°F)	Initial (°F)	Final (°F)	Initial (cu.ft.)	Final (cu.ft.)	Initial (in.H2O)	Final (in.H2O)	$(Y_{fm,max} - Y_{fm,min}) <$ 0.010 **	$0.98 < (Y_{fm,i}/Y_{fm}) <$ 1.02	Average Coeff. $Y_{fm,i}$	$dH@_{i,avg} <$ (dH@ ± 0.15)	Semi A Yfm: 0.9871
74.0	74.0	74.0	74.0	416.467	422.685	0.850	0.850					Calibration Interval:
74.0	76.0	74.0	75.0	422.685	428.911	0.850	0.850	0.0032	0.997	0.965	1.962	Bi-monthly: x
75.0	77.0	75.0	75.0	428.911	435.120	0.850	0.850	PASS	PASS	PASS	PASS	Standard Temperature (deg.F)
79.0	80.0	76.0	76.0	452.990	458.620	2.100	2.100					Tstd = 60
80.0	81.0	76.0	77.0	458.620	464.255	2.100	2.100	0.0098	1.003	0.970	1.989	Barometric Pressure (in.Hg)
81.0	81.0	77.0	77.0	464.255	469.950	2.100	2.100	PASS	PASS	PASS	PASS	Pbar: 30.00

Orifice Series No.	Run Time (min)	CRITICAL ORIFICE					DRY GAS METER					CALCULATIONS	
		Orifice K-factor	Tested Vacuum (in.Hg)	Ambient Temp. (°F)	Corrected Flowrate Q'rm (SCFM)	Corrected Volume (cu.ft.)	Orifice dH (in.H2O)	AVG Temp. (°F)	NET Volume (cu.ft.)	Corrected Flowrate Q'fm (SCFM)	Corrected Volume (SCF)	Coefficient $Y_{fm,i}$ $(0.95 < Y_{fm,i} < 1.05)$	Orifice $dH@_i$ (in.H2O)
52	12	0.3769	23.0	75.0	0.489	5.868	0.850	74.00	6.218	0.507	6.087	0.9639	1.964
52	12	0.3769	23.0	75.0	0.489	5.868	0.850	74.75	6.226	0.507	6.087	0.9640	1.961
52	12	0.3769	23.0	76.0	0.489	5.862	0.850	75.50	6.209	0.505	6.062	0.9671	1.962
63	7	0.5890	21.0	76.0	0.763	5.344	2.100	77.75	5.630	0.784	5.490	0.9734	1.989
63	7	0.5890	21.0	77.0	0.763	5.339	2.100	78.50	5.635	0.784	5.487	0.9730	1.990
63	7	0.5890	21.0	77.0	0.763	5.339	2.100	79.00	5.695	0.792	5.541	0.9636	1.988

* Critical Orifice used.

Almega ENVIRONMENTAL

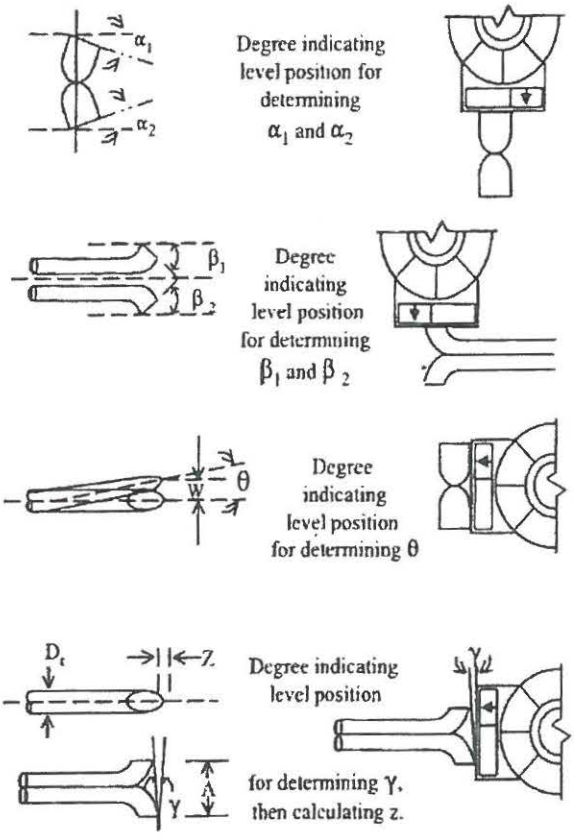
Almega ENVIRONMENTAL

TYPE S PITOT TUBE SEMIANNUAL INSPECTION SHEET

CAL DATE: 7/2/2015

NEXT DUE DATE: 12/31/2015

PITOT ID: PT-83



Parameter	Values	Allowable Range
Level and Perpendicular?	Yes OR No	Yes
Obstruction?	Yes OR No	No
Damaged?	Yes OR No	No
α1	1	$-10° \leq \alpha1 \leq +10°$
α2	-1	$-10° \leq \alpha2 \leq +10°$
β1	1	$-5° \leq \beta1 \leq +5°$
β2	1	$-5° \leq \beta2 \leq +5°$
γ	2	NA
θ	2	NA
Z = A (tan γ)	0.022	≤ 0.125 in.
W = A (tan θ)	0.022	≤ 0.031 in.
Dt	0.248	$0.188 \leq Dt \leq 0.375$
A	0.640	NA
A/2/(Dt)	1.29	$1.05 \leq PA/Dt \leq 1.5$

Certification:

I certify that this pitot tube meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor Cp of 0.84.

Certified By: _____ **Date:** 7/2/2015

ALMEGA ENVIRONMENTAL AND TECHNICAL SERVICES
10602 WALKER STREET
CYPRESS, CA 90630

STACK TEMPERATURE SENSOR SEMI-ANNUAL CALIBRATION

TEMPERATURE SENSOR I.D:	83	REF. IMMERSION GLASS THERMOMETER ID:	: 1, 2 & 3
READ OUT I.D:	TRO-2	ICE BATH: YES	
PITOT TUBE I.D:	S-83	BOILING WATER:	YES
PITOT TUBE LENGTH:	113 inch	HOT OIL:	YES
DATE:	9/24/2015	CALIBRATED BY:	LB

ICE BATH			
REF. IN HG. GLASS THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
35.0	35.0	0.0	0.0
35.0	35.0	0.0	0.0
34.0	34.0	0.0	0.0

BOILING WATER			
REF. IN HG. GLASS THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
212.0	211.0	1.0	0.5
213.0	212.0	1.0	0.5
214.0	213.0	1.0	0.5

HOT OIL			
REF. IN HG. GLASS THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
446.0	446.0	0.0	0.0
448.0	448.0	0.0	0.0
448.0	447.0	1.0	0.2

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. ICE BATH THERMOMETER: -30 - 120 (F)
REF. BOILING WATER THERMOMETER: 20 - 500 (F)
REF. HOT OIL THERMOMETER: 20 - 500 (F)

Almega ENVIRONMENTAL

ALMEGA ENVIRONMENTAL AND TECHNICAL SERVICES
10602 WALKER STREET
CYPRESS, CA 90630

STACK TEMPERATURE SENSOR BI-MONTHLY CALIBRATION

TEMPERATURE SENSOR I.D:	83	REF. IMMERSION GLASS THERMOMETER ID:	: 1, 2 & 3
READ OUT I.D:	TRO-1	ICE BATH: YES	
PITOT TUBE I.D:	83	BOILING WATER:	YES
PITOT TUBE LENGTH:	113'	HOT OIL:	YES
DATE:	8/17/2015	CALIBRATED BY:	LB L. B.

ICE BATH			
REF. IN HG. GLASS THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
34.0	33.5	0.5	1.5

BOILING WATER			
REF. IN HG. GLASS THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
213.0	215.0	2.0	0.9

HOT OIL			
REF. IN HG. GLASS THERMOMETER TEMPERATURE (^{O}F)	FIELD METER TEMPERATURE (^{O}F)	ABSOLUTE DIFFERENCE TEMPERATURE (^{O}F)	% DIFFERENCE (%)
415.0	414.0	1.0	0.2

NOTE:
MAXIMUM TOLERANCE BETWEEN ANY TWO MEASUREMENT IS 1.5%.
TAKE READING EVERY ONE MINUTE.

REF. ICE BATH THERMOMETER: -30 - 120 (F)
REF. BOILING WATER THERMOMETER: 20 - 500 (F)
REF. HOT OIL THERMOMETER: 20 - 500 (F)

CERTIFICATE OF CALIBRATION

CUSTOMER:	ALMEGA ENVIRONMENTAL	**CALIBRATION DATE:**	07/13/2015
PO NUMBER:		**CALIBRATION DUE:**	07/13/2016
INST. MANUFACTURER:	SHORTRIDGE	**PROCEDURE:**	NAVAIR-17-20MP-03
INST. DESCRIPTION:	AIR FLOW TESTER	**CALIBRATION FLUID:**	AIR @ 70F
MODEL NUMBER:	ADM-880C	**STANDARD(S) USED:**	A321 DUE 2-2016
SERIAL NUMBER:	M10327	**NIST TRACE #' S:**	1236086968
RATED UNCERTAINTY:	+/- 3% RD. + 5 FPM	**AMBIENT CONDITIONS:**	764 mmHGA, 43% RH, 74F
UNCERTAINTY GIVEN:	+/- .17% RD.; K=2	**CERTIFICATE FILE #:**	460189.2015A

NOTES: AS RECEIVED / AS LEFT WITHIN SPECS.

RUN 1			RUN 2			RUN 3		
UUT INDICATED "H2O	DM.STD. ACTUAL "H2O	% RD. ERROR	UUT INDICATED "H2O	DM.STD. ACTUAL "H2O	% RD. ERROR	UUT INDICATED "H2O	DM.STD. ACTUAL "H2O	% RD. ERROR
0.0000	0.00000	0.000	0.0000	0.00000	0.000	0.0000	0.00000	0.000
0.0010	0.00102	2.000	0.0010	0.00101	1.000	0.0010	0.00102	2.000
0.0025	0.00252	0.800	0.0025	0.00252	0.800	0.0025	0.00252	0.800
0.0050	0.00505	1.000	0.0050	0.00507	1.400	0.0050	0.00506	1.200
0.0100	0.01009	0.900	0.0100	0.01008	0.800	0.0100	0.01010	1.000
0.0500	0.05015	0.300	0.0500	0.05012	0.240	0.0500	0.05011	0.220
0.5000	0.50033	0.066	0.5000	0.50025	0.050	0.5000	0.50028	0.056
1.0000	1.00530	0.530	1.0000	1.00041	0.041	1.0000	1.00045	0.045
2.5000	2.50099	0.040	2.5000	2.50097	0.039	2.5000	2.50089	0.036
5.0000	5.00174	0.035	5.0000	5.00122	0.024	5.0000	5.00115	0.023
7.5000	7.50185	0.025	7.5000	7.50179	0.024	7.5000	7.50153	0.020
10.0000	10.00256	0.026	10.0000	10.00255	0.025	10.0000	10.00224	0.022
	AVERAGE =	0.477		AVERAGE =	0.370		AVERAGE =	0.452

All instruments used in the performance of the shown calibration have traceability to the National Institute of Standards and Technology (NIST). The uncertainty ratio between the calibration standards (DM.STD.) used and the unit under test (UUT) is a minimum of 4:1, unless otherwise noted. Calibration has been performed per the shown procedure number, in accordance with ISO 10012:2003, ISO 17025:2005, ANSI/NCSL-Z-540.3, and/or MIL-STD-45662A. Test methods: API2530-92 & ASME MFC-3M-1989.

Dick Munns Company • 10572 Calle Lee #130 • Los Alamitos, CA 90720
Phone (714) 827-1215 • Fax (714) 827-0823

Date: 7-13-2015 Approved By: _____ Calibration Technician: _____

Appendix E2

CEMS Calibration Gas Certificates

Airgas

Almega ENVIRONMENTAL

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
11711 S. Alameda Street
Los Angeles , CA 90059
(323) 568-2208 Fax (323) 567-3686
www.airgas.com

Part Number:	E03NI69E15A3832	Reference Number:	48-124459216-1
Cylinder Number:	CC408131	Cylinder Volume:	151.4 CF
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	2015 PSIG
PGVP Number:	B32014	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Oct 21, 2014

Expiration Date: Oct 21, 2022

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	8.750 %	8.749 %	G1	+/- 0.6% NIST Traceable	10/21/2014
OXYGEN	22.00 %	21.99 %	G1	+/- 0.4% NIST Traceable	10/21/2014
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12061353	CC360995	11.002 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	Jan 11, 2018
NTRM	09061417	CC273563	22.53 % OXYGEN/NITROGEN	+/- 0.4%	Mar 08, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS 6E CO2	NDIR	Oct 13, 2014
SIEMENS OXYMAT 6	PARAMAGNETIC	Oct 13, 2014

Triad Data Available Upon Request

Approved for Release

PRAXAIR

Almega ENVIRONMENTAL

Praxair
5700 South Alameda Street
Los Angeles, CA 90058
Tel: (323) 585-2154 Fax:(714) 542-6689
PGVPID: F22015

DocNumber: 000082722

CERTIFICATE OF ANALYSIS / EPA PROTOCOL GAS

Customer & Order Information:

PRAXAIR WHSE SIGNAL HILL
2677 SIGNAL PARKWAY
SIGNAL HILL CA 907550

Praxair Order Number: 32010813
Customer P. O. Number: 05655758
Customer Reference Number:

Fill Date: 7/30/2015
Part Number: NI CD4 3O1E-AS
Lot Number: 109521109
Cylinder Style & Outlet: AS CGA 590
Cylinder Pressure & Volume: 2000 psig 140 cu. ft

Certified Concentration:

Expiration Date:		8/5/2023	NIST Traceable
Cylinder Number:		CC248731	Analytical Uncertainty:
4.32	%	CARBON DIOXIDE	± 0.7 %
12.01	%	OXYGEN	± 0.4 %
Balance		NITROGEN	

Certifcation Information: *Certification Date:* 8/5/2015 *Term:* 96 Months *Expiration Date:* 8/5/2023

This cylinder was certified according to the 2012 EPA Traceability Protocol, Document #EPA-600/R-12/531, using Procedure G1. Do Not Use this Standard if Pressure is less than 100 PSIG.

O2 responses have been corrected for CO2 interference.

Analytical Data: *(R=Reference Standard, Z=Zero Gas, C=Gas Candidate)*

1. Component: CARBON DIOXIDE

Requested Concentration: 4.3 %
Certified Concentration: 4.32 %
Instrument Used: Horiba VIA-510 S/N 2807014
Analytical Method: NDIR
Last Multipoint Calibration: 7/13/2015

First Analysis Data:						Date:	8/5/2015
Z:	0	R:	9.87	C:	4.32	Conc:	4.32
R:	9.87	Z:	0	C:	4.32	Conc:	4.32
Z:	0	C:	4.32	R:	9.87	Conc:	4.32
UOM:	%			Mean Test Assay:			4.32 %

Reference Standard Type: GMIS
Ref Std Cylinder # : SA17695
Ref Std Conc: 9.87%
Ref Std Traceable to SRM # : 1674b
SRM Sample #: 7-H-07
SRM Cylinder #: FF10631

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

2. Component: OXYGEN

Requested Concentration: 12 %
Certified Concentration: 12.01 %
Instrument Used: OXYMAT 5E
Analytical Method: PARAMAGNETIC
Last Multipoint Calibration: 7/24/2015

First Analysis Data:						Date:	8/5/2015
Z:	0	R:	19.9	C:	12.01	Conc:	12.01
R:	19.9	Z:	0	C:	12.01	Conc:	12.01
Z:	0	C:	12.01	R:	19.9	Conc:	12.01
UOM:	%			Mean Test Assay:			12.01 %

Reference Standard Type: GMIS
Ref Std Cylinder #: SA16022
Ref Std Conc: 19.90%
Ref Std Traceable to SRM #: 2659a
SRM Sample #: 71-E-19
SRM Cylinder #: FF22331

Second Analysis Data:						Date:	
Z:	0	R:	0	C:	0	Conc:	0
R:	0	Z:	0	C:	0	Conc:	0
Z:	0	C:	0	R:	0	Conc:	0
UOM:	%			Mean Test Assay:			0 %

Analyzed by: Ying Yu

Certified by: Jack Fu (ems)
Jack Fu

AIR LIQUIDE Air Liquide America Specialty Gases LLC

Intertek

Almega ENVIRONMENTAL

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

8832 DICE ROAD, SANTA FE SPRINGS, CA 90670-2516 Phone: 800-323-2212 Fax: 562-464-5262

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory - PGVP Vendor ID: A52012

AIR LIQUIDE AMERICA SPECIALTY GASES LLC
8832 DICE ROAD
SANTA FE SPRINGS, CA 90670-2516

P.O. No.: RECERT
Document # : 45861199-001

Customer
ALMEGA ENVIRONMENTAL & TECHNICAL SE

WEDNESDAY DELIVERY ONLY U
5251 MC FADDEN AVE.
HUNTINGTON BEACH CA 92649
US

ANALYTICAL INFORMATION Gas Type : CO,BALN

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number:	**CC259973**	**Certification Date:**	18Apr2012	**Exp. Date:**	19Apr2020
Cylinder Pressure*:**	1700 PSIG	**Prev Certification Date:**	07Apr2009	**Batch No:**	SB00052655

COMPONENT	CERTIFIED CONCENTRATION (Moles)		ACCURACY**	TRACEABILITY
CARBON MONOXIDE	899	PPM	+/- 2%	NIST and VSL
NITROGEN		BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1681	15Jun2015	KAL004633	970.0 PPM	CARBON MONOXIDE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//001785245	09Apr2012	FTIR

Special Notes: The expiration date has been extended without re-assay per EPA 600/R-12/531.

APPROVED BY: MT
Thuan Tran

Airgas

Almega ENVIRONMENTAL

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
11711 S. Alameda Street
Los Angeles , CA 90059
323-568-2208 Fax: 323-567-3686
www.airgas.com

Part Number:	E02NI99E15A0499	Reference Number:	48-124465925-1
Cylinder Number:	CC39463	Cylinder Volume:	144.3 CF
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	2015 PSIG
PGVP Number:	B32014	Valve Outlet:	350
Gas Code:	CO,BALN	Certification Date:	Dec 02, 2014

Expiration Date: Dec 02, 2022

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	450.0 PPM	453.8 PPM	G1	+/- 0.8% NIST Traceable	12/02/2014
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	12062425	CC366875	487.1 PPM CARBON MONOXIDE/NITROGEN	+/- 0.6%	Jun 22, 2018

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AMP0900118 CO	FTIR	Nov 21, 2014

Triad Data Available Upon Request

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Airgas

Almega ENVIRONMENTAL

Airgas Specialty Gases
11711 S. Alameda Street
Los Angeles , CA 90059
(323) 568-2208 Fax: (323) 567-3686
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15AC0D7	Reference Number:	48-124438647-2
Cylinder Number:	CC147621	Cylinder Volume:	144.3 CF
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	2015 PSIG
PGVP Number:	B32014	Valve Outlet:	660
Gas Code:	NO,BALN	Certification Date:	Jun 14, 2014

Expiration Date: Jun 14, 2017

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	45.00 PPM	45.24 PPM	G1	+/- 1.0% NIST Traceable	06/07/2014, 06/14/2014
NITRIC OXIDE	45.00 PPM	45.03 PPM	G1	+/- 1.0% NIST Traceable	06/07/2014, 06/14/2014
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13061227	CC403919	49.40 PPM NITRIC OXIDE/NITROGEN	+/- 0.8%	Nov 19, 2019
PRM	12328	680179	10.01 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Oct 15, 2014
GMIS	1211201301	CC501041	4.950 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Dec 11, 2016

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801551 NO	FTIR	May 27, 2014
Nicolet 6700 AHR0801551 NO2	FTIR	May 21, 2014

Triad Data Available Upon Request

Notes:

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Airgas Specialty Gases
11711 South Alameda Street
Los Angeles, CA 90059
(323) 568-2203 Fax: (323) 567-3686
www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15A3576	Reference Number:	48-124376725-6
Cylinder Number:	CC199782	Cylinder Volume:	144.3 Cubic Feet
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	2015 PSIG
PGVP Number:	B32013	Valve Outlet:	660
Gas Code:	NO,BALN	Certification Date:	Jun 07, 2013

Expiration Date: Jun 07, 2021

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NOX	90.00 PPM	89.91 PPM	G1	+/- 0.9% NIST Traceable	05/31/2013, 06/07/2013
NITRIC OXIDE	90.00 PPM	89.88 PPM	G1	+/- 0.9% NIST Traceable	05/31/2013, 06/07/2013
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	11060532	CC331845	101.2 PPM NITRIC OXIDE/NITROGEN	+/- 0.6%	Feb 16, 2017
PRM	12312	680179	10.01 PPM NITROGEN DIOXIDE/NITROGEN	+/- 2.0%	Feb 14, 2012
GMIS	124208889129	CC323206	4.835 PPM NITROGEN DIOXIDE/NITROGEN	+/-2.0%	Oct 11, 2013

The SRM or PRM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AMP0900118 NO	FTIR	May 09, 2013
Nicolet 6700 AMP0900118 NO2	FTIR	May 20, 2013

Triad Data Available Upon Request

Notes:

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Airgas Specialty Gases
11711 S. Alameda Street
Los Angeles, CA 90059
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www.airgas.com

CERTIFICATE OF ANALYSIS
Grade of Product: EPA Protocol

Part Number:	E02NI99E15W4BQ4	Reference Number:	48-124424353-1
Cylinder Number:	CC502676	Cylinder Volume:	CF
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	
PGVP Number:	B32014	Valve Outlet:	660
Gas Code:	NO2,BALN	Certification Date:	Mar 27, 2014

Expiration Date: Apr 03, 2017

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
NITROGEN DIOXIDE	16.50 PPM	16.46 PPM	G1	+/- 2.0% NIST Traceable	03/27/2014, 04/03/2014
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
GMIS	1211201301	CC500610	14.91 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.6%	Dec 11, 2016
PRM	12329	726612	25.02 PPM NITROGEN DIOXIDE/NITROGEN	+/- 1.5%	Oct 15, 2014

The SRM, PRM or RGM noted above is only in reference to the GMIS used in the assay and not part of the analysis.

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801551 NO2	FTIR	Mar 13, 2014

Triad Data Available Upon Request

Permanent Notes.OXYGEN ADDED TO MAINTAIN STABILITY

Notes:

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Appendix E3

Other QA/QC

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA
Source: Engine 1
Test: RATA
Test Date: 09/29/15

NO_2-to-NO CONVERTER EFFICIENCY CALCULATION

NO2 CONCENTRATION (Co): (CC502676)		16.46
AUDIT GAS WITH NO MODE (C1):		0.00
AUDIT GAS WITH NOx MODE (C2):		15.50
CALCULATIONS:		
D1=|C2-C1|=	15.50	
D2=|Co-C2|=	**0.96**	
% CONVERTER EFFICIENCY: %CE=D1*100/Co=		**94.2**

Acceptance Criteria*	**(Yes/No)**
D2 < 1 ppm:	yes
% Converter Efficiency > 90% :	yes

STATUS: PASS

* NO2-to-NO Conversion Efficiency must be greater than 90%

Notes: Stripchart and DAS can be found in Appendix D2 and D3 respectively.
NOx analyzer was calibrated on a 0-100ppm range, while the NO_2 calibration gas used was below 20% of this range (16.46ppm). Converter efficiency value is still considered valid.

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NOx Converter, QA/QC Check

Facility:	**OCSD, Plant No. 2**	**Run No.: 1**
City:	**Huntington Beach, CA**	**Test Date: 9/29/2015**
Source:	**Engine 1**	**Test: NOx Converter Check**
Test:	**RATA**	

TEST DATA

VARIABLE	DESCRIPTION	Pollutant 1 NOx
A	ANALYTICAL RANGE	**100**
	Unit of Measurement	**ppmd**
	CALIBRATION GAS INFORMATION	
B	Zero Gas	**0.00**
C	Mid Gas Concentration	**45.03**
	Mid Gas Cylinder S/N:	CC147621
D	High Gas Concentration	**89.88**
	High Gas Cylinder S/N:	CC199782
	Primary Gas Cylinder S/N:	
E	UPSCALE CALIBRATION GAS USED	**45.03**
	L=Low, M=Mid, H=High	**M**
	INITIAL CALIBRATION ERROR TEST	
F	Zero Gas Response	**0.00**
G	Mid Gas Response	**45.20**
H	High Gas Reponse	**89.68**

QA/QC CALCULATIONS

CALIBRATION GAS SELECTION, % of Range		
Mid Gas	45.0	C*100/A
High Gas	89.9	D*100/A
CALIBRATION ERROR, % of Range		
Initial Zero Gas Error	0.00	(F-B)*100/A
Initial Mid Gas Error	0.17	(G-C)*100/A
Initial High Gas Error	-0.20	(H-D)*100/A
LINEARITY, % of Range		
Initial	0.27	{(G-F)-[(H-F)*C]/D}*100/A

APPENDIX F

FACILITY CEMS DATA

Appendix F1

FACILITY CEMS – Results and Calculations

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Facility CEMS Data Summary

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA
Source: Engine 1
Test: RATA
Date: 9/29/2015

Run No.	Time (hh:mm)	NOx ppm	NOx ppm@15%O2	NOx lb/hr	CO ppm	CO ppm@15%O2	CO lb/hr	Dry Flow dscfh	O2 %
1	7:26-7:55	53.87	33.22	3.85	494.35	304.92	21.51	598,708	11.33
2	7:56-8:25	54.73	33.77	3.91	493.89	304.74	21.49	598,571	11.34
3	8:26-8:55	53.01	31.98	3.38	491.63	296.72	19.04	531,988	11.11
4	9:12-9:41	52.61	31.23	3.10	486.28	288.83	17.43	493,152	10.96
5	9:42-10:11	53.94	32.27	3.28	485.41	290.46	17.98	509,537	11.04
6	10:12-10:41	54.58	31.94	3.07	483.09	282.70	16.54	471,106	10.82
7	10:58-11:27	52.77	32.80	3.88	503.62	313.08	22.53	615,470	11.41
8	11:28-11:57	49.36	31.14	3.73	519.27	327.62	23.84	631,711	11.55
9	11:58-12:27	49.66	31.37	3.75	518.99	327.87	23.86	632,347	11.56
Average:		52.73	32.19	3.55	497.39	304.10	20.47	564,732	11.24

Facility Process Data

Facility: OCSD, Plant No. 2
City: Huntington Beach, CA
Source: Engine 1
Test: RATA
Date: 9/29/2015

Run No.	Load %	Nat Gas Flow dscfm	Dig Gas Flow dscfm
1	92.98	16.16	781.74
2	91.99	16.15	781.31
3	82.42	14.31	709.19
4	76.89	13.18	669.48
5	79.72	13.62	686.61
6	73.57	12.56	649.26
7	94.22	16.55	797.27
8	94.63	52.20	748.87
9	93.82	62.45	732.05
Average:	86.69	24.13	728.42

RATA Report 1

Unit Name: OCSD P2 Unit 1

Report Start Date/Time : Tue 09/29/2015 7:26

Report End Date/Time : Tue 09/29/2015 7:55

DATE/TIME	O2 (%)	NOx Raw (ppmvd)	CO Raw (ppmvd)	Stack Flow (dscfm)	NOx Lbs/Hr	CO Lbs/Hr	CO @15%O2 (ppmvd)	NOx @15%O2 (ppmvd)
09/29/2015 7:26	11.32 V	56.78 V	488.70 V	10019.36 V	4.08 V	21.35 V	300.90 V	34.96 V
09/29/2015 7:27	11.32 V	56.24 V	490.70 V	10024.52 V	4.04 V	21.45 V	302.21 V	34.64 V
09/29/2015 7:28	11.35 V	54.29 V	498.00 V	10037.34 V	3.91 V	21.80 V	307.50 V	33.52 V
09/29/2015 7:29	11.35 V	54.53 V	494.50 V	10014.63 V	3.92 V	21.60 V	305.42 V	33.68 V
09/29/2015 7:30	11.37 V	52.99 V	497.30 V	10051.38 V	3.82 V	21.80 V	307.88 V	32.81 V
09/29/2015 7:31	11.32 V	53.56 V	496.70 V	10041.75 V	3.86 V	21.75 V	305.90 V	32.99 V
09/29/2015 7:32	11.40 V	52.59 V	495.60 V	10093.22 V	3.81 V	21.81 V	307.79 V	32.66 V
09/29/2015 7:33	11.37 V	52.02 V	499.80 V	10050.97 V	3.75 V	21.91 V	309.51 V	32.21 V
09/29/2015 7:34	11.35 V	52.07 V	496.00 V	10009.61 V	3.74 V	21.65 V	306.35 V	32.16 V
09/29/2015 7:35	11.32 V	53.24 V	498.80 V	9976.81 V	3.81 V	21.70 V	307.11 V	32.78 V
09/29/2015 7:36	11.35 V	53.35 V	495.60 V	10005.00 V	3.83 V	21.62 V	306.02 V	32.94 V
09/29/2015 7:37	11.35 V	53.94 V	498.10 V	9979.90 V	3.86 V	21.68 V	307.57 V	33.31 V
09/29/2015 7:38	11.35 V	54.33 V	495.20 V	9941.53 V	3.87 V	21.47 V	305.86 V	33.56 V
09/29/2015 7:39	11.32 V	54.25 V	493.10 V	9906.29 V	3.85 V	21.30 V	303.68 V	33.41 V
09/29/2015 7:40	11.32 V	54.42 V	493.60 V	9895.99 V	3.86 V	21.30 V	303.99 V	33.52 V
09/29/2015 7:41	11.32 V	55.37 V	491.70 V	9893.77 V	3.93 V	21.21 V	302.82 V	34.10 V
09/29/2015 7:42	11.32 V	54.98 V	489.90 V	9951.35 V	3.92 V	21.26 V	301.71 V	33.86 V
09/29/2015 7:43	11.35 V	54.59 V	490.70 V	9931.38 V	3.89 V	21.25 V	303.00 V	33.71 V
09/29/2015 7:44	11.35 V	54.08 V	493.90 V	9959.11 V	3.86 V	21.45 V	305.05 V	33.40 V
09/29/2015 7:45	11.32 V	53.53 V	491.10 V	9928.82 V	3.81 V	21.26 V	302.45 V	32.97 V
09/29/2015 7:46	11.32 V	53.31 V	496.30 V	9961.37 V	3.81 V	21.56 V	305.65 V	32.83 V
09/29/2015 7:47	11.32 V	53.97 V	491.80 V	9946.35 V	3.85 V	21.33 V	302.88 V	33.24 V
09/29/2015 7:48	11.32 V	52.69 V	493.50 V	9948.29 V	3.76 V	21.41 V	303.93 V	32.45 V
09/29/2015 7:49	11.32 V	53.38 V	496.20 V	9961.79 V	3.81 V	21.56 V	305.51 V	32.87 V
09/29/2015 7:50	11.32 V	53.24 V	499.40 V	9966.80 V	3.81 V	21.71 V	307.48 V	32.78 V
09/29/2015 7:51	11.32 V	53.53 V	488.90 V	9978.89 V	3.83 V	21.28 V	301.10 V	32.97 V
09/29/2015 7:52	11.32 V	54.43 V	495.60 V	9976.81 V	3.89 V	21.56 V	305.14 V	33.51 V
09/29/2015 7:53	11.35 V	53.53 V	490.40 V	9976.97 V	3.83 V	21.34 V	302.89 V	33.06 V
09/29/2015 7:54	11.35 V	53.55 V	494.90 V	9942.09 V	3.82 V	21.46 V	305.67 V	33.08 V
09/29/2015 7:55	11.32 V	53.17 V	494.60 V	9982.02 V	3.81 V	21.53 V	304.69 V	32.75 V
Average:	11.33	53.87	494.35	9978.47	3.85	21.51	304.92	33.22
Maximum:	11.40	56.78	499.80	10093.22	4.08	21.91	309.51	34.96
Minimum:	11.32	52.02	488.70	9893.77	3.74	21.21	300.90	32.16