UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

DEC 0 7 2009

OFFICE OF
AIR, WASTE AND TOXICS

Rosanne F. Paris
Environmental Lead
ConocoPhillips Company
Ferndale Refinery
P.O. Box 8
Ferndale, Washington 98248

Dear Ms. Paris:

Re: Opacity Alternative Monitoring Plan Proposal for the Fluid Catalytic Cracking Unit (FCCU) Wet Gas Scrubber (WGS) for the Ferndale Refinery

This is in response to your letter of August 17, 2009, requesting approval of a revision to the previously approved alternative monitoring plan (AMP) dated March 31, 2006. After review of the information ConocoPhillips submitted, EPA approves your request.

ConocoPhillips requested that the approved AMP be modified as follows:

- Update the AMP to reflect the most recent physical modifications. As required by the March 31, 2006 AMP, the additional Belco filtration modules have been installed.
- Allow alternative flow calculation methodologies (Equation 2) per 40 CFR 63 Subpart UUU (40 CFR § 63.1573 (a) (2)).

EPA approves the following AMP modification for opacity:

This alternative monitoring plan (AMP) is to be implemented in place of the requirement to install and operate a continuous opacity monitoring system (COMS) required by NSPS Subpart J [40 CFR § 60.105(a)(1)] and by reference from MACT Subpart UUU (Table 2).

The ConocoPhillips Fluid Catalytic Cracking Unit (FCCU) Wet Gas Scrubber (WGS) is not a venturi scrubber, so the requirements of Tables 2 and 3 of MACT Subpart UUU apply. Because a WGS is being used and as the result of the presence of condensed water in the stack, a COMS will not accurately measure opacity. An appropriate continuous parameter operating system (CPMS) for the ConocoPhillips FCCU WGS includes monitoring the WGS liquid-to-gas (L/G) ratio and the weight percent solids in the scrubber recirculation liquid. The value for L will be determined by measuring the amperage to each WGS recirculation pump motor that is operating, calculating the power generated by the pump motor at the measured amperage using a standard equation from the Chemical Engineers Handbook, determining the liquid flow rate at the calculated power input from the pump manufacturer's Centrifugal Pump Characteristics

Curve and summing the liquid flow rate from each operating pump. The value for G will be measured by a gas flow meter or calculated in accordance with 40 CFR § 63.1573(a)(2)(iii) using control room instrumentation for air flow into the regenerator, and continuous gas analyzers on the exhaust from the regenerator. As described in the guideline of 40 CFR § 63.1564(b)(2) and (3), the L/G ratio will be calculated and recorded at least once every operating hour. ConocoPhillips has established a minimum L/G ratio of 1.25 calculated on a three-hour block average based on performance testing.

The weight percent solids in the WGS liquid must be sampled and analyzed weekly. ConocoPhillips has established a maximum weight percent value of 1.0 based on data taken during performance testing.

ConocoPhillips has developed and must maintain a written monitoring plan which describes the specific CPMS for this AMP including the measurement equipment, equations, centrifugal pump characteristics curves or algorithms, sampling methods, analytical methods and operation and maintenance requirements. This monitoring plan must be reviewed annually and revised, if necessary, and made available to EPA and NWCAA upon request. This CPMS will meet the requirements of 40 CFR §63.1572(c) and (d).

If you have any questions about this approval, please contact Madonna Narvaez at 206-553-2117, or electronically at narvaez.madonna@epa.gov.

Sincerely,

Nancy Helm

Nancy Helm, Manager
Federal and Delegated Air Programs Unit

cc: Tim Hall, ConocoPhillips
Annie Naismith, NWCAA

[redacted]

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, WA 98101

APR 4 2003

Reply To
Attn Of: OAQ-107

Tim Hall, Environmental Coordinator
ConocoPhillips
Ferndale Refinery
3901 Unick Road - P.O. Box 8
Ferndale, Washington 98248

Re: Alternative Sulfur Monitoring Plan
Subpart J Truck Rack Vapor Combustion

Dear Mr. Hall:

EPA received your letter dated February 24, 2003, in which you requested approval of an alternative monitoring plan (AMP) for the NSPS Subpart J monitoring requirements that apply to the John Zinc Thermal Oxidizing Flare at the truck loading rack. This alternative monitoring plan was requested as provided for in 40 CFR § 60.13(i). This letter contained data requested by EPA in support of your original request dated September 11, 2002.

EPA has reviewed the plan that was attached to your February 24, 2003, letter titled "Alternative Monitoring Provisions for Truck Loading Rack." This AMP was evaluated using the guidance published by EPA in a document titled "Alternative Monitoring Plan for NSPS Subpart J Refinery Fuel Gas." EPA finds that your AMP is consistent with the guidance in "Alternative Monitoring Plan for NSPS Subpart J Refinery Fuel Gas" and that the monitoring data you submitted provides reasonable assurance that the H_2S content in the truck loading rack vapors will be significantly less than the Subpart J requirement of <230 mg/dscm (162 ppmv). Therefore, EPA approves the AMP titled "Alternative Monitoring Provisions for Truck Loading Rack" that was submitted with your letter of February 24, 2003, with the provision that you change one word which appears to be a typographical error. In the first sentence of Section 2.0 (a) of the AMP the word "deep" should be changed to the word "keep."

If you have any questions about this AMP approval, please contact Madonna Narvaez of my staff at (206) 553-2117 or electronically at narvaez.madonna@epa.gov.

Sincerely,

Jeff KenKnight

Jeff KenKnight, Manager
Federal and Delegated Programs Unit

cc: Lester Keel, NWAPA

APR 9 2003
Ferndale Refinery

Printed on Recycled Paper

ConocoPhillips

Ferndale Refinery
3901 Unick Road – P.O. Box 8
Ferndale, Washington 98248
phone 360.384.1011

February 24, 2003

Jeff KenKnight, Director
Federal & Delegated Air Program
EPA, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Alternative Sulfur Monitoring Plan
Subpart J Truck Rack Vapor Combustion
File No. 6.2.3.9.2.4

Dear Mr. KenKnight,

The ConocoPhillips Ferndale Refinery operates a truck loading rack, which is subject to 40 CFR 60 Subpart J limitations to sulfur dioxide in the vapor recovered from gasoline cargo tank filling. The John Zinc Thermal Oxidizing Flare (ZTOF), installed to combust these vapors, does not feature a fuel gas sulfur monitoring system that is explicitly compliant with subpart J. On September 11, 2002, ConocoPhillips requested approval of the attached alternative monitoring plan for sulfur dioxide in the truck loading rack vapor combustion unit. On October 22, 2002, EPA requested that ConocoPhillips provide supporting test results from sampling the gas stream using appropriate H_2S monitoring. The tests were performed following the methods outlined in the EPA document *Alternative Monitoring Plan for NSPS Subpart J Refinery Fuel Gas – Conditions for Approval of the Alternative Monitoring Plan for Miscellaneous Refinery Fuel Gas Streams.*

The tests were started on January 8, 2003. Length-of-stain detector tubes in the range of 0-10/0-100 ppm (N=10/1) were used for testing. Seven samples were collected from the infrequently operated gas stream. Due to irregular loading schedules and other activities in the area, the grab samples could not be taken on consecutive days. To ensure that the tests were representative, samples were taken from the gas stream just before it entered the ZTOF. The sampling was completed on February 24, 2003. The following table summarizes the H_2S test results

OFFPLOT TRUCK RACK
Gasoline Vapor Combustion System (ZTOF)

Date	Time	Product	H2S (ppm)	Drager 10 strokes
1/8/03	0815	RegUnl	1	yes
1/9/03	1030	RegUnl	0	yes
1/10/03	1500	RegUnl	0	yes
2/14/03	0900	RegUnl	0	yes
2/18/03	0800	Reg/SUL	0	yes
2/21/03	0900	RegUnl	0	yes
2/24/03	0730	RegUnl	0	yes

The test results are representative of typical operating conditions affecting H_2S content in the gas stream going to the loading rack ZTOF. Sample range and variability calculations were not performed because all test values were essentially zero and obviously well below the acceptability limit of 81 ppm (one-half the maximum allowable fuel gas standard of 162 ppm under Subpart J).

If you require additional information, please contact me at (360) 384-8424.

Sincerely,

T. J. Hall
Environmental Specialist

g:\nwapa\altplantruckrack&test.doc

cc: Lester Keel
Northwest Air Pollution Authority
1600 South Second Street
Mount Vernon, WA 98273-5202

Alternative Monitoring Provisions for Truck Loading Rack

The ConocoPhillilps Ferndale Refinery shall comply with the requirements of 40 CFR 60 Subpart J except as explicitly listed below. The following alternate monitoring plan shall only apply to the truck loading rack Zink Thermal Oxidation Flare (ZTOF) as long as all fuels loaded at the truck loading rack meet the specific sulfur product specification noted in Attachment 1. Pilot and assist gas shall be commercial grade propane gas purchased from an independent distributor.

1.0 Monitoring methods

(a) ConocoPhillips Ferndale Refinery shall monitor all fuels loaded at the truck loading rack to assure that they meet the specific sulfur product specification for that finished product.

2.0 Record Keeping Requirements

(a) ConocoPhillips Ferndale Refinery shall keep a record of each fuel sampling performed pursuant to Section 1.0 Each record shall identify the date and location of sampling.

(b) ConocoPhillips Ferndale Refinery shall maintain records for a period of five (5) years after the generation of such documentation. This alternative monitoring plan shall be kept permanently, or until it has been replaced with a different alternative monitoring plan or the truck loading rack is permanently taken out of service.

3.0 Reporting Requirements

(a) Within 30 days of the change, ConocoPhillips Ferndale Refinery shall report any change in the type of fuels or change in the sulfur product specification of the fuels loaded at the truck loading rack if the sulfur product specification has a higher sulfur content than shown in Attachment 1.

(b) Within 30 days of the change, ConocoPhillips Ferndale Refinery shall report any change in the type of gases used as pilot or assist gas at the truck loading rack ZTOF.

Attachment 1

Type of Fuel Loaded	Sulfur Product Specification (Total Sulfur Concentration)
Regular Unleaded Gasoline	0.1 % (weight)
Super Unleaded Gasoline	0.1 % (weight)
Midgrade Unleaded Gasoline	0.1 % (weight)
Diesel	0.047 % (weight)
Ultra Low Sulfur Diesel	30 ppm (weight)

Rosanne F. Paris
Environmental Air Lead

ConocoPhillips Company
Ferndale Refinery
3901 Unick Road – P.O. Box 8
Ferndale, WA 98248

ConocoPhillips

May 17, 2011
HSE 480.001.002; File No. 6.2.6.9

Annie Naismith
Air Quality Engineer
Northwest Clean Air Agency
1600 South Second Street
Mount Vernon, WA 98273-5202

Re: Submission of Final Plan for FCC Enhanced Selective Non-Catalytic Reduction (E-SNCR) Ammonia Predictive Emissions Monitoring

Dear Annie,

Pursuant to Condition 4b in NWCAA OAC #1047, ConocoPhillips is required to submit a final plan to establish a predictive relationship between the FCC Unit and ESNCR operating parameters and emissions of ammonia. The plan must be submitted within 180 days after conducting the initial ammonia compliance test. Ferndale completed the initial compliance test for ammonia at the FCC/CO Boiler wet gas scrubber outlet on January 13, 2011.

If you have questions regarding this issue, please don't hesitate to contact the undersigned at (360) 384-8375.

Sincerely,

Rosanne F. Paris

Enclosure: Ammonia Emissions Monitoring Plan

Cc: Christian Schoepe
William Henning

Ammonia Emissions Monitoring Plan
ESNCR System
ConocoPhillips Ferndale Refinery
Revision B
May 13, 2011

Introduction

The ConocoPhillips Ferndale Refinery has installed an ESNCR system on the CO Boiler in the FCC Unit to reduce NOx emissions. This system vaporizes aqueous ammonia and injects the stream into the CO Boiler where the ammonia reacts with NOx to form molecular nitrogen. A hydrogen stream may also be injected in order to improve the conversion of NOx.

Any of the ammonia that does not react with the NOx will either react to form ammonia salts or will exit the boiler as ammonia vapor. The ammonia that exits the boiler as vapor is known as 'slip'.

This document describes how ConocoPhillips plans to estimate the amount of ammonia that passes through the Wet Gas Scrubber and is released to the atmosphere through the stack.

Basis

The ammonia flow to the ESNCR system will be automatically controlled either by an algorithm that estimates the amount of NOx in the CO Boiler, or by feedback control from an ammonia slip analyzer that is located between the CO Boiler and the Wet Gas Scrubber. In either case, the amount of ammonia slip will be measured and used to limit the amount of un-reacted ammonia that exits the boiler.

A portion of the ammonia vapor that exits the CO Boiler is captured by the Wet Gas Scrubber. It is assumed that this portion will be a function of the degree of contact in the scrubber and will remain relatively constant. The portion of the ammonia captured by the scrubber was calculated using data from a January 2011 stack test, and was found to be about 35%.

Estimate of Ammonia Emissions

The amount of ammonia slip from the CO Boiler is to be continuously measured by AE-7340, which is a tunable diode laser analyzer located on the duct between the boiler and the scrubber. If we assume that the correction factor to correct to 0% O2 remains fairly constant, then the expected ammonia emissions from the wet gas scrubber stack can be calculated from the slip value and the capture efficiency in the scrubber. A maximum ammonia slip of approximately 13.6 ppmv (wet) corresponds to ammonia emissions from the wet gas scrubber of 8.8 ppmvd. When this is corrected to 0% O2, it corresponds to 10 ppmvd out the stack and to the atmosphere.

Corrective Actions

Process control alarms will be set to alert the operator that the maximum ammonia slip value is being approached or exceeded. The operator will act to reduce the flow of ammonia to the ESNCR system in order to lower the ammonia slip value to an acceptable level.

Rosanne F. Paris
Environmental Air Lead

ConocoPhillips Company
Ferndale Refinery
3901 Unick Road – P.O. Box 8
Ferndale, WA 98248

ConocoPhillips

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NORTHWEST
CLEAN AIR AGENCY

Gail ___ Axel ___ Annie AN
Christos ___ Dan ___
Erica ___ Lyn T ___ Toby ___
Mark A ___ Lynn B ___ Julie ___
Mark B ___ Other: ___
Rtn to: ___

December 15, 2009
HSE 480.001.002; File No. 6.2.3.9.16

Annie Naismith
Northwest Clean Air Agency
1600 South Second Street
Mount Vernon, WA 98273

RE: Vacuum Heater (4F-2) SCR
Predictive Emissions Model – OAC #1012b, Final Plan

Dear Ms. Naismith,

As required by the Northwest Clean Air Agency (NWCAA) Order of Approval to Construct (OAC) #1012b for the Vacuum Heater (4F-2) SCR, Condition 9.b., please find attached the Predictive Emissions Model (PEM) for ammonia.

On September 4, the source tested required by the OAC was completed. The report was issued to the NWCAA under separate cover.

If you have questions regarding this issue, please do not hesitate to contact me at (360-384-8375).

Sincerely,

Rosanne Paris

Rosanne F. Paris

RFP; kjh

Enclosure: Vacuum Heater SCR Ammonia PEMS

Predictive Emissions Model for Vacuum Heater (4F-2) SCR

A Predictive Emissions Model (PEM) is required by the Northwest Clean Air Agency (NWCAA) Order of Approval to Construct (OAC) # 1012B for the Vacuum Heater (4F-2) SCR.

ConocoPhillips Ferndale Refinery has chosen to use VIM Technologies, Inc as the data acquisition system (DAS) for the Ammonia Emissions Monitoring PEM. The equations used in the PEM calculation are provided in Attachment 1.

The QA/QC program for the operating value inputs into the Ammonia PEM is provided in Attachment 2.

The corrective actions when the PEM indicates the emission limit in Condition 5 as required by Condition 9.b. may be exceeded are shown in Attachment 3.

The PEM calculation was tested during an engineering test period on September 2nd and 3rd of 2009. From these tests, a factor "d" with a value of 0.05 was determined and incorporated into the model. Attachment 4 includes graphs of the PEM vs. test data and a table providing operating data used in the PEM for test periods on September 2nd and 3rd. FTIR equipment was utilized during these engineering tests to provide real-time response at various ammonia addition rates. As indicated in the graphs the factor "d" of 0.05 used in the PEM provides a conservative prediction of ammonia slip.

On September 4th the Source Test was completed as required by the OAC. The report was issued to the NWCAA under separate cover. Included in Attachment 4 are graphs showing the PEM calculation using the 0.05 factor against the Source Test data collected for the three 1 hour periods. Again the PEM calculation for ammonia predicts emission levels higher than determined by the Source Test.

Attachment 1
AMMONIA PEMS MODEL EQUATION

VIM Technologies, Inc.

7464 New Ridge Road, Suite 2, Hanover, MD 21076 • (410) 859-5455 • FAX (410) 859-5457
e-mail: viminfo@vimtechnologies.com

DAS Equations – Conoco Phillips Vacuum Flash Heater – VIM Job No. 4229-P01

Rev	Date	Description
3		Changed NH3 Slip equation per Lester Keel's direction.
4	06/08/2009	Changed PLC and Data Supervisor to use Raw NOx value instead of correct NOx value to calculate NOx lb/mmBtu. Regenerated historical data in Data Supervisor to update calculated values. JBP
6	10/20/2009	Corrected NH3 Slip documentation. Also corrected numbering for some formulas. Corrected the Heat input equation parameter list that listed TDF and oil as possible fuels.
7	10/26/2009	Removed liquid fuels equation. Changed description paragraph for fuel heat equation. Changed units flow in heat equation. Changed heat equation to match units of flow.

I. Correction of Pollutant Concentrations to O_2 Standard

Correction of Pollutant Concentration Using O_2 Concentration.
Reference 40 CFR 60 Appendix A Reference Method 20 Section 7.3.1, Eq. 20-4

$$C_{Adj} = C_d \times \left(\frac{20.9 - STD}{20.9 - \%O_2} \right)$$

where:

C_{Adj} - Pollutant concentration corrected to STD percent O_2 ppm.

C_d - Pollutant concentration measured, dry basis, ppm.

$\%O_2$ - Measured O_2 concentration dry basis, percent.

STD - volumetric oxygen concentration to be corrected to (3%)

II. Emission Rate lb/mmBtu

To calculate emission rate when the pollutant is measured on a dry basis and O2 dry is used as the diluent:
Reference: 40CFR75, Appendix F, Equation F-5, 40CFR60, Appendix A, Method 19, Equation 19-1 and 40 CFR60 Appendix A Method 20 Equation 20-6.

$$E_h = K\ C_h\ F_d\ \frac{20.9}{(20.9 - \%O_{2d})}$$

where,

E_h - Pollutant emission rate, lb/mmBtu

$\%O_2$ - Measured O_2 concentration dry basis, %O2, % volume.

K - 1.194×10^{-7} for NOx, (lb/scf)/ppm

C_h - Pollutant concentration, ppm

F_d - Fuel Factor, dry, dscf/mmBtu (operator-entered constant for refinery fuel gas)

III. Heat Input Rate, mmBtu/hr

To calculate the Heat Input rate use measured fuel flow:

Reference 40 CFR 75 Appendix F

$$HI = \frac{\left(Q \times \left(\frac{1000}{24}\right)\right) \times GCV}{10^6}$$

Where:

HI - Heat Input Rate (fuel specific), mmBtu/hour.

Q - Measured flow of fuel Gas (kscf/d) (from DCS)

GCV - Gross calorific value of fuel (Btu/scf) (from DCS)

10^6 - Conversion of Btu to mmBtu.

IV. NOx LB-MOL

The following equation will be used to calculate the NOx LB-MOL.

$$NOX_{mass}(LB - MOL) = \frac{NOX_{mass}(LB)}{46(LB / LB - MOL)}$$

where,

$NOX_{mass}(LB - MOL)$ - NOX Mass measured in LB-MOL

$NOX_{mass}(LB)$ - NOX Mass measured in LB

V. NH3 Slip Corrected

The following equation will be used to calculate the NH3 Corrected to 3% O2 (PPMC)

$$NH3@3\%O2 = \left\{\left[\frac{a}{b} \times 10^6 \times \frac{(20.9 - 3)}{20.9}\right] - \left(NOX_{inlet}@3\%O2 - NOX_{outlet}@3\%O2\right)\right\} \times d$$

$$a = NH3_{inj}(lb/hr) \times \left(\frac{19\%}{100}\right) \times \frac{385.15(scf / lb\_mol)}{17.03(lb / lb\_mol)}$$

$$b = Heat(mmBtu/hr) \times 8710(dscf / mmBtu)$$

where,

$NH3@3\%O2$	- NH3 Corrected to 3% O2 (PPMC) (result calc of Equation III)
a	- NH3 Injection flow (dscf/hr) (sub calc of this Equation)
b	- Flue gas flow (dscf/hr) (sub calc of this Equation)
d	- Factor obtained from testing (operator-entered constant)

$NH3_{inj}$	- NH3 Injection (lb/hr) (from DCS)
$Heat$	- Heat Input (mmBtu/hr) (Using Equation III)
$NOX_{inlet}\,@3\%O2$	- NOX Inlet Corrected to 3% O2 (PPMC) (Using Equation I)
$NOX_{OUTLET}\,@3\%O2$	- NOX Outlet Corrected to 3% O2 (PPMC) (Using Equation I)

VI. Mass Emissions, lb/hr

NOx calculations (for P75/NBP sources)

To calculate mass emissions using the calculated pollutant emission rate and total heat input
Reference 40 CFR 75 Appendix F Equation F-24

$$M_h \;=\; E_h \times HI_{\mathrm{h}} \times t_h$$

where,

M_h	- Pollutant mass emission rate, lb/hr.
E_h	- Pollutant emission rate, lb/mmBtu
HI_h	- Total Heat Input derived from all fuels, mmBtu/hr
t_h	- Operating time for hour h, in fraction of an hour.

Attachment 2
QA/AC PROCEDURES

Input Valve	Description	Data source / Tag	QA/QC Classification	QA/QC Procedure
% O2	Measured O2 concentration dry basis,	CEMS / 04AI-7059	A [CEMS]	Daily automatic validation of CEMS (Appendix F of 40CFR Part 60)
NH3inj	NH3 Injection flow	DCS / 04FI- 7024	A [ENV]	Yearly calibration of instrument (flow)
Q	Measured flow of Fuel Gas (kscf/d)	DCS / 04FUX030A Compensated - Sum of 4 pass meters 04FI-027- 030	A [ENV]	Yearly calibration of instrument (flow)
GCV	Gross caloric value of Fuel (BTU/scf)	DCS / 22XX-920	A [ENV]	Checked against Lab Analysis Quarterly
NOx Inlet	NOx Inlet – raw	CEM / 04AI-7076	A [ENV]	Daily automatic calibration with Standard Gas
NOx Outlet	NOx Stack - raw	CEM / 04AI-7060	A [CEMS]	Daily automatic validation of CEMS (Appendix F of 40CFR Part 60)

Attachment 3
CORRECTIVE ACTIONS

The corrective action when the PEM indicates that the emission limit in Condition 5 may be exceeded will be as follows:

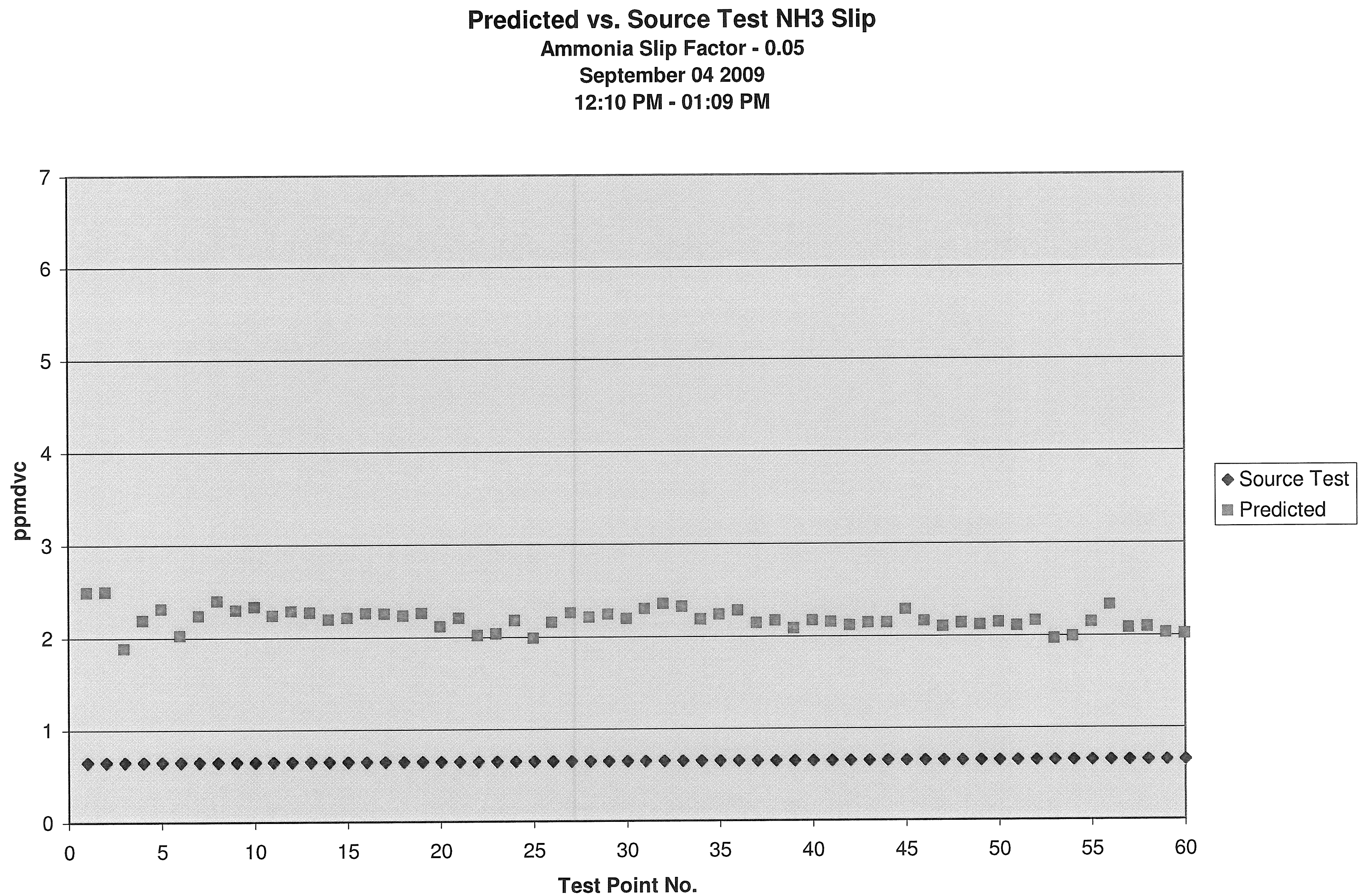
Ammonia Slip	Primary Action	Secondary Action		
>9.5* ppm on 24 hour basis and NOx Stack less than ~70* ppm on 24 hour rolling average	Decrease Ammonia addition rate	None required		
>9.5* ppm on 24 hour basis and NOx Stack greater than ~70* ppm on 24 hour basis	Decrease Ammonia addition rate	Adjust Heater operation to reduce NOx emissions to bring NOx within Condition 3.a. and 3.b.		

* Ammonia and NOx action points will vary determined by system response. This is a guideline response point. Condition 3.a. and 3.b. determines NOx compliance and Condition 5 Ammonia compliance.

Attachment 4
TEST GRAPHS AND OPERATIONAL DATA

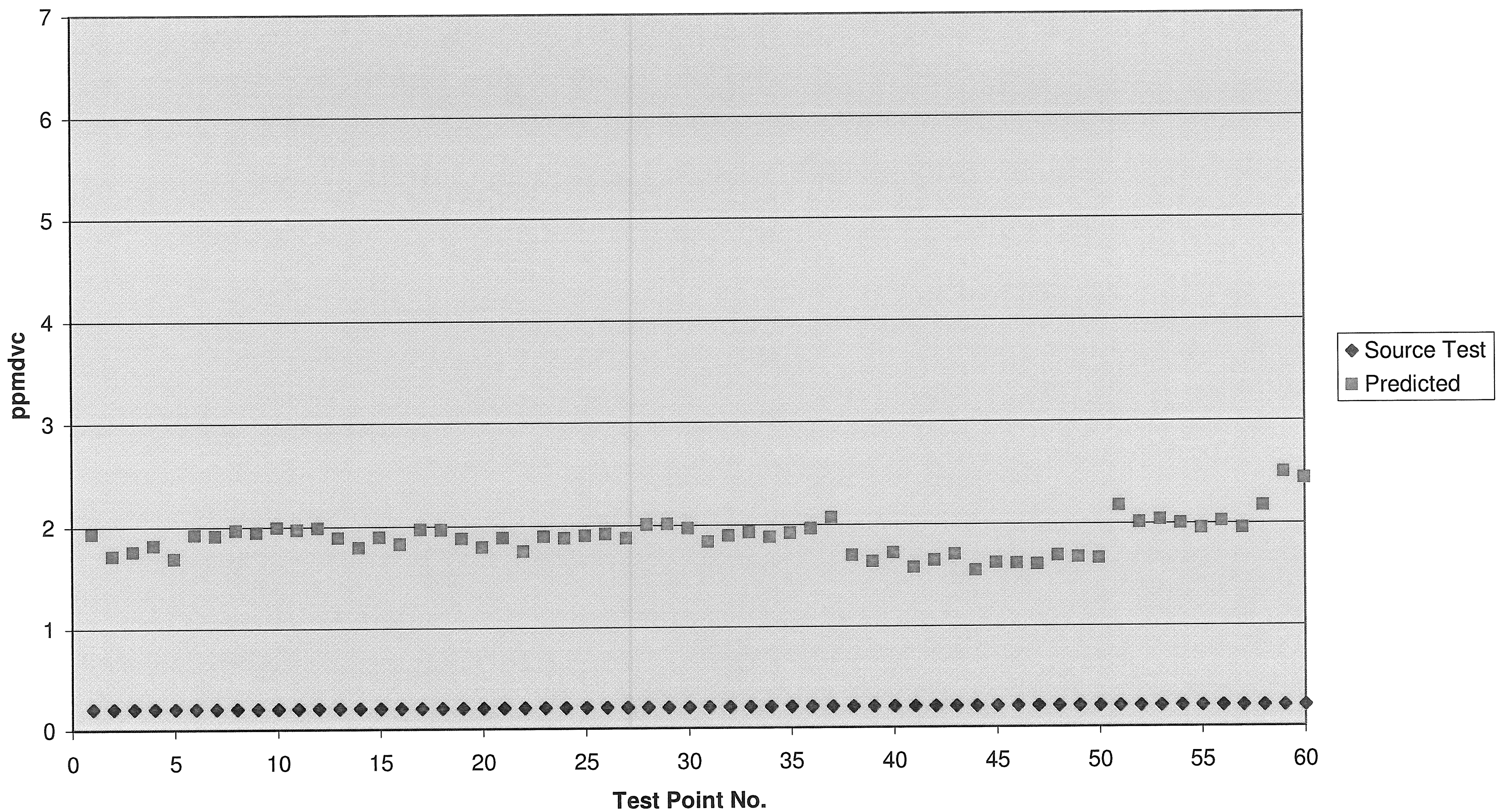
ConocoPhillips Vacuum Heater SCR
Ammonia Slip Test Results Summary - September 2009
Basis: Stack Flow Combustion Calculations

Test Day	SCR Inlet Temp °F	Stack Outlet Temp °F	Est SCR Flow dscfm	Est Stack Flow dscfm	SCR Inlet NOx ppmvd, 3% O2	SCR Outlet NOx ppmvd, 3% O2	Stack Outlet NOx ppmvd, 3% O2	SCR Outlet NH3 ppmvd, 3% O2
9/2/2009	792	377	25460	27643	242.0	28.9	39.3	1.5
9/3/2009	792	376	25847	27689	240.8	14.5	28.2	4.4
Average	792	377	25654	27666	241	22	34	3

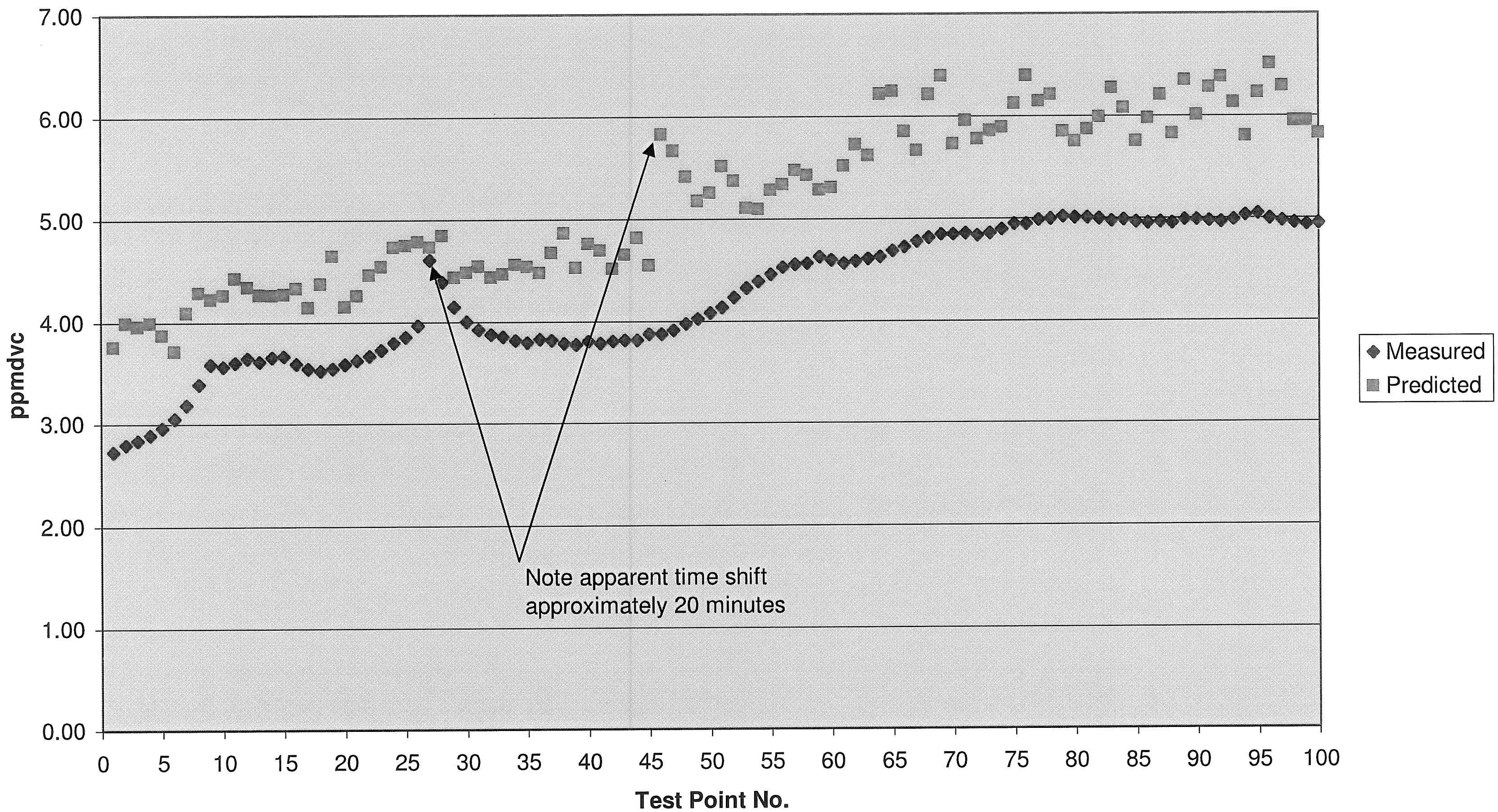


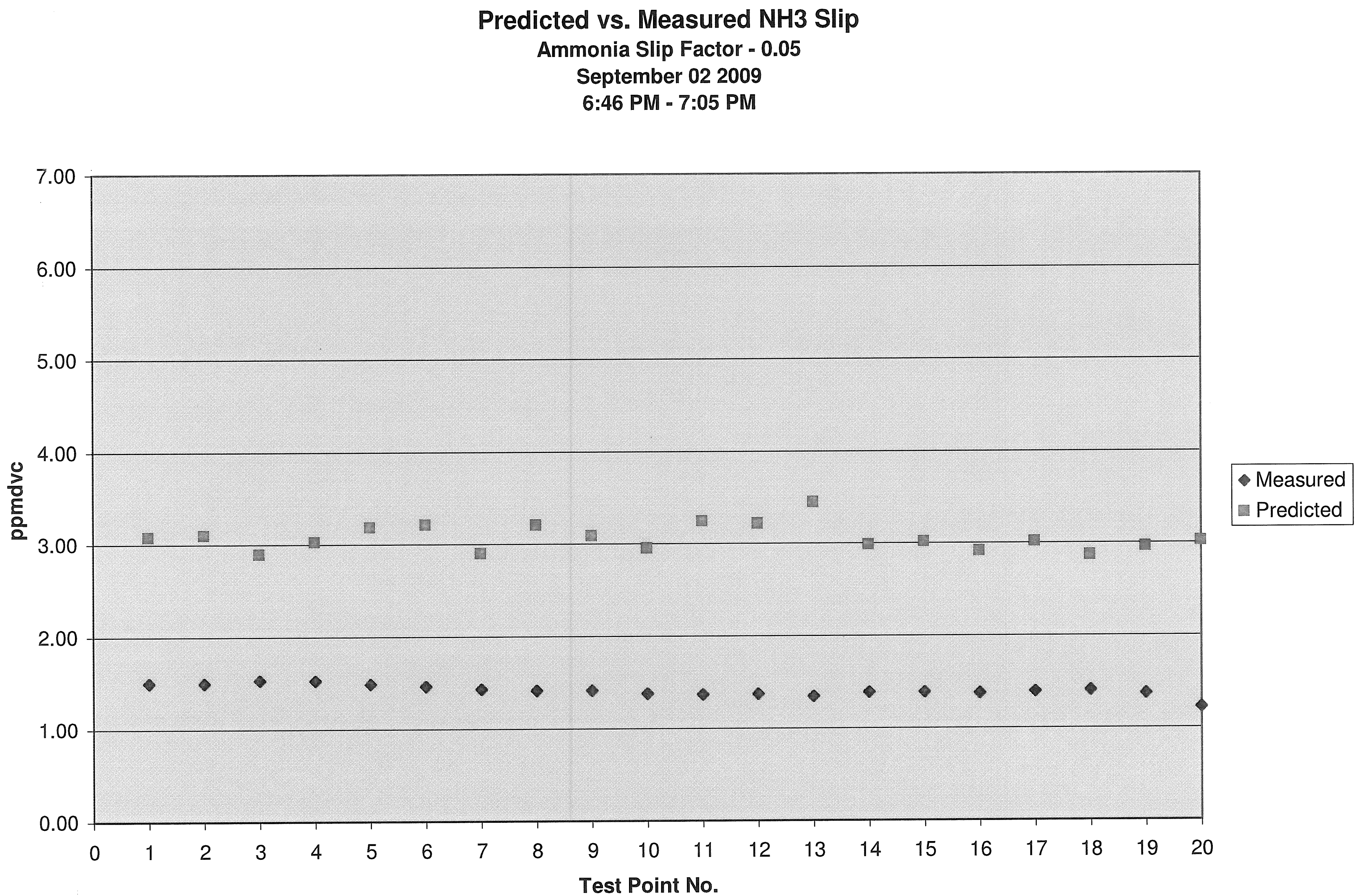
Predicted vs. Source Test NH3 Slip
Ammonia Slip Factor - 0.05
September 04 2009
12:10 PM - 01:09 PM
7
6
5
4
3
2
1
0
ppmdvc
0
5
10
15
20
25
30
35
40
45
50
55
60
Test Point No.
Source Test
Predicted

Predicted vs. Source Test NH3 Slip
Ammonia Slip Factor - 0.05
September 04 2009
10:07 AM - 11:06 AM



Predicted vs. Measured NH3 Slip
Ammonia Slip Factor - 0.05
September 03 2009
9:10 AM - 10:50 AM




Predicted vs. Measured NH3 Slip
Ammonia Slip Factor - 0.05
September 02 2009
6:46 PM - 7:05 PM
ppmdvc
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
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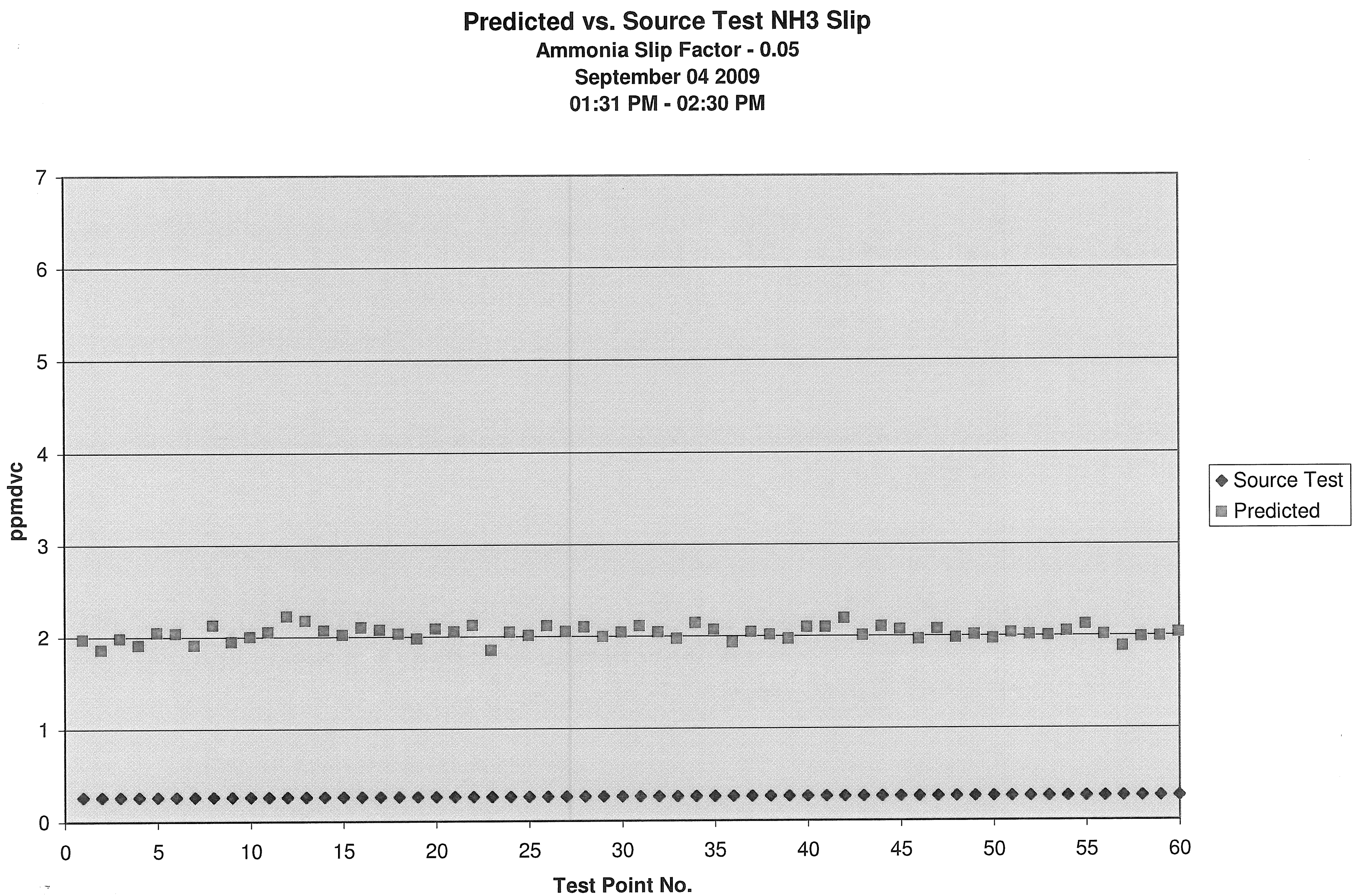
Test Point No.
Measured
Predicted


Predicted vs. Source Test NH3 Slip
Ammonia Slip Factor - 0.05
September 04 2009
01:31 PM - 02:30 PM
ppmdvc
Test Point No.
Source Test
Predicted
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