

## South Coast Air Quality Management District

21865 Copley Drive, Diamond Bar, CA 91765-4178 (909) 396-2000 • www.aqmd.gov

### SOURCE TEST REPORT

16-333

### CONDUCTED AT

Anaplex Corporation 15547 Garfield Avenue Paramount, CA 90723

### HEXAVALENT CHROMIUM EMISSIONS FROM THREE TYPES OF PROCESS TANKS

TESTED:

ISSUED: December 9, 2016

**REPORTED BY:** 

Wayne Stredwick Air Quality Engineer II

November 16, 2016

**REVIEWED BY:** 

1

Michael Garibay Supervising Air Quality Engineer

SOURCE TEST ENGINEERING BRANCH

MONITORING & ANALYSIS DIVISION

Cleaning the air that we breathe..."

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Date: <u>11/16/2016</u>

Test Nos. <u>16-333</u>

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<u>SU</u>	JMMARY		
a.	Firm	Anaplex Corporation	
b.	Test Location	15547 Garfield Avenue, <u>Paramount, CA 90723</u>	
c.	Unit Tested	<u>Various Metal Finishing Tar</u>	ıks
d.	Test Requested by	Matt Miyasato (DEO), (909) <u>SCAQMD</u>	396-3249,
e.	Reason for Test Request	<u>High ambient air monitor rea</u>	adings of Cr(VI)
f.	Date of Test	<u>November 16, 2016</u>	
g.	Source Test Performed by	Mike Garibay, Wayne Stred <u>Bill Welch, Eric Padilla</u>	wick
h.	Test Arrangements Made Through	Carmen Campbell (Presiden <u>Anaplex Corporation (562)</u> 6	t) 534-5700
g.	Source Test Observed by	B. L. Griffiths <u>Cast Metals Services, Inc. (</u> 9	909)374-0270
j.	Company I.D. No	<u>16951</u>	
k.	Permit No	513707	

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### **RESULTS**

## Table 1. Summary of Test Conditions

<u>Tank - 11/16/2016</u>	Chromate Content
Sodium Dichromate Seal Tank #22	3.2 %
Chemical Film Tank #43	0.5 %
Chromic Acid Anodizing Tank #19	8.7 %

### Table 2. Summary of Emissions

### HEXAVALENT CHROMIUM EMISSIONS 11/16/2016

Emissions Source	Concentration (ng/m³) *	Tank Operating Temperature (deg F)	Surface Tension (dynes/cm)	Air Agitation
Sodium Dichromate Seal Tank #22	682,000	194-212	70.2	NO
Chromate Film Tank #43	8,340	Ambient	70.3	YES
Chromic Acid Anodizing Tank #19	6,880	91-99	23.8	YES
Three Run Average	232,000	-	-	-

\* The concentrations are reported in the same units as the recent ambient air monitoring data, which was 14 ng/m3 - average 11/5 through 11/17 from Monitor 1978471 located immediately outside the facility roll up door near the tanks listed above.

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## EXECUTIVE SUMMARY

Source testing was conducted at Anaplex Corporation to identify the specific causes of elevated ambient hexavalent chromium levels measured recently very near to the facility. The emissions above three hexavalent chromium containing tanks within the facility were measured for concentration. The tanks were classified into three types: electrolytic tanks where anodizing is taking place, heated seal tanks where the tanks are heated to near boiling, and agitated tanks where air is bubbled through the tanks. The testing included one of each of the three classifications of tanks that were closest in proximity to the ambient monitor with elevated readings. The results were obtained for purposes of identifying potential sources of the elevated ambient readings and to rank them for their relative potential impacts.

The average ambient concentration adjacent to the facility was 14 ng/m<sup>3</sup> for the period surrounding the test date, as compared to the measured source concentrations from the facility which was 232,000 ng/m3 as the average of the three tanks tested. This elevated source concentration at 16,600 times the ambient, is considered positive identification that the facility is contributing to the nearby elevated ambient concentrations. Of the three types of tanks tested, the heated seal tank is the largest identified contributor with a measured emissions concentration of 632,000 ng/m<sup>3</sup>. The other two tanks types, air agitated and anodizing, were also positively identified with elevated hexavalent chromium emissions over ambient at 8,340 ng/m<sup>3</sup> and 6,880 ng/m<sup>3</sup> respectively. Additionally, it is likely that several tanks in the facility similar to all three types tested, are all contributing to the nearby elevated ambient concentrations.

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## **INTRODUCTION**

On November 16, 2016, Engineers from the South Coast Air Quality Management District (SCAQMD) Source Test Engineering (STE) branch conducted source testing at Anaplex Corporation in Paramount, California. The purpose of the testing was to identify the specific causes of elevated ambient hexavalent chromium levels measured very near to the Anaplex facility. For purposes of clarification, when the terms chromate and chromic acid are used in describing the equipment at this facility, the chromium in chromate and chromic acid are in the hexavalent state.

Several operations at the facility were identified that contain or process hexavalent chromium containing materials. It is possible that there are several potential sources of hexavalent chromium at the facility including the chromic acid anodizing tank, and several chromate or chromic acid containing tanks. Some of these tanks are also heated and air agitated (also called sparging). The tanks that contain hexavalent chromium were classified into three types that are potential emission sources:

- 1. Electrolytic tanks where anodizing is taking place.
- 2. Heated seal tanks where the tanks are heated to near boiling.
- 3. Agitated tanks where air is continuously bubbled through the tanks for mixing the tank contents.

One tank from each of these categories was tested. The facility had also previously sprayed chromate based coatings in their spray booths, but this process was not tested since it was not nearest to the ambient monitor with elevated readings, and the facility had claimed that they no longer use chromate containing coatings.

Sources whose emissions are measured as greater than that of the downwind monitor are considered to be potential contributors to the hexavalent chromium measured by the monitor, with those exhibiting the greater concentrations more positively identified as contributors.

The Discussion/Test Critique section of this report includes conclusions that can be drawn from the results.

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### EQUIPMENT AND PROCESS DESCRIPTION

Anaplex Corporation provides finishing services such as anodizing, plating and coating for aerospace products. The facility operates several permitted units in their process. The equipment tested, sampling locations, and facility tank location diagram are shown in Figures 1 - 4. Specifics of the tank sizes are specified on the facility's permit. None of the tanks tested employ add on control devices. The anodizing tank uses only mist suppressant for emissions control. The facility formerly used Atotech Fumetrol 140 mist suppressant, but recently switched to the Hunter HCA 8.4 PFOS free mist suppressant to comply with the recent PFOS ban. Both mist suppressant products have been previously approved by SCAQMD and CARB as certified for the Rule 1469 0.01 mg/A-hr limit.

The emissions from the tanks escape the building through either powered roof vents and/or roll up doors on either end of the buildings. The anodizing building roll up doors were open during the testing, with the east facing door located in close proximity to the SCAQMD Ambient Monitor 1978472 located on a sidewalk utility pole on Garfield Avenue.

Previously, according to the facility, they had discontinued the use of chromate containing coatings inside their spray booths. John Anderson of the SCAQMD Enforcement group, noted chromate containing coatings, were found at the facility, but were not observed being sprayed.

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### SAMPLING AND ANALYTICAL PROCEDURES

Three locations were identified for one sample run at each location for emissions information testing. The three source testing samples were obtained for purposes of identifying emission sources and to rank them on their relative potential impacts. Three sources of potential hexavalent chromium emissions were selected as possibly having the greatest potential for causing elevated ambient hexavalent chromium near the facilities. The samples were taken from the air above the sources as to represent emissions that are diluted and transported by air currents that are diluted and move towards the direction of the ambient monitors. The locations chosen were emissions above the Chromic Acid Anodizing Tank #19, emissions above the Dichromate Seal Tank #22, and emissions above the Chemical Film Tank #43. These locations were based on previous ambient monitoring results from low volume samplers located on Garfield Avenue in the city of Paramount, California.

### Hexavalent Chromium Sampling

Testing was conducted based on California Air Resources Board Method 425 applied to the nonstack open air above the tanks, with the procedures of the method specific to stack sampling omitted. Three samples were taken at single non-isokinetic sample points for informational purposes. Each sampling train consisted of a sampling line, which was used to draw the stack sample from the source. The sample was then drawn through two impingers each filled with an aqueous solution of 0.1N NaHCO<sub>3</sub> (per section 21.2), an empty impinger, a 2" filter, and an impinger bubbler filled with tared silica gel. Each sampling train was connected to a leak free vacuum pump, a dry gas meter, and a calibrated orifice. The impingers were contained in an ice bath to condense water vapor and other condensable matter present in the sample stream (see Figure 5).

The samples were extracted using the sampling trains. The pH of the solution in the first impinger was measured after the test, but prior to recovery, at pH 9. The impinger solutions were recovered within 24 hours and the SCAQMD laboratory analyzed the hexavalent chromium in the samples by CARB SOP MLD039. Hexavalent chromium deposited in the filter, sample line and impingers were extracted and analyzed by an Ion Chromatograph equipped with a post-column reactor (IC/PCR) and a visible wavelength detector. Moisture content was determined gravimetrically and volumetrically.

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### **DISCUSSION/TEST CRITIQUE**

For purposes of interpreting the test results, the typical ambient Los Angeles Basin average for hexavalent chromium measured during the most recent SCAQMD Multiple Air Toxics Exposure Study (MATES) IV study is less than 0.1 ng/m<sup>3</sup>. While all of the results are substantially higher than the background, it should be noted that it takes a significant volume of air at source concentrations substantially higher than the background to able to affect the ambient air levels and is a function of distance away from the facility due to air dilution and deposition. The intent of this test was to identify sources that are at least several times higher than the background levels to identify the major contributors and to provide a focus for potential remediation. The average ambient concentration adjacent to the facility was 14 ng/m<sup>3</sup> for the period surrounding the test date, as compared to the measured source concentrations from the facility which was 232,000 ng/m<sup>3</sup> as the average of the three tanks tested. These elevated source concentrations at 16,600 times the ambient, are considered as positive identification that the facility is contributing to the nearby elevated ambient concentrations. Additionally, it is likely that several tanks in the facility of all three types tested, are all contributing to the nearby elevated ambient concentrations.

The CARB Method 425 sampling method isokinetic requirements could not be met due to the samples being taken in the open space above the tanks and not in a stack of their control devices since there were no control devices present. This resulted in an over isokinetic condition of over 110% as allowed in the method. General isokinetic theory dictates that an over isokinetic condition results in dilution of the emissions particles and a resulting low bias in the measured emissions. Although a low bias may have occurred, the results are considered to be suitable for purposes of their intended use, since the emissions are certain to be present at concentrations at or above that which was measured during the testing.

Fugitive emissions from Dichromate Seal Tank (#22) were identified as the most significant contributor. However, emissions were also high from Chemical Film Tank (#43), and Chromic Acid Anodizing Tank (#19.) Of the three tanks that were tested, only the chromic acid anodizing tank uses mist suppressant to reduce toxic air emissions. The mechanism for causing the hexavalent chromium in each tank to become airborne is different for each process. It is thought that the seal tanks cause elevated emissions when the temperature begins to approach the boiling point, perhaps 10 - 40 degrees before boiling, when the tanks begin to generate visible steam. The emissions from the air agitated chromate tanks are thought to be driven by the smaller droplets created by the bubbling that are entrained with the rising air and into the airspace above the tanks. The emissions from the anodizing tanks are generated by a similar droplet formation from bubbling formed both during plating and air agitation.

Dichromate Seal Tank (#22) is not air agitated, but it is heated to over 200°F. Visible steam generated from the tank are indicators that elevated temperatures may be the cause of the elevated

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hexavalent emissions. Possible options to reduce emissions from these tanks would include lowering the tank temperature, employing an alternative non-chromate containing seal technique, or installing add on controls with 100% capture efficiency. The facility has an existing hot water and a nickel acetate seal tank, but it is unknown whether they are acceptable substitutes. While it is possible that a reduction in the tank's surface tension may also help reduce emissions, there is no test data to confirm the effectiveness of this approach. While the tank does not operate above the boiling point of water, the tank does use a steam coil to heat the tank and micro boiling was observed at the water/ heating coil surface.

Chromate Film Tank (#43) operates at ambient temperature, but uses air agitation. Chromic acid Anodizing Tank (#19) operates at 91-99 °F and utilizes air agitation with a mist suppressant. Mechanical agitation is an option instead of air agitation to reduce toxic air emissions for both types of tanks. Alternative means of mixing the tanks such as submerged eductors have been employed at other facilities. Many plating and/or anodizing facilities do not use air agitation. If a suitable alternative can be employed, the practice of air agitating chromate containing tanks may be producing emissions unnecessarily. If the air agitation cannot be eliminated, add on controls with 100% capture efficiency would then be an option.

Other solutions that could be applied to any tank type includes using polyball type material to blanket the tank's liquid surface and also reducing tank freeboard.

Anaplex Corporation also utilizes large building fans on the roof of the plating and anodizing area to cool the building and remove tank emissions from the building. A view of the roof of Anaplex Corporation using Google Maps indicates discoloration around each roof vent (see Figure 6.) This discoloration is most likely due to residue from the emissions from the tanks below the fans. This residue may be an additional source of hexavalent chromium, which may also need to be removed once the sources inside the building are controlled.

Aside from those specific tanks that were tested, there are other tanks within the facility that contain hexavalent chromium. These include several chromate seal and dip tanks of which some are heated as well as others that contain chromic acid, nickel and cadmium. It is possible that these other tanks could be contributing to the facility wide emissions. Although the spray booths were not specifically included in the testing, they should not be ruled out as potential sources due to residual overspray from chromate containing coatings used in the past.

Finally, while these ideas discussed can be used to reduce hexavalent chromium emissions in the immediate future, the ideal solution would be for all chromate tanks to be ventilated to emission control systems using HEPA filters with vent systems designed according to the American Conference of Governmental Industrial Hygienists guidelines. An even more encompassing approach would be enclosing the buildings and venting the buildings to approved control devices. Any of the control techniques discussed should be discussed and approved by the SCAQMD Engineering and Permitting group.

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Figure 1: Heated Dichromate Seal Tank #22

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Figure 2: Air Agitated Chromate Film Tank #43

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## Figure 3: Air Agitated Chromic Acid Anodizing Tank #19

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Figure 4: Analplex Corporation's Tank Location



Figure 5: CARB Method 425

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Figure 6: Roof View of Anaplex Corporation

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## **CHROMIUM CALCULATIONS**

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SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT 21865 E. Copley Dr. Diamond Bar, California 91765-4182

Test No. 16-333						Test Date:	11/16/2016	
		SOUR	CE TEST	CALCULATIO	NS			
Product Tested: Fugitive Sample Train: Train #1	Emissi	ons from Sc	dium Dich	romate Seal T	ank #22	Input by:	W Stredwig	~k
	Ŭ					input by	W. Olicawi	
SUMMARY								
A. Average Traverse Velocity		- 6					. 0.00	tps
B. Gas Meter Temperature (Use 6	0 deg.	- for Temp (	Comp. Met	ers)			. 79.69	deg F
C. Gas Meter Correction Factor	•••••						. 1.0075	"LL_0
E Nozzle Diameter							. 7.00	inch
E1 Plating Amps							0.0000	Δ
F. Stack Inside Diameter		0	inch	M. Pitot Co	rrection Facto	r	0.84	
G. Stack Cross Sect. Area		0.000	ft2	N. Samplin	a Time		120	min
H. Average Stack Temp		0.0	dea F	O. Nozzle 2	K-Sect. Area		0.00000	ft
I. Barometric Pressure		28.75	"HgA	P. Hex Chr	ome Sample	Collection	. 3.23	mg
J. Gas Meter Pressure (I+(D/13.6)	)	29.26	"HgA	Q. Total Cł	irome Sample	Collection		. mg
K. Static Pressure		0.000	"H20	R. Water V	apor Condens	sed	. 82.8	ml
L. Total Stack Pressure (I+(K/13.6	i))	. 28.75	"HgA	S. Gas Vol	ume Metered.		. 176.138	dcf
T. Corrected Gas Volume [(S x J/2	29.92) x	c 520/(460+E	3) x C				. 167.240	dscf
PERCENT MOISTURE/GAS DEN	ISITY							
U. Percent Water Vapor in Gas S	ample	((4.64 x R)/(	(0.0464 x I	R) + T))			. 2.25	%
V. Average Molecular Weight (W	'et):							
Component	Vol. F	ract. x	Moist. Fra	ct. x	Molecular	Wt. =	Wt./M	ole
 Water	0.022		1 00	 0	18.0		0.40	
Carbon Dioxide	0.022	Dry Basis	0.97	8	44.0	,	0.40	
Carbon Monoxide	0.0000	Dry Basis	0.97	8	28.0	,	0.00	
Oxygen	0.0000	Dry Basis	0.97	8	32.0	,	6.54	
Nitrogen & Inerts	0.791	Dry Basis	0.97	8	28.2	,	21.81	
		,		-				
						Sum	28.75	
ELOW RATE								
W. Gas Density Correction Factor	r (28.95	5/V)^.5					. 1.00	
X. Velocity Pressure Correction F	actor (2	29.92/L)^.5						
Y. Corrected Velocity (A x M x W	x X)						. 0.00	fps
Z. Flow Rate (Y x G x 60)							. 0	cfm
AA. Flow Rate (Standard) {Z x (L/2	29.92)	x [520/(460+	·H)]}				. 0	scfm
BB. Dry Flow Rate (AA x (1-0/100	))						. 0	ascim
SAMPLE CONCENTRATION/EMI	SSION	RATE						
CC. Sample Concentration [0.0154	43 x (P	/T)]					. 2.98E-04	gr/dscf
DD. Sample Concentration [54,14	3xCC/	51.996	(Molecula	r Wt.)]			. 3.10E-01	ppm
EE. Hexavalent Chrome Emission	Rate (	0.00857 x B	B xCC)				. 0.00E+00	lb/hr
FF. Total Chrome Emission Rate [	[(0.000)	1322 x Q x E	3B)/T]				0.00E+00	lb/hr
GG. Sample Concentration [P/T x	1,000,0	000 x 35.314	45]				. 6.82E+05	ng/m <sup>3</sup>
HH. Hexavalent Chrome Emission	Rate (	453592 x El	Ξ)					mg/hr
JJ. Hexavalent Chrome Emission	Factor	(HH/E1)					#DIV/0!	mg/A-hr
KK. Total Chrome Emission Rate	(45359)	2 x FF)					. 0.000	mg/hr
LL. Total Chrome Emission Factor	r (KK/E	1)					. #DIV/0!	mg/A-hr
MM Hexavalent Chrome Concentr	ation (2	288 3 x CC	)					ma/dscm

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Test No. 16-333						Test Date:	11/16/2016	
		SOUF	RCE TEST	CALCULATIO	NS			
Product Tested: Fugitive Sample Train: Train #	Emiss 11	ions from C	hemical Fili	m Tank #43		Input by:	W. Stredwie	ck
SUMMARY								
A. Average Traverse Velocity							0.00	fps _
B. Gas Meter Temperature (Use 6	30 deg.	F for Temp	Comp. Met	ers)			79.69	deg ⊦
C. Gas Meter Correction Factor			•••••				1.0293	"LL_0
D. Average Onlice Pressure     E. Nozzle Diameter							0.80	⊓20 inch
E1 Plating Amps							0.0000	Δ
F Stack Inside Diameter		0	inch	M Pitot Co	rrection Facto	r	0.84	~
G Stack Cross Sect Area		0 000	ft2	N Samplin	a Time		60	min
H. Average Stack Temp		. 0.0	dea F	O. Nozzle )	X-Sect. Area		0.00000	ft
I. Barometric Pressure			"HgA	P. Hex Chr	ome Sample (	Collection	0.01921	mg
J. Gas Meter Pressure (I+(D/13.6	))	. 29.25	"HgA	Q. Total Ch	nrome Sample	Collection	0	mg
K. Static Pressure			"H20	R. Water V	apor Condens	sed	16.4	ml
L. Total Stack Pressure (I+(K/13.6	5))	. 28.75	"HgA	S. Gas Vol	ume Metered.		83.925	dcf
T. Corrected Gas Volume [(S x J/	<b>29.92)</b> :	x 520/(460+	B) x C				81.365	dscf
PERCENT MOISTURE/GAS DEN	ISITY	·						
II Percent Water Vapor in Gas S	Sample	((4 64 x R)/	((0 0464 x I	3) + T))			0.93	%
		((4.04 X 10))	((0.0+0+ 7 )	() · · ))			0.00	70
V. Average Molecular Weight (W	/et):							
Component	Vol. F	=ract. x	Moist. Fra	ict. x	Molecular	Wt. =	Wt./M	ole
Water	0.009		1.00	0	18.0	,	0.17	
Carbon Dioxide	0.0000	Dry Basis	0.99	1	44.0	,	0.00	
Carbon Monoxide	0.0000	Dry Basis	0.99	1	28.0	,	0.00	
Oxygen	0.2090	Dry Basis	0.99	1	32.0	,	6.63	
Nitrogen & Inerts	0.791	Dry Basis	0.99	1	28.2	,	22.10	
						, Sum	28.89	
FLOW RATE								
W Gas Density Correction Facto	r (28 Q	51/1/2 5					1 00	
X Velocity Pressure Correction F	actor (	29 92/1 )^ 5					1.00	
Y. Corrected Velocity (A x M x W	x X)						0.00	fps
Z. Flow Rate (Y x G x 60)							0	cfm
AA. Flow Rate (Standard) {Z x (L/	29.92)	x [520/(460-	+H)]}				0	scfm
BB. Dry Flow Rate (AA x (1-U/100	)))						0	dscfm
SAMPLE CONCENTRATION/EM	ISSION	I RATE						
CC. Sample Concentration [0.015	43 x (F	P/T)]					3.64E-06	gr/dscf
DD. Sample Concentration [54,14	3xCC/	51.996	(Molecula	ır Wt.)]			3.79E-03	ppm
EE. Hexavalent Chrome Emission	Rate (	(0.00857 x E	3B xCC)				0.00E+00	lb/hr
FF. Total Chrome Emission Rate	[(0.000	1322 x Q x	BB)/T]				0.00E+00	lb/hr
GG. Sample Concentration [P/T x	1,000,	000 x 35.31	45]				8.34E+03	ng/m³
HH. Hexavalent Chrome Emission	۱ Rate (	(453592 x E	E)				0.000	mg/hr
JJ. Hexavalent Chrome Emission	Factor	(HH/E1)					#DIV/0!	mg/A-hr
KK. I otal Chrome Emission Rate	(45359	92 X ⊢⊢)					0.000	mg/hr
LL. I Otal Unrome Emission Facto	i (KK/E	· 1 )	·····				#DIV/0!	ing/A-nr
vivi nexavalent Chrome Concent	auon (2	2288.3 X CC	,)					. mg/ascr

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				Test Bule.	11/10/2010	
		SOUF	RCE TEST C	ALCULATIONS		
Product Tested: Sample Train:	Fugitive Emissions Train #7	s from C	hromic Acid /	Anodizing Tank #19 Input by: \	W. Stredwid	
SUMMARY						
A. Average Traverse Velo	city					. fps
B. Gas Meter Temperature	e (Use 60 deg.F fo	or Temp	Comp. Meter	s)	83.36	deg F
C. Gas Meter Correction F	actor				1.0075	
D. Average Orifice Pressu	re				1.73	"H20
E. Nozzle Diameter					0.0000	inch
E1. Plating Amps						A
F. Stack Inside Diameter			inch	M. Pitot Correction Factor	0.84	
G. Stack Cross Sect. Area		0.000	ft2	N. Sampling Time	60	min
H. Average Stack Temp			deg F	O. Nozzle X-Sect. Area	0.00000	ft
I. Barometric Pressure		28.75	"HgA	P. Hex Chrome Sample Collection	0.00746	mg
J. Gas Meter Pressure (I+	(D/13.6))	28.88	"HgA	Q. Total Chrome Sample Collection.	0	mg
K. Static Pressure		0.000	"H <sub>2</sub> 0	R. Water Vapor Condensed	10.4	ml
L. Total Stack Pressure (I+	-(K/13.6))	28.75	"HgA	S. Gas Volume Metered	41.160	dcf
T. Corrected Gas Volume	[(S x J/29.92) x 52	20/(460+	B) x C		38.302	dscf
PERCENT MOISTURE/G	AS DENSITY					
U. Percent Water Vapor i	n Gas Sample ((4.	64 x R)/	((0.0464 x R)	+ T))	1.24	%
V. Average Molecular We	eight (Wet):					
Component	Vol. Frac	st. x	Moist. Frac	t. x Molecular Wt. =	Wt./N	lole
Water	0.012		1.000	18.0 ,	0.22	
Carbon Dioxide	0.0000 Dry	/ Basis	0.988	44.0 ,	0.00	
Carbon Monoxide	0.0000 Dr	/ Basis	0.988	28.0 ,	0.00	
	-		0 0 0 0			
Oxygen	0.2090 Dry	/ Basis	0.988	32.0 ,	6.60	
Oxygen Nitrogen & Inerts	0.2090 Dry 0.791 Dry	/ Basis / Basis	0.988	32.0 , 28.2 ,	6.60 22.03	
Oxygen Nitrogen & Inerts	0.2090 Dry 0.791 Dry	/ Basis / Basis	0.988 0.988	32.0 , 28.2 ,	6.60 22.03	
Oxygen Nitrogen & Inerts 	0.2090 Dry 0.791 Dry	/ Basis / Basis	0.988 0.988	32.0 , 28.2 , , Sum	6.60 22.03 28.86	
Oxygen Nitrogen & Inerts 	0.2090 Dry 0.791 Dry	/ Basis / Basis	0.988 0.988	32.0 , 28.2 , , Sum	6.60 22.03 28.86	
Oxygen Nitrogen & Inerts  FLOW RATE W. Gas Density Correctio	0.2090 Dry 0.791 Dry	/ Basis / Basis //.5	0.988 0.988	32.0 , 28.2 , , Sum	6.60 22.03 28.86 	
Oxygen Nitrogen & Inerts  FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre	0.2090 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9	/ Basis / Basis //.5 92/L)^.5.	0.988 0.988	32.0 , 28.2 , , Sum	6.60 22.03 28.86 1.00 1.02	
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corr Y. Corrected Velocity (A x	0.2090 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 M x W x X)	/ Basis / Basis /^.5 92/L)^.5.	0.988 0.988	32.0 , 28.2 , , Sum	6.60 22.03 28.86 1.00 1.02 0.00	fps
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60)	0.2090 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 M x W x X)	/ Basis / Basis /^.5 92/L)^.5.	0.988 0.988	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0	fps cfm
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Standard)	0.2090 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 M x W x X)	/ Basis / Basis )^.5 )2/L)^.5. 20/(460-	0.988 0.988	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0	fps cfm scfm
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Standard) BB. Dry Flow Rate (AA x (	0.2090 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 M x W x X) {Z x (L/29.92) x [5 1-U/100))	/ Basis / Basis /^.5 02/L)^.5. 20/(460-	0.988 0.988 +H)]}	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 0	fps cfm scfm dscfm
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI	0.2090 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 M x W x X) {Z x (L/29.92) x [5 1-U/100))	/ Basis / Basis /^.5 02/L)^.5. 20/(460-	0.988 0.988 +H)]]	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 0	fps cfm scfm dscfm
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Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Y x G x 60) AA. Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI CC. Sample Concentratior DD. Sample Concentratior	0.2090 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 X X W X X) (Z x (L/29.92) x [5 1-U/100)) ON/EMISSION RA n [0.01543 x (P/T)] 54,143xCC/	/ Basis / Basis /^.5 02/L)^.5. 20/(460- ATE 	0.988 0.988 +H)]]	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 0 0 3.01E-06 3.13E-03	fps cfm scfm dscfm gr/dscf ppm
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Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Standard) BB. Dry Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI CC. Sample Concentratior DD. Sample Concentratior DE. Hexavalent Chrome E FF. Total Chrome Emissio	0.2090 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 (Z x (L/29.92) x [5 1-U/100)) ON/EMISSION RA n [0.01543 x (P/T)] n [54,143xCC/ mission Rate (0.0 n Rate [(0.000132	/ Basis / Basis / Basis /^.5 20/(460- 20/(460- 375 20/(460- 375 20/(460- 375 20/(460- 375 20/(460- 375 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 375) 20/(460- 20/(40))	0.988 0.988 +H)]] (Molecular <sup>1</sup> 3B xCC) BB)/T]	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 0 3.01E-06 3.13E-03 0.00E+00 0.00E+00	fps cfm scfm dscfm gr/dscf ppm lb/hr lb/hr
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Correct Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Y x G x 60) BB. Dry Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI CC. Sample Concentration D. Sample Concentration EF. Total Chrome Emissio GG. Sample Concentration	0.2090 Dry 0.791 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 (X x W x X) {Z x (L/29.92) x [5 1-U/100)) ON/EMISSION RA n [0.01543 x (P/T)] n [54,143xCC/ mission Rate (0.00 n Rate [(0.000132 n [P/T x 1.000.000	/ Basis / Basis / Basis /^.5 22/L)^.5. 20/(460- 22/L)^.5. 51.996 0857 x E 22 x Q x 1 2 x Q x 1 2 x Q x 1	(Molecular <sup>1</sup> BB xCC) BB)/T]	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 0 3.01E-06 3.13E-03 0.00E+00 0.00E+00 6.88E+03	fps cfm scfm dscfm lb/hr lb/hr lb/hr pn/m <sup>3</sup>
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Correctio Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Y x G x 60) BB. Dry Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI CC. Sample Concentration DD. Sample Concentration EF. Total Chrome Emissio GG. Sample Concentration HH. Hexavalent Chrome E	0.2090 Dry 0.791 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 (Z x (L/29.92) x [5 1-U/100)) ON/EMISSION RA n [0.01543 x (P/T)] n [54,143xCC/ mission Rate (0.00 n Rate [(0.000132 n [P/T x 1,000,000 mission Rate (450	/ Basis / Basis / Basis /^.5 20/(460- 20/(460- 51.996 0857 x E 22 x Q x   2 x Q x   0 x 35.31 3502 v E	0.988 0.988 +H)]] (Molecular <sup>1</sup> 3B xCC) BB)/T] 45]	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 3.01E-06 3.13E-03 0.00E+00 6.88E+03 0.00E	fps cfm scfm dscfm lb/hr lb/hr lb/hr lb/hr
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Y x G x 60) AA. Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI CC. Sample Concentration D. Sample Concentration EE. Hexavalent Chrome E FF. Total Chrome Emissio GG. Sample Concentration HH. Hexavalent Chrome E	0.2090 Dry 0.791 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 (Z x (L/29.92) x [5 1-U/100)) ON/EMISSION RA (0.01543 x (P/T)) 1 [54,143xCC/ mission Rate (0.0 n Rate [(0.000132 n [P/T x 1,000,000 imission Rate (453 mission Rate (453	/ Basis / Basis / Basis /^.5 20/(460- 20/(460- 51.996 0857 x E /2 x Q x   0 x 35.31 3592 x E 4/E1)	0.988 0.988 +H)]] (Molecular <sup>1</sup> 3B xCC) BB)/T] 45] E)	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 3.01E-06 3.13E-03 0.00E+00 0.00E+00 6.88E+03 0.000	fps cfm scfm dscfm gr/dscf ppm lb/hr lb/hr ng/m <sup>3</sup> mg/hr mg/A_br
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Corre Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Y x G x 60) AA. Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI CC. Sample Concentration DD. Sample Concentration EE. Hexavalent Chrome E FF. Total Chrome Emissio GG. Sample Concentration HH. Hexavalent Chrome E JJ. Hexavalent Chrome E KK Total Chrome Emissio	0.2090 Dry 0.791 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 (X × W × X) (Z × (L/29.92) × [5 1-U/100)) ON/EMISSION R/ n [0.01543 × (P/T)] n [54,143xCC/ mission Rate (0.0 n Rate [(0.000132 n [P/T × 1,000,000] imission Rate (453502)	/ Basis / Basis / Basis /^.5 20/(460- 20/(460- 0857 x E 20/(460- 0857 x E 22 x Q x 1 3592 x E 1/E1) FE	(Molecular \ BB/T] (45]	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 0 3.01E-06 3.13E-03 0.00E+00 0.00E+00 6.88E+03 0.000E 0.00E+00 6.88E+03 0.000	fps cfm scfm dscfm lb/hr lb/hr lb/hr ng/m <sup>3</sup> mg/hr mg/A-hr mg/hr
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Correy Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Y x G x 60) AA. Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI CC. Sample Concentration DD. Sample Concentration EE. Hexavalent Chrome E FF. Total Chrome Emissio GG. Sample Concentration HH. Hexavalent Chrome Er JJ. Hexavalent Chrome Er KK. Total Chrome Emissio	0.2090 Dry 0.791 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 (X X W X X) (Z x (L/29.92) x [5 1-U/100)) ON/EMISSION RA (0.01543 x (P/T)) n [54,143xCC/ mission Rate (0.0 n Rate [(0.000132 n [P/T x 1,000,000 mission Rate (453 mission Rate (453 mission Rate (453592 x n Factor (KK/E1)	/ Basis / Basis / Basis //.5 20/(460- 20/(460- 20/(460- 51.996 0857 x E 2 x Q x 2 x Q x 2 x Q x 2 x Q x 3592 x E 1/E1) FF)	(Molecular \ BB/T] (45]E).	32.0 , 28.2 , Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 0 3.01E-06 3.13E-03 0.00E+00 0.00E+00 0.00E+00 6.88E+03 0.000 #DIV/0! 0.000	fps cfm scfm dscfm lb/hr lb/hr lb/hr ng/m <sup>3</sup> mg/hr mg/A-hr mg/A-hr
Oxygen Nitrogen & Inerts FLOW RATE W. Gas Density Correctio X. Velocity Pressure Correy Y. Corrected Velocity (A x Z. Flow Rate (Y x G x 60) AA. Flow Rate (Y x G x 60) AA. Flow Rate (Standard) BB. Dry Flow Rate (AA x ( SAMPLE CONCENTRATI CC. Sample Concentration DD. Sample Concentration EF. Total Chrome Emissio GG. Sample Concentration HI. Hexavalent Chrome E JJ. Hexavalent Chrome E KK. Total Chrome Emissio LL. Total Chrome Emissio	0.2090 Dry 0.791 Dry 0.791 Dry n Factor (28.95/V) ection Factor (29.9 M x W x X) {Z x (L/29.92) x [5 1-U/100)) ON/EMISSION R/ n [54,143xCC/ mission Rate (0.0 n Rate [(0.000132 n [P/T x 1,000,000 imission Rate (453 nission Factor (HH nn Rate (453592 x n Factor (KK/E1) oncentration (228	/ Basis / Basis / Basis //-5 //-5 //-2/L)^-5. //-5. //-2/L)^-5. //-5.//-5.	0.988 0.988 (Molecular <sup>1</sup> 3B xCC) BB)/T] 45] E)	32.0 ; 28.2 ; Sum	6.60 22.03 28.86 1.00 1.02 0.00 0 0 0 3.01E-06 3.13E-03 0.00E+00 0.00E+00 0.00E+00 6.88E+03 0.000 #DIV/0! 6.88E-03	fps cfm scfm dscfm lb/hr lb/hr lb/hr ng/m <sup>3</sup> mg/hr mg/A-hr mg/A-hr mg/A-hr

Test No. <u>16-333</u>

-21-

Date(s): <u>11/16/2016</u>

APPENDICES

Test No. <u>16-333</u>

-22-

Date(s): <u>11/16/2016</u>

## APPENDIX A

Field Data

Test No. <u>16-333</u>

-23-

Date(s): 11/16/2016

			Sou	uth Coa	ast Air G	uality Ma	anagem	ent Dis	trict			<i>,</i> ·	
Te	est No.		Com	ipany:	Ana	PLAX			D	ate:	11/1	4/14	
Sa	ampling	Location:	Tank	95 y	13	(			S	ample T	rain:	-4	
					Traverse	Source	Test Da	ta					
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Pi	tot Tube	Leak Check:	Pass	/ Fail	vac		Pite	ot Tube	Leak Ch	eck:	Pass /	Fail	ao
			1 400	/ r can									
Time	Sample	Gas Meter	Sta	ck	(	Calculated		Probe	Filter	Imp.	Meter	Temp.	Vacuum
	Point #	Reading (dcf)	Velocity Head	Temp. °F	Velocity (fps)	Sampling Rate	Orifice △P	Temp.	Temp.	Temp.		F Out	i ig
		Start:	("H <sub>2</sub> O)		(	(cfm)	( "H <sub>2</sub> O)	Г	Г	Г	m		
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+40		836,1						86	83				
+45		\$43.15					6.7	86	83				13
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Compl	ing Prol	oo: Stainless	Steel / Bor	osilicato	/ Quartz		Stac	k Hori	zontal / Ve	ertical	Rect	angular	/ Circular

Sampling Probe: Stainless Steel / Borosilicate / Quartz

Test No. <u>16-333</u>

-24-

Date(s): <u>11/16/2016</u>

Τe	est No.	16-333	Com	pany:	Ana	plex	CORP.		D	ate:	11-1	6-16	>
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Time	Point	Gas Meter Reading (dcf)	Velocity	CK	Velocity	Sampling	Orifice	Temp	Temp	Temp.	° Nieter	F	" F
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	and the state	Marine State State State	and a state	and the	Sector Ast	Philos Philipping	MAN (MG/	2. Area to the		Sec. 14	(approxide)	and the	
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Therm Gas M	eter No.	N0711	(	Cal: 👖	-15-16	)			_			G	

-25-

Date(s): <u>11/16/2016</u>

Sampling Location:       Invite #I-3.3       Traverse Source Test Data         Pre-Test Leak Check:       Filter:	Те	st No.	16-335	Com	pany:	Ane	plex	COLL	ORATIO	N Da Sa	ate: ample T	//-/	6-16	
A. G. M. J. TAVE # 1-2.3 Pre-Test Leak Check: Filter:       Inaverse Source rest Data         Prote:	Sa	mpling	Location: /	HNK #	9-0	NIOMIC	ACIO	Toot Do	to			c		
Pre-Test Leak Check:       "Hg vac       Probe	AG	E ang	mx =1-23			Iraverse	Source	Port Da	et Test I	eak Che	ck.			
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Proble:       O       Chr (@)       Dig Vac       Proble       Proble:       Proble: <t< td=""><td>Fil</td><td>ter:</td><td> cfm @</td><td></td><td>Hg</td><td>vac</td><td></td><td>Dro</td><td>be ()</td><td>12180</td><td>fm @</td><td>15</td><td>"Ha</td><td>/ac</td></t<>	Fil	ter:	cfm @		Hg	vac		Dro	be ()	12180	fm @	15	"Ha	/ac
Pitot Tube Leak Check:         Pass (Pail         The result of the resul	Pr	obe:		12		vac		Pit	ot Tube	Leak Ch	eck:	Passy	ail	
Sample Point #         Gas Meter Reading (dc)         Stack         Calculated         Prob         Fitter temp.         Meter Temp.         Vecum           11:55 /r         StarG714.020         ("Ho)         F         (/P)         Sampling 0.0ft (eg)         Fmp.         // (P)         Sampling 0.0ft (eg)         Fmp.         // (P)         Sampling 0.0ft (eg)         Fmp.         // (P)	Pit	ot Tube	e Leak Check:	Pass	JFair			1 IU		Louit off	TANY	0		
Imme         Sample         Case Meter         State(h)         Velocity         Temp.			0.11.1	Ola	-		Calculated		Probe	Filter	tmp.	Meter	Temp.	Vacuum
#         Totaling (tot)         Head (tho)         TP         (tps)         Rate (cfm)         (tps)         Rate (tho)         (tps)         Rate (cfm)         Rate (cfm)         (tps) <td>Time</td> <td>Point</td> <td>Gas Meter Reading (dcf)</td> <td>Velocity</td> <td>Temp</td> <td>Velocity</td> <td>Sampling</td> <td>Orifice</td> <td>Temp.</td> <td>Temp.</td> <td>Temp.</td> <td>°I</td> <td>-</td> <td>″Hg</td>	Time	Point	Gas Meter Reading (dcf)	Velocity	Temp	Velocity	Sampling	Orifice	Temp.	Temp.	Temp.	°I	-	″Hg
(I.SS m       (Ho)		#	Startion	Head	°F	(fps)	Rate	ΔP	°F	Am Me	€ °F	In	Out	
11:55 m       0.40       516 205       92       80       15         110       980,320       0.91       516 205       92       82       15         120       985,660       0.80       516 205       92       82       15         150       940,935       0.75       516214       98       82       15         140       946,000       0.70       516214       98       83       15         150       1004,300       97       83       15       15         1004,300       97       97       83       15         13000       97       97       83       15         13000       97       97       83       15         13000       97       97       97       97       15         13000       97       97       97       15       15         13000       97       97       15       15       15       15         13000       97       10       10       10       10       10       10         13000       10       10       10       10       10       10       10       10         13000			914,020	( "H <sub>2</sub> O)			(cfm)	("H <sub>2</sub> O)		5-11-207	Cal	82	80	15
#10       980,320       0.41       510203 50       82       15         #20       985,660       0.80       516204 88       82       15         #30       910,835       0.73       516204 88       83       82       15         #30       910,835       0.73       516214 98       83       82       15         #40       910,835       0.70       516213 99       83       83       15         #50       #0.04,300       41.0       516224 90       87       83       15         #50       #0.04,300       41.0       516224 90       87       83       15         #50       #0.04,300       41.0       516224 90       87       83       15         #30.04       93       93       15       15       15       15       15         #30.04       93       15	11:551	n			10-1-11-11-11-11-11-11-11-11-11-11-11-11	The second states and		0.90	State of the	510000	- VL	82	80	15
+20       985,660       0.80       51621/98       83       82       75         +20       996,000       0.70       516213       89       83       15         +20       996,000       0.70       516213       89       83       15         +20       996,000       0.70       516213       89       83       15         +20       996,000       970       516222       90       87       83       15         +20       1015,180       4,0       516224       90       87       85       15         40       1015,180       4,0       516234       90       87       85       15         12004       93       93       15       15       15       15       15       15         12004       93       15       15       15       15       15       15       15         13004       93       15       15       15       15       15       15       15         13004       1015,180       1015,180       1015,180       1015,180       1015,180       1015,180       1015,180       1015,180       1015,180       1015,180       1015,180       1015,180       1	+10		980,320				Carl and the	0.91	and an area	510 203	80	QU	87	ie
130       990, 335       0.73       316219       30       33       15         140       910, 300       910, 300       910, 31621       90       35       35       15         150       1015, 180       910, 300       <	+20		985,660			ALC: CHARGE ST	11 190 199 199 199 19	0.80	201.1.2.3	516201	00	87	82	15
HY0       996,000       0.70       S1621       90       85       15         Hy004,300       4.0       516221       90       87       85       15         Hy004,300       4.0       516224       90       87       85       15         Hy004,300       4.0       516224       90       87       85       15         Hy004,300       93       93       15       15       15       15       15         Hy004,300       93       93       15 <td>+30</td> <td></td> <td>990,835</td> <td></td> <td></td> <td></td> <td></td> <td>0.75</td> <td>and the second</td> <td>516619</td> <td>CC</td> <td>80</td> <td>83</td> <td>15</td>	+30		990,835					0.75	and the second	516619	CC	80	83	15
1004,300     4.0     5/6221     0     87     85     15       1015,180     4.0     5/6224     90     87     85     15       1300     93     93     1     1     1     1       1300     5/6234     1     1     1     1       1300     1015,180     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       1300     1     1     1     1     1       <	+40		996,000				A CONTRACTOR	0.70		51621+	90	Ch.	84	15
40     1015;180     40     576226;70     87     85     75       13000     93     93     93     93     93     93     93       13000     5762284     93     1     1     1     1     1       13000     1000     1000     1000     1000     1000     1000     1000     1000       13000     1000     1000     1000     1000     1000     1000     1000     1000       13000     1000     1000     1000     1000     1000     1000     1000     1000       13000     1000     1000     1000     1000     1000     1000     1000     1000       13000     1000     1000     1000     1000     1000     1000     1000     1000       13000     1000     1000     1000     1000     1000     1000     1000       10000     1000     1000     1000     1000     1000     1000     1000       10000     10000     10000     10000     10000     10000     10000     10000       100000     100000     100000     100000     100000     100000     100000     100000       10000000     10000000     1	+50		1004,300		CAR AND	and the second second		4.0	And the second	516201	90	00	07	15
1300 m     93       1300 m     57/6284/       100 m     57/6284/       100 m     100 m       100 m	160		1015,180					4.0		516220	2 70	81	83	15
1300 m     92     1       1300 m     57/6284/     1       1     1     1       1     1		Sec. and			1.20		A CONTRACTOR			1222	00	1	a device of	Child Sector
No0 Ph     5/6284     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1       1     1     1	:3000									100 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	92	Contract Prov	Contraction (Contraction)	r and the ris
		- 17 JA	1. N. C. Margarette		9 11 19 19 19 19 19 19 19 19 19 19 19 19		$= \mathcal{I}_{0,n} \cap \mathcal{I}_{0}^{n} \cap \mathcal{I}_{0}^{n}$		1.1.1.1.1		1	1.	1.	- Phillippin in the
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Image: Net Vol. Uncorr.)         Avg.         Image: Net Vol. Uncorr.)         Avg.         Image: Net Vol. Uncorr.)         Image	1997				1.	and the second s								
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	(Net VO	i. oncon.)		] ,	L					22	UDITS Y	+.		"Ha vac
		D:		"			F	ecordeo	d By:	w	>			
Recorded By:	Nozzie	e Diame		25		"HaA	F	itot Fac	tor:					
Nozzle Diameter: " Recorded By:	Barom	netric Pi	essure:	5+13		ngA "	H_O .							
Nozzle Diameter: " Recorded By: Barometric Pressure: 28.75 " HgA Pitot Factor:	Static	Pressu	re in Stack:	+/-			1120				$\sim$		_/	
Nozzle Diameter:       "       Recorded By:       US         Barometric Pressure:       28.75       " HgA       Pitot Factor:         Static Pressure in Stack:       + / -       " HgA       " HgA			Calibration	Data				Î			N	<b>↑</b>		
Nozzle Diameter: " HgA Recorded By: Barometric Pressure: # HgA The HgA Static Pressure in Stack: + / " HgA The Hg	Incline	d Man	ometer		(Cal:	N/A	)	1	V			diam.		
Nozzle Diameter: " HgA Recorded By: Barometric Pressure: " HgA The diameter (Cal: N/A )	Magne	ehelic N	10		(Cal:		)						$\phi \mid s$	tack
Nozzle Diameter:       "       "       Recorded By:	Ditot T	Tubo No	NO		(Cal:		)					1	. D	imensions
Nozzle Diameter:       "       "       Recorded By:	Patan	tiomoto	r No 110211		(Cal:	11-15-16				/		diam.		
Nozzle Diameter:       "       "       Recorded By:       US         Barometric Pressure:       28.75       "HgA       "HgA       "HgA       "HgA         Static Pressure in Stack:       + / -       "HgA       "HgA       "HgA       "HgA         Inclined Manometer       (Cal:       N/A       )       (Cal:       )       (Cal:       )         Pitot Tube No.       (Cal:       )       (Cal:       )       (Cal:       )         Patentiometer No       (Cal:       (Cal:       )       (Cal:       )       (Cal:       )         Pitot Tube No.       (Cal:       (Cal:       )       (Cal:       )       (Cal:       )       (Cal:       )	Poten	lonete	0 No		(Cal:		j					<b>J</b>	$\Delta$	
Nozzle Diameter: " HgA Barometric Pressure: $2 \otimes .75$ " HgA Static Pressure in Stack: +/ " HgA Calibration Data Inclined Manometer (Cal: N/A ) Magnehelic No (Cal:) Pitot Tube No (Cal:) Potentiometer No. <u>N0311</u> (Cal: <u>(1-(5-(6))</u> )	Inerm	locoupi	e NU.		(Cal· I	1-15-16			-	-		(	G	
Nozzle Diameter: " HgA Barometric Pressure: $2 \times 3.75$ " HgA Static Pressure in Stack: +/ " HgA Calibration Data Inclined Manometer (Cal: N/A ) (Cal:) (Cal:		neter N	J. NUTT		(Gai.	1 10 18	/					(		
Nozzle Diameter: " HgA Barometric Pressure: $2 \cdot 8 \cdot 7 \cdot 5$ " HgA Static Pressure in Stack: +/ " HgA Calibration Data Inclined Manometer (Cal: N/A ) (Cal:	Gasi	0	actor 1	0075										

Test No. <u>16-333</u>

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Date(s): <u>11/16/2016</u>

## **APPENDIX B**

District Laboratory Data

Tes	t No. <u>16-333</u>		-27	7_	Date	(s): <u>11/16/2016</u>
				articiai a		
		SOUTH COAS SOURCE TE	T AIR QUALI ST REQUEST 1	TY MANAGEMENT I FOR EQUIPMENT/A	DISTRICT NALYSIS	
201 - <b>2</b> 01	Company1 Address Basic	BD Angles	< rol Device_	Source Test No Date	16-333	
	Source Test R For Complianc Other (Specif	equested by e, Rule(s) y)		Team 1	10	
	ALTERNATE COM	PANY*				
	New Company N Address Basic	ame		Sourc	ce Test No Dat	:e
	Source Test R For Complianc	equested by e, Rule(s) y) Phy(Any)	WagnE St	REDUÁCK	Теа	am No
	other (opeor	Paramo	unt Sat	-uvation		
	Quantity and	Description	SAMPLE EQUII	PMENT REQUEST Laboratory No. I.D. Nos.	1631506	
TS	3 Ke- Hex Chrony	E TRACK		Train No.	11,13,7	
- 0	/+	(CK0067		Rof: Blece Pages	118,120	>
			<u>.</u>			
	Source Test N Sample Descri	o ption	E EQUIPMENT	ANALYSIS REQU Laboratory No. Analysis Reques	sted	
Iq	Trains 7, 11, 13	· · · · · · · · · · · · · · · · · · ·		Hex + Torm C	nrome	f a 100 1
l	- 3 SAMPLE 1904 I-CHOMMTE	RINSE 77AC #43	7	Pex + IUVA CI	mone, such the	_ tension
1.	3 - Chromate An	sodibly TAK # 19	<u> </u>			
		SAMPI	LE EQUIPMENT	CHAIN OF CUST	ODY	
	Sample	Tracin	l To	For (S/T, Analysis, Cleanup,	Date	Time
ikanadé néwatan susa	Equipment #	John M Lunger	ar certo	ST.	11-15-16	1:20 7:20 An
		nuger	Harwood	(TAGKIL)		
	*Reason for t	esting at a d	lifferent co	mpany:		

Test No. 16-333

### -28-

Date(s): 11/16/2016

1631506

11/17/2016

16-333

Paramount

11/17/2016

Wayne Stredwick

#### SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT 21865 Copley Dr., Diamond Bar, CA 91765-4182

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#### MONITORING & ANALYSIS REPORT OF LABORATORY ANALYSIS

LABORATORY NO

SOURCE TEST NO

DATE RECEIVED

**PROJECT/ RULE** 

**REQUESTED BY** 

DATE ANALYZED

TO Mike Garibay, Supervising AQ Engineer Source Test Engineering

#### SAMPLE(S) DESCRIBED AS 3 Hex Chrome trains

5 Hex Chiome trains

SAMPLING LOCATION Anaplex 15547 Garfield Avenue Paramount, CA 90723

## ANALYTICAL WORK PERFORMED, METHOD OF ANALYSIS AND RESULTS Moisture and Hexavalent Chrome by CARB 425 (Sodium Bicarbonate solution)

$\setminus$	<b>TRAIN 7</b>	<b>TRAIN 11</b>	<b>TRAIN 13</b>
Moisture gain, g	10.4	16.4	82.8
Silica gel% expended	60	80-85	25
Filter gain, mg	<1	<1	<1
Recovery notes	No Probe	No Probe	No Probe
	Tube only	Tube only	Tube only
$Cr^{+6}$ total µg	7.46	19.21	3228

Cr<sup>+6</sup> blank ND

NOTE (1) Additional significant figures provided for calculation purposes.

REF STR-113-63

Date Approved:

11/28/16

Approved By:

Solomon Teffera, Acting Senior Manager Laboratory Services (909) 396-2391

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Date(s): 11/16/2016

### SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT 21865 Copley Dr., Diamond Bar, CA 91765-4182

## MONITORING & ANALYSIS REPORT OF LABORATORY ANALYSIS

Page 1 of 2

ТО	Mike Garibay	LABORATORY NO	1631506-11 to -13
	Supervising AQ Engineer		
	Source Testing	DATE RECEIVED	11/17/2016
SAMPLE	(S) DESCRIBED AS	FACILITY ID	16951
	(-)		
	Three chromate solutions	<b>REQUESTED BY</b>	Wayne Stredwick
		SOURCE TEST NO	16-333
SAMPLI	NG LOCATION		
	Anaplex	<b>PROJECT/ RULE</b>	R 1469
	15547 Garfield Ave		
	Paramount, CA 90723		

Analytical Work Performed, Method of Analysis and Results Chromic acid and Hexavalent Chromium by Sodium Thiosulfate Titration True surface tension (S) at deg C by EPA Method 306B, Fisher Model 20 Tensiometer

Lab No(s)	Sample Description	Temp	S	Cr <sup>+6</sup>	CrO <sub>3</sub>	CrO <sub>3</sub>
		С	dynes/cm	g/l	oz/gal	%
1631506-11	Sample 1 chromate rinse tank #43	24	70.3	2.7	0.7	0.5
1631506-12	Sample 2 chromate seal tank #22	24	70.2	16.9	4.4	3.15
1631506-13	Sample 3 chromate anodizing tank #19	24	23.8	48.6	12.8	8.70

Approved by

Date Aaron Katzenstein

Senior Manager Laboratory Services 909-396-2219

12/6/20/6

-30-

Date(s): 11/16/2016

### SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT 21865 Copley Dr., Diamond Bar, CA 91765-4182

### MONITORING & ANALYSIS REPORT OF LABORATORY ANALYSIS Page 2 of 2

SAMPLE(S) DESCRIBED AS

Three chromate solutions

LABORATORY NO 1631506

**REQUESTED BY** Wayne Stredwick

Chromic acid and Hexavalent Chromium by Sodium Thiosulfate Titration True surface tension (S) at deg C by EPA Method 306B, Fisher Model 20 Tensiometer

#### QUALITY CONTROL SUMMARY (SURFACE TENSION)

Reference Material	S measured	S theoretical	Percent of theoretical
Water at 24.0 °C	70.0	72.1	97%
Water at 23.6 °C	70.8	72.2	98%

			Percent of
<b>Reference Material</b>	S measured	S theoretical	theoretical
1,1,1-TCE at 24.0 °C	25.2	25.2	100%
1,1,1-TCE at 23.9 °C	25.2	25.2	100%

S=True ST	
Temp	
Date sample(s) received	11/17/2016
Date sample(s) analyzed for surface tension	11/18/2016
Date sample(s) analyzed for chromic acid	11/30/2016

Test No. <u>16-333</u>

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Date(s): <u>11/16/2016</u>

## **APPENDIX C**

Equipment Calibrations

Test No. <u>16-333</u>

-32-

Date(s): <u>11/16/2016</u>

Field   Ref. Tl Tempera	Meter Si nermomen ature So	TQC= ter # ource(;		HM O	8340	0	C: C:	alibra Alibra Ser B:	Dat tion B tion Pe niannua Imonthl Othe:	II-15- T.N.	
		Grongeners, - Scholauffreisensp	Lead	Wire		NATION DISTRICTS CONTRACTOR CONTRACTOR	Lead	Wirb	5		
Temp.*	A	<ul> <li>Andrew States and Antication and Anti- Anti-Anti-Anti-Anti-Anti-Anti-Anti-Anti-</li></ul>	B	(B-A	.)100		B	(B-A	.)100		
Sensor STQC#	Ref. Temp.	Ch#1	Ch#2	Ch#1	Ch#2	Ch#1	Ch#2	A Ch#1	** Ch#2	COMMENT	
Notes	5:210.	.211	312		***	312	212			an an a sa ana a a a a a a a a a a a a a	
10104	212	311	212			212	211			na na katalogo na katalogo Na tana katalogo na katalogo	
Noios Malau	716	710	712			71(	711				
10109	_10	<u>N.t</u>	112							0.0495.745183.0003.459.709767960494	
NOIDS	410	411	410	WE LOLD A JUNE	107-194 <i>0-1</i> 9-200-194	411	410				
N0104	410	411	410	Weekturer anderen		410	410				
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SOUTH COAST AIR QUALITY MANAGEMENT	DISTRICT
21865 Copley Drive, Diamond Bar, California	91765

Test No. <u>16-333</u>						-33	<b>i</b> -		Date(s): <u>11/16/201</u>
age 1				UC FL RT CFM	0.3179 0.3162 0.3164	0.5385 0.5397 0.5389	0.8041 0.7433 0.7431	1.0391 1.0391 1.0373	
μ.	r.Nguyen	TTLON		TIME Decimal	47.18 41.43 100.51	56.08 37.24 40.64	40.30 21.93 29.61	18.86 20.88 17.74	
				SEC	11.05 25.60 30.55	4.80 14.61 38.34	17.70 55.77 36.34	51.76 52.99 44.30	
DISTRICT	PORMED BY	TER ID		NIM SS	47 41 1 40	56 37 40	40 21 29	1820	
NAGEMENT	PERI	RY GAS MET		OTAL HI ubicF	15.0 13.1 31.8	30.2 20.1 21.9	32.4 16.3 22.0	19.6 21.7 18.4	
ралітт ма салівка		A		ER READ2 T bic F) c	200.0 213.2 245.2	302.7 322.9 345.0	385.5 417.2 439.4	482.8 504.7 523.7	
AST AIR C				MET READ1 ( in cu	185.0 200.1 213.4	272.5 302.8 323.1	353.1 400.9 417.4	463.2 483.0 505.3	
солтн со			7812470	Н20	1.2 1.2 1.2	2.8 2.8 2.8	5.6 5.6	დ. დ. დ.	
				PRESSURI	1.25 1.25 1.25	2.8 2.8 2.8	5.6 5.6	ი ი ი ი ი ი	
				H2O IN	1.2 1.2	2.8 2.8 2.8	5.6 5.6	ററ്റ്. പ്രം ന്ന്ന്	
	16 0 편	In.Hg	TER ID#:	TEMP	74 74 74	74 74 74	74 74 74	74 74 74	
	11-15-20 75	29.43	Y GAS ME'	TOTAL	15.0 13.1 31.8	30.2 20.1 21.9	32.4 16.3 22.0	19.6 21.7 18.4	
	DATE: AMBIENT AIR	PBAR:	STANDARD DR	TRIAL CFM	1 1/4 2 1/4 3 1/4	1 1/2 2 1/2 3 1/2	1 3/4 2 3/4 3 3/4	-1 K M	

est No. <u>16-333</u>			-34-						Date(s): <u>11/16/2016</u>		
م م م			UC FL RT CFM	0.3167 0.3156 0.3153	0.5295 0.5306 0.5399	0.7928 0.7397 0.7497	1.0513 1.0517 1.0253				
μ.	Nguyen		TIME Decimal	47.67 41.51 100.87	56.66 37.69 40.00	40.61 22.44 29.08	18.74 20.54 18.24	11-15-2016			
	г		SEC	40.33 30.55 51.96	39.60 41.43 0.29	36.79 26.55 4.80	44.35 32.25 14.36	ATE:			
T DISTRICT RKSHEET	ERFORMED BY:		HRS MIN	47 41 1 40	56 37 40	40 22 29	18 20	Α			
ANAGEMEN ATION WO	đ		CubicF ]	15.1 13.1 31.8	30.0 20.0 21.6	32.2 16.6 21.8	19.7 21.6 18.7				
ЛАLITY М САLIBR			SR READ2 ( ibic F)	606.2 619.4 651.4	708.5 728.6 750.3	790.6 822.3 844.2	887.8 909.6 928.5				
AIR Q AST AIR Q			METI READ1 ( in cu	591.1 606.3 619.6	678.5 708.6 728.7	758.4 805.7 822.4	868.1 888.0 909.8				
олтн сол			Н20	0.7 0.7	1.8 1.8	8.8.8. 8.8.8. 8.8.8.	6.2				
Ø			SSURE OUT	0.3 0.3 0.3	1.0 1.0 1.0	2.1 2.1 2.1	а.0 а.0 а.0				
		1110	H2O PRE IN	1.0 1.0	2.7 2.7	5.4 5.4 4.0	6.6 6.6				
	16	я 	TEMP	74 74 74	74 74 74	74 74 74	74 74 74				
	11-15-20	ER ID	TOTAL cubicF	15.1 13.1 31.8	30.0 20.0 21.6	32.2 16.6 21.8	19.7 21.6 18.7				
	DATE:	DRY GAS MET.	TRIAL CFM	1 1/4 2 1/4 3 1/4	1 1/2 2 1/2 3 1/2	1 3/4 2 3/4 3 3/4	 				

Т

Test No. <u>16</u>	<u>5-333</u>	<u>3</u>					-35	5-			Date(s): <u>11/16/2016</u>
									541) 541		×.
		016 n			Ч	ň				75	
	Page 3	11-15-2 T.Nguye			OVERAL	1.007				.00.T	
		: 7			AVE:	1.0045	1.0132	1.0080	1.0043		
		: ORMED B			EF	0051 0034 0050	0195 0195 0005	0188 0095 9958	.9966 .9961 .0201	CTOR:	
		DATE PERF			ted CC	е 8 8 8 8 8 8 9 9 9	95 1. 95 1. 95 1.	55 1. 51 1. 18 0.	24 0 29 0 71 1	TION F2	
4				N0713	Correct FlowRa	0.303 0.302 0.302	0.509	0.766	1.02 1.02 0.99	CORREC	
				 日	Н20	0.65 0.65 0.65	1.83 1.83 1.83	3.75 3.75 3.75	6.15 6.15 6.15		
				METER	TEMP	74 74 74	74 74 74	74 74 74	74 74 74		
				DRY GAS	U/C FlowRate	0.3167 0.3156 0.3153	0.5295 0.5306 0.5399	0.7928 0.7397 0.7497	1.0513 1.0517 1.0253		
										TTLON	
	ISTRICT		SN	470 0000	ected wRate	3054 3038 3040	5194 5206 5198	7809 7219 7217	0189 0189 1710	ID : 1 15-2016	
	IENT D.		JLATIO	7812 1.	O COLL	 	888	6 6 0 9	u u u u u u	METER 11-:	
	ANAGER		CALCI	;#: of	IP H2	2.1 4 2.1 4 2.1 4 2.1 4	47 47 24 24 24 24 24 24 24 24 24 24 24 24 24	74 5 74 5 74 5	74 9 74 9 74 9	Y GAS TE:	
	LITY M BRATIO		ICIENT	TER II cient	TEN	6 6 4	35 26 39 26		901 10 10	DA DA	
	LIR QUA		COEFF	GAS ME Coeffi	U/C FlowRé	0.31( 0.31( 0.31(	0.53	0.80 0.74	1.03 1.03 1.03		
	OAST A METER		METEF	ND DRY With	CFM	1/4 1/4 1/4	1/2 1/2 1/2	3/4 3/4 3/4	<b>ччч</b>		
	SOUTH C DRY GAS		DRY GAS	STANDAF	TRIAL	н 0 м	ЧИМ	н 0 м	M N M		

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