APPENDIX C
SUMMARY OF RULE AND PERMIT VIOLATIONS AND RESOLUTIONS

Table C-1 summarizes Quemetco's rule and permit violation notifications for the past decade, and describes actions taken to remedy each violation. The table also identifies the formal resolution date of the violation. The table includes notices of violations issued by South Coast AQMD, DTSC, Cal-OSHA, Los Angeles County Fire Department, Los Angeles County Sanitation District, and the Los Angeles Regional Water Quality Control Board. Violations are typically addressed through discussions with the agency issuing the notice of violation, and, where appropriate, the implementation of corrective measures to address the alleged violation.

Notably, the vast majority of violations are addressed and remedied immediately, at the time of inspection, or shortly thereafter. The formal resolution date identified in the table below indicates when the matter is administratively closed, not when the remedy was actually implemented, which can predate the formal resolution date substantially.

Table C-1 Summary of Rule and Permit Violations and Remedial Actions Taken

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
South Coast AQMD			
2/23/2012	Notice of Violation (NOV) No. P49163: (1) Failed to reconcile quarterly NOx emissions in the third and fourth quarters. (2) NOx emissions from the beginning of the 2010 compliance year through the end of the last quarter exceeded the annual NOx emissions allocation in effect at the end of the reconciliation periods for those quarters.	(1) The Facility immediately addressed applicable recordkeeping requirements to return to compliance with South Coast AQMD Rule 2004 and coordinated a resolution with South Coast AQMD RECLAIM Compliance. (2) Facility purchased RECLAIM Trading Credits in 2013 to cover the shortfall in allocation.	8/29/2013
5/16/2014	NOV No. P61067: (1) Failed to operate all equipment at a Title V facility in compliance with all terms, requirements and conditions specified in the Title V permit. (2) Failure to timely notify of an unplanned shutdown of the Wet Electrostatic Precipitator system (WESP).	(1) The facility immediately corrected the issue, and no excess emissions and no violation of permit emissions limits resulted from the unplanned shutdown, as confirmed by fenceline monitoring data. (2) The facility enhanced its existing notification procedures, to ensure that employees with notification responsibilities report momentary shutdowns immediately and in compliance with District rules. These enhanced procedures are still in place at the Facility.	9/13/2017
7/31/2014	NOV No. P49173: Discharging arsenic emissions into the atmosphere that exceeded 10.0 nanograms per cubic	The Facility investigated the cause of this exceedance incident and determined that it resulted from trucks entering the Facility. The	9/13/2017

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
	meter averaged over a 24-hr time period at fenceline monitoring station #1. This violation resulted in curtailment.	Facility obtained a Compliance Plan that required implementation of new rules on trucks entering the facility to avoid such future exceedances. The Compliance Plan is still in place at the Facility.	
11/5/2014	NOV No. P61071: Failed to operate all equipment at a Title V facility in compliance with all terms, requirements and conditions specified in the Title V permit. This violation related to shutdown of the Wet Electrostatic Precipitator system (WESP).	The Facility addressed the violation and implemented enhanced procedures including additional training and education for employees and outside vendors. The Facility was returned to compliance with South Coast AQMD Rule 3002. These measures are still in place at the Facility.	9/13/2017
6/12/2015	NOV No. P61079: Violation of benzene hourly limit based on source test #15-323 conducted by South Coast AQMD on 3/25/15.	The facility conducted a compliant source test.	4/19/2018
6/12/2015	NOV No. P61080: Violation of benzene hourly limit based on source test #15-325 conducted by South Coast AQMD on 5/6/15 and 5/7/15.	The facility conducted a compliant source test.	4/19/2018
6/12/2015	NOV No. P61081: Violation of benzene hourly limit based on source test #15-325 conducted by South Coast AQMD on 5/12/15.	The facility conducted a compliant source test.	4/19/2018
9/18/2015	NOV No. P52406: Failure to obtain a Title V permit revision prior to constructing/modifying Regenerative Thermal Oxidizer (RTO) C161 by adding a puff chamber.	The Facility submitted the permit revision application and subsequently was issued the revised permit for the RTO.	9/13/2017
12/10/2015	NOV No. P64402: Operating a fuel meter for RECLAIM NOx large source D165 that was not non-resettable and tamper proof.	Quemetco contacted the fuel meter's manufacturer to ensure the meter's settings were properly configured, to prevent future resets, and to ensure compliance with requirements for non-resettable and tamper proof metering. With manufacturer input, the Facility addressed the violation and returned to compliance with South Coast AQMD Rule 2012. This remedy is still in place at the Facility.	9/13/2017
7/14/2017	NOV No. P52418: (1) Failure to timely notify of an unplanned shutdown of an emission control device designed to maintain negative pressure. (2) Discharging ambient air concentrations of lead and arsenic in	(1) and (2) The Facility confirmed that the violation did not occur as a result of backup power systems failing to activate. To address potential for human error, the Facility implemented enhanced employee training and operational protocols for such events. The Facility submitted and obtained a Compliance Plan to require implementation of enhanced procedures to further mitigate fugitive lead	9/13/2017

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
	excess of limit at fenceline monitoring station #2. This violation resulted in curtailment in Facility activities.	dust in order to remedy future incidents from occurring. Enhanced training and education, as well as the Compliance Plan, are still in place at the Facility.	
2/8/2018	NOV No. P52420: Discharging arsenic emissions into the atmosphere that exceeded 10 nanograms per cubic meter averaged over a 24-hr time period at fenceline monitoring station #1. This violation resulted in curtailment of Facility activities.	The Facility investigated the cause of this exceedance, and obtained an approved Compliance Plan which required implementation of enhanced procedures to avoid such future exceedances. The Compliance Plan is still in place at the Facility.	4/30/2020
6/13/2018	NOV No. P64422: Facility submitted an inaccurate Quarterly Certification of Emissions Report for the 1st quarter of compliance year 2017 for Major Source and total SOx emissions. The report was inaccurate for major source sulfur oxides (SOx) emissions and for total SOx emissions.	Facility addressed recordkeeping requirements which caused the over-reporting of SOx emissions.	4/30/2020
7/27/2018	NOV No. P67052: (1) Failure to maintain continuous negative pressure for enclosures. (2) Failure to maintain continuous operation of enclosure digital differential pressure monitoring systems. (3) Exceeding 1,3-butadiene lbs/hr limit during November 2017 source testing.	(1) and (2) The Facility investigated the cause of these incidents and determined that each were the result of an electrical power failure, and that there was no malfunction in any Facility process or pollution control device. To protect against future power failures, the Facility established the position of Incident Commander for implementation of the Power Loss-Interruption Response Procedure and gave the Incident Commander the highest rank on site. The Incident Commander was assigned the role of initiating the response actions, coordinating and providing support and resources as necessary, confirming completion of checklists performed by Departments, and helping to determine the cause of the power loss/interruption if feasible. The Facility also assigned the Air Quality Department the responsibility of verifying the continuous operation of Busch Units I, F, and J, which are critical for maintaining negative pressure. The Air Quality Department is required to report back to the Incident Commander once the continuous operation of Busch Units I, F, and J is confirmed. The Facility also assigned Department Managers the responsibility for verifying that all building doors in their area are closed. The Facility also assigned the Electrician(s) on duty responsibility for verifying that negative pressure monitors are in continuous operation, that all fenceline ambient monitors are in	4/30/2020

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
		operation, and that the switch to backup power supply was successful. (3) To address the NOV's alleged 1,3-butadiene hourly limit exceedance Quemetco undertook maintenance work on a partially blocked duct between the kiln and the baghouse, in coordination with District staff and consistent with Rule 1420.1 procedures. Recent source testing confirms that the facility was in compliance with Rule 1420.1's emission limits after this maintenance.	
10/17/2018	NOV No. P67053: (1) Exceeding 0.00342 pounds of 1.3-butadiene per hour from the WESP stack (S159S)- testing date 6/18/18. (2) Failure to submit report for source testing conducted pursuant to Rule 1420.1, subdivision (k), to the South Coast AQMD in 90 days or less after completion of testing.	(1) The Facility conducted a subsequent compliant source test to return to compliance with South Coast AQMD Rules 1420.1 and 3002. (2) Training was completed and a task was added to compliance calendar to address the untimely submittal of the report and to prevent future untimely submittals from occurring.	4/30/2020
4/25/2019	NOV No. P67054: (1) Fenceline exceedances of arsenic and lead at fenceline monitoring station #4. (2) Failure to perform all maintenance activities that could generate lead dust in a manner that minimizes emissions of fugitive dust. This violation resulted in curtailment of Facility activities.	(1) and (2) Facility investigated the cause of this exceedance incident, and obtained a Compliance Plan that required implementation of enhanced procedures to avoid contractor mobile maintenance activities from causing such future exceedances. As a remedy, the facility implemented enhanced operational procedures to address future power failures. These include: requiring direct supervision and constant oversight of contractor maintenance personnel; requiring all contractors to have a Facility escort upon entering the Facility; and requiring all contractor vehicles to have an identifying sign/placard indicating their affiliation. These procedures are still in place at the Facility.	4/30/2020
7/23/2020	NOV No. P67058: (1) Failure to continuously maintain total enclosure at a negative pressure of at least 0.02mm of Hg. (2) Failure to ventilate the total enclosure continuously to ensure negative pressure values of at least 0.013mm of Hg.	(1), (2) and (3) The Facility investigated the cause of this incident, and implemented enhanced procedures, including closing all battery wrecker enclosure doors when there is an unplanned shutdown of (or power interruption to) the WESP, until such time as visual verification that the battery wrecker Busch Units are operating properly can be made. These procedures are still in place at the Facility.	Pending

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
	(3) Failure to operate equipment at a Title V facility in compliance with permit conditions.		
Department of Toxic Substances Control (DTSC)			
2011 Financial Records Review	Inspection resulted in two minor and two Class II violations concerning financial responsibility requirements, including closure costs funding and letter of credit requirements.	The Facility addressed the financial responsibility requirements to return to compliance.	10/11/2012
2013 Compliance Evaluation Inspection (CEI)	Inspection resulted in the following alleged violations: (1) Failure to properly document repair work in inspection logs. (2) Failure to conduct required tank inspections.	(1) The Facility addressed on the same day of DTSC's inspection. (2) The Facility implemented procedures to ensure all required inspections were conducted. These procedures are still in place at the Facility.	7/27/2013
2014 CEI	Inspection resulted in the following alleged violations: (1) Exceedance of storage time limits for waste to be shipped offsite. (2) Failure to develop schedule for inspecting emergency notification equipment. (3) Failure to develop and follow a written schedule for assessing tank conditions.	(1) The Facility implemented procedures to ensure compliance with storage time limit requirements. These procedures are still in place at the Facility today. (2) The Facility developed a written schedule for emergency notification inspections within ten days of DTSC's inspection. This schedule is still in place at the Facility today. (3) The Facility developed and implemented a written schedule for tank assessments within 30 days of DTSC's inspection. This schedule is still in place at the Facility today.	8/14/2014
2015 CEI	Inspection resulted in the following alleged violations: (1) Failure to properly document/record waste manifest entries. (2) Failure to properly record staff observations in inspection records. (3) Failure to design and operate a secondary containment system free of cracks or gaps, noting cracks in the battery storage area. (4) Failure to properly establish procedures for inspection of interior of tanks.	(1) The Facility corrected the manifest entries and conducted refresher training for all shipping and receiving personnel at the Facility. (2) The Facility corrected deficiencies to ensure recording of staff observations and corrective actions. (3) The Facility sealed all visible cracks and implemented procedures to continually monitor area. (4) The Facility developed and implemented new procedures to utilize when assessing storage tanks. These procedures are still in place at the Facility today.	6/10/2015

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
	(5) Failure to follow procedures to minimize the accumulation of liquid on the primary barrier of the containment building. (6) Failure to take proper steps to repair the containment building's primary barrier.	(5) The Facility developed and implemented various measures to minimize liquid accumulation, including the application of fresh concrete to the flooring as well as ensuring that operations minimize any liquid accumulation by focusing on removing such buildup. (6) The Facility demonstrated that the barrier was properly designed and constructed.	
2015 Groundwater Monitoring Evaluation	Inspection resulted in the following alleged violations: (1) Failure to maintain the integrity of the monitoring well bore hole. (2) Failure to include and implement consistent sampling and analytical procedures designed to ensure monitoring results. (3) Failure to include an accurate determination of the groundwater surface elevation at each well. (4) Failure to prevent the downward entry of water into the closed landfill, failed to maintain the integrity and effectiveness of the final cover, and to prevent run-on and run-off from eroding or otherwise damaging the final cover. (5) Failure to implement a groundwater detection monitoring program for the former raw materials storage area. (6) Failure to implement a groundwater detection monitoring program for the closed surface impoundment. (7) Failure to implement a groundwater detection monitoring program (non-unit specific). (8) Failure to implement a groundwater evaluation monitoring program for the former raw materials storage area. (9) Failure to implement a groundwater evaluation	Prior to issuance of the alleged violations, the Facility had submitted requisite monitoring plans to DTSC and engaged in discussions with DTSC staff regarding development and implementation of required monitoring plans to address most of the alleged violations. Since DTSC's issuance of the NOVs, the Facility has cooperated and engaged with DTSC to address its compliance with the alleged violations. All alleged violations have been addressed through the implementation of corrective action, or the Facility has submitted a plan for the implementation of such corrective action (e.g., revised modified monitoring plans, etc.) to DTSC for approval of the same.	Pending

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
	monitoring program for the closed surface impoundment. (10) Failure to establish a surface water monitoring program. (11) Failure to establish an unsaturated zone monitoring program. (12) Failure to notify the department of the inadequacy of the groundwater detection monitoring program and apply for permit modification. (13) Failure to notify the department of inadequacy of the groundwater evaluation monitoring program. (14) Failure to maintain monitoring well borehole. (15) Failure to adequately maintain groundwater monitoring wells to enable collection of representative samples. (16) Failure to collect the data necessary to conduct appropriate statistical analyses for surface water and unsaturated zone monitoring.		
2016 CEI	Inspection resulted in the following alleged violations: (1) Failure to repair a condition that could potentially lead to a release in the containment building. (2) Failure to include a secondary containment system with a functioning leak detection system in containment building. (3) Failure to maintain stored hazardous waste piles at a proper height within containment building. (4) Violations pertaining to containment building's enclosure system. (5) Failure to document observations and repairs to plastic storage area in inspection records.	Since DTSC's issuance of the NOVs, the Facility has cooperated and engaged with DTSC to address its compliance with the alleged violations. With the exception of item #2 (containment building leak detection system), all alleged violations have been addressed through the implementation of corrective action (or otherwise). In response to item #2, the Facility has submitted a plan for the installation of a modified containment building leak detection system as part of Quemetco's on-going RCRA permit renewal application. DTSC's evaluation of the same is on-going as part of the permit renewal process.	1) Pending 2) Pending 3) 10/18/2016 4) 10/18/2016 5) 12/28/2016 6) 12/28/2016 7) 9/29/2016 8) 9/14/2016 9) 6/9/2016

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
	(6) Failure to repair observed deterioration in plastic trailer storage area concrete. (7) Improper signing and dating of transporter waste manifests. (8) Failure to properly estimate remaining service life of its tank system. (9) Failure to update documentation to include DTSC's updated emergency number.		
2017 CEI	Inspection resulted in violation alleging a failure to include a secondary containment system with a functioning leak detection system in containment building.	In response to this NOV, the Facility has submitted a plan for the installation of a modified containment building leak detection system as part of Quemetco's on-going RCRA permit renewal application. DTSC's evaluation of the same is on-going as part of the permit renewal process.	Pending
2018 CEI	Inspection resulted in the following alleged violations: (1) Failure to include a secondary containment system with a functioning leak detection system in containment building. (2) Failure to maintain primary barrier in the containment building. (3) Failure to comply with regulatory notice requirements for investigation work.	(1) The Facility has submitted a plan for the installation of a modified containment building leak detection system as part of Quemetco's on-going RCRA permit renewal application. DTSC's evaluation of the same is on-going as part of the permit renewal process. (2) and (3) The Facility has cooperated and engaged with DTSC to address its compliance with the alleged violations. Primary barrier and regulatory notice issues have been addressed through the implementation of corrective action prohibiting hazardous waste from being located in the area where investigatory work was performed in compliance with the law.	Pending
2020 Financial Records Review	Failure to properly complete certificate of insurance information.	The Facility addressed deficiencies in insurance documentation.	8/24/2020
Cal-OSHA			
2/28/2018	Cal-OSHA issued one regulatory violation, two general violations and one Serious violation for alleged issues	Following settlement discussions, the Serious violation and one general violation were vacated. The remaining alleged violations	1/21/2020

Issue Date of Notice of Violation	Description of Violation(s)	Actions Taken to Remedy the Violation	Formal Resolution Date
	related to an employee injury that occurred on September 15, 2017, while the employee was performing routine maintenance activities.	pertained to requirements for the timing of injury-reporting and periodic inspection of procedures. The Facility cooperated with Cal-OSHA to address the alleged violations and to ensure compliance with applicable requirements.	
3/27/2020	Cal-OSHA alleged two general violations, alleging that the Facility failed to: (1) Properly notify employees of lead exposure. (2) Provide proper respirator for level of lead in air.	The Facility cooperated with Cal-OSHA to address the alleged violations and to ensure compliance with applicable requirements. The Facility modified employee notification procedures to include ongoing corrective actions to lower exposure levels. The Facility also reviewed ongoing employee monitoring data, and ensured respirators are provided to provide proper employee protection.	10/5/2020
Los Angeles County Fire Department (LACFD)			
7/13/2018	Failure to: (1) Conduct a hazardous waste tank assessment for a portable used oil tank at the facility. (2) Update recyclable materials report. (3) Submit required payment for Aboveground Petroleum Storage Act (APSA) fees. (4) Submit required information for APSA business plan.	The Facility completed required assessment and addressed administrative issues to return to compliance.	11/13/2018; 9/18/2019
1/23/2019	Minor violation for failure to accurately report all hazardous material inventories.	The Facility updated inventories to return to compliance.	2/19/2019
Los Angeles County Sanitation District (LACSD)			
2/28/2018	Exceedance of November 2017 monthly average limit for Lead as reported on the fourth quarter 2017 Self-Monitoring Report.	The Facility determined that erroneous data had been mistakenly submitted, resulting in alleged exceedance. Facility submitted corrected data/report to return to compliance.	3/5/2018
Los Angeles Regional Water Quality Control Board (LARWQCB)			
1/1/2012	Failure to pay 7/1/2011 to 6/30/2012 required annual fees.	The Facility investigated and addressed fee payment discrepancy to return to compliance.	1/18/2012

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APPENDIX D.1

TECHNICAL AIR QUALITY METHODS AND EMISSIONS ASSUMPTIONS

Introduction

The following sections present the detailed assumptions and methods that were used to calculate the baseline air emissions and the proposed Project's potential air emissions. It also provides additional details on modeling protocols and analysis assumptions used in the Ambient Air Quality Analysis (AAQA) and Health Risk Assessment (HRA). Refer to Section 4.2: Air Quality and GHG Emissions in Chapter 4 - Environmental Impacts Analysis, for summarized results of the air emissions calculations, AAQA, and HRA.

Air Emissions Calculation Methodology

The EIR evaluated whether the proposed Project has the potential to significantly impact ambient air quality by exceeding the South Coast AQMD thresholds of significance for criteria pollutants and GHGs (Refer to Section 4.2). The proposed Project would only cause operational emissions as the proposed Project does not call for any construction. This technical appendix summarizes the methods and assumptions that were used to estimate mobile and stationary sources of emissions for the baseline and proposed Project's potential operations.

Mobile Source Emissions Assessment

The proposed Project's mobile sources would include trucks, locomotives, and passenger vehicles. The mobile source emission calculations for criteria pollutants and GHGs for both the baseline and proposed Project conditions used the calendar year 2019 fleet emission factors (EFs) from CARB's EMFAC2017 model (CARB, 2020).

EMFAC2017 fleet EFs represent an aggregation of model years. Year 2019 EFs constitute the most conservative project operations year at the time of initial EIR preparation in calendar year 2018; utilizing EFs from a later year would only result in lower emissions.

Criteria pollutant EFs for the calendar year 2014 fleet were not used for baseline criteria pollutant emissions. Year 2014 fleet EFs would be higher than year 2019 EFs reflecting an older and less efficient vehicle fleet. Thus, use of the year 2014 EFs for the baseline condition would result in higher baseline emissions and, ultimately, negative net emissions. Instead, year 2019 fleet EFs were applied when estimating both year 2014 baseline emissions and proposed Project emissions (year 2019). This approach resulted in a greater, more conservative difference between baseline emissions and the proposed Project's emissions.

Similarly, EMFAC2017 GHG EFs for calendar year 2014 were not used to estimate baseline GHG emissions. Year 2019 EFs conservatively represent both year 2014 baseline and the proposed Project's potential GHG emissions.

The following mobile sources were included in the EIR's analysis of criteria pollutants and GHG analysis:

Trucks

As mentioned above, CARB's EMFAC2017 model provides truck travel EFs (CARB, 2020). The emission calculations reflect the following assumptions in the EMFAC2017 model for both the baseline (year 2014) and the proposed Project (year 2019):

- Region – South Coast AQMD;
- Calendar Year – 2019;
- Season – Annual;
- Vehicle Class – T7;
- Fuel – Diesel; and
- Speed – Aggregate.

The chosen T7 CA International Registration Plan (CAIRP) truck vehicle class represents a typical heavy-duty diesel truck licensed to operate for long periods of time.

Outputs from the EMFAC2017 program helped to quantify criteria pollutant and GHG emissions from daily diesel trucks, and included the following assumptions:

- 1,615 trucks per month in the 2014 baseline year and 2,030 trucks per month in the 2019 proposed Project year (i.e., an increase of 415 delivery trucks per month) (Table 2-1, Chapter 2 - Proposed Project);
- 2 one-way trips per truck;
- Trip distance for baseline and proposed Project emissions from EMFAC2017 for 2014 and 2019 as the off-site truck travel distance;
- 15 minutes of total onsite idling per truck occurring in three 5-minute increments at the facility entrance, unload area, and exit; and
- Maximum hourly increase of no more than 1 truck and, therefore, 2 trips.

The average number of vehicles at the facility per day and per year were calculated based on the number of trucks per month in the baseline and proposed Project conditions and a maximum operating schedule of 12 months per year and 365 days per year, leading to a conservative emissions estimate.[1] The number of trips per day and per year was quantified by multiplying the number of vehicles in these operating periods by the number of trips per vehicle (each vehicle makes two one-way trips). Table D.1-1 summarizes the truck input parameters and numeric assumptions that were used for criteria pollutant and GHG emission calculations.

Table D.1-1 Truck Logistic Parameters: Baseline & Proposed Project

Basis	Roundtrip Truck Trips (per day)	One-way Truck Trips (per day)	Total One-way Trip Length (miles/trip)	Idle Time (hr-idle/day)
2014 Baseline	53.10	106.19	13.69	0.25
Post-Project	66.74	133.48	12.86	0.25

The EMFAC2017 run produced a truck travel EF and an idling EF (in units of grams per mile and converted into pounds per mile) for all criteria pollutants and GHGs based on the calendar year

[1] This represents a conservative estimation as Quemetco, or any other secondary lead smelter, does not operate 365 days per year due to the occurrence of events like rebuilds, mechanical breakdowns, etc.

2019 fleet, as summarized in Table D.1-2. As previously noted, year 2019 fleet EFs were conservatively applied to estimate both year 2014 baseline and proposed Project emissions.

Table D.1-2 Truck Travel and Idling Emission Factors

Pollutant	ROG	NOx	CO	SOx	PM10	PM2.5	CO2	CH4	N2O
Emission Factor – Travel (lbs/mile)[a]	1.85E-04	7.47E-03	8.21E-04	2.89E-05	1.08E-04	1.03E-04	3.06E+00	8.61E-06	4.81E-04
Emission Factor – Idle (lbs/vehicle/hr-idle)[a]	9.89E-04	1.23E-02	1.18E-02	2.26E-05	2.94E-05	2.81E-05	2.39E+00	4.59E-05	3.75E-04

a Emission factors from EMFAC2017 model for calendar year 2019, converted from grams to pounds (CARB, 2020).

Truck travel EFs (in units of pounds per mile) were multiplied by the trip distance and number of trips to calculate the daily and annual criteria pollutant emissions from the baseline and the proposed Project's truck travel. Truck idling EFs were multiplied by the idling time per day, number of operating days (1 for daily or 365 for annual), and the number of trucks to calculate the daily and annual emissions for the baseline and from the proposed Project's potential truck idling.

Global warming potentials (GWPs) of 1, 25, and 298 for CO2, CH4, and N2O, respectively, were applied to the CO2, CH4, and N2O emissions to calculate the CO2e emissions (South Coast AQMD, 2017). For annual emissions, criteria pollutants were expressed in units of short tons per year while GHG emissions were expressed in units of metric tons per year consistent with the applicable thresholds.

Daily and annual truck emissions for truck travel and idling were combined to determine total daily or annual emissions.

Emission increases, calculated as the difference between the proposed Project's potential emissions and the baseline year emissions, were quantified for trucks on a daily and annual basis.

Locomotives

Locomotive EFs were calculated using Section 5 of *U.S. EPA's Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories* (U.S. EPA, 2009). Assumptions necessary to calculate the locomotive EFs included:

- SOx, PM_{10}, and $PM_{2.5}$ EFs are based on fuel with a 15 ppm sulfur content per 40 CFR 1033.901;
- 2014 EFs were used for 2014 baseline values; and
- 2015 EFs were used for post-Project values. These represent the most recent EFs available in the above referenced document and serve as a conservative representation of more recent, cleaner locomotive emissions.

Table D.1-3 summarizes the locomotive emission factors.

Table D.1-3 Locomotive Emission Factors

Pollutant		ROG	NOx	CO	SOx	PM10	PM2.5	CO2	CH4	N2O
Switch[a]	2014 Baseline & Post-Project	0.08	1.00	1.83	0.005	0.015	0.015	483.00	0.013	0.04
Onsite Line-Haul[a]	2014 Baseline	0.25	6.54	1.28	0.005	0.10	0.097	483.00	0.013	0.04
	Post-Project	0.24	6.41	1.28	0.005	0.10	0.097	483.00	0.013	0.04
Off-Site Line-Haul[a]	2014 Baseline	5.21	136.25	26.67	0.095	2.08	2.02	10,062.5	0.27	0.83
	Post-Project	5.00	133.54	26.67	0.095	2.08	2.02	10,062.5	0.27	0.83

a Source: U.S. EPA, 2009

Table D.1-4 presents the applicable locomotive emissions assumptions. These assumptions were primarily derived from Section 5 of *U.S. EPA's Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories* (U.S. EPA, 2009) unless otherwise noted.

Table D.1-4 Locomotive Emission Calculation Assumptions

Parameter[a]	2014 Baseline	Proposed Project
Average In-Use Switch Power (bhp)	2,000	2,000
Trains Per Year	62	78
Train cars/Railcars Per Train	2	2
Train cars/Railcars Per Year[b]	124	155
Switching Time Per Year (hrs)	0.9	1.2
Time Per Switching Event (hrs)	0.75	0.75
Switching Events	1.2	1.6
Switching Percentage	2%	2%
Non-Switching Time Per Year (hrs)	31	39
Time Per Train (hrs)	0.50	0.50
Total Onsite Time Per Year (hrs)	32	40
Onsite Line-Haul Rail Activity (hp-hrs)	34,720	43,400
Average Load Factor	28%	28%
Average Locomotive Horsepower	4,000	4,000
Onsite Fuel Consumption (gallons)	1,736	2,170
Fuel Consumption Rate Factor (bhp-hr/gal)[c]	20	20
Off-Site Fuel Consumption (gallons)	4,791	5,988
Fuel Consumption Index (revenue ton-miles/gal)	400	400
Empty Ratio	100%	100%
Rail Traffic Density (revenue ton-miles)	958,125	1,197,656
Total Tonnage (tons)	7,665	9,581

Parameter[a]	2014 Baseline	Proposed Project
Distance to Region Boundary (miles)[d]	125	125

a Methodology and most inputs from Section 5 of *U.S. EPA's Current Methodologies in Preparing Mobile Source Port-Related Emissions Inventories* (U.S. EPA, 2009). Additional sources as discussed in footnotes b) through d) below.
b Quemetco provided the baseline and projected number of railcars, which were factored based on existing truck to railcar shipment ratio.
c Attachment 4 of CARB's *Proposed Method For Estimating Fuel Consumption of a New Locomotive* provides the fuel consumption rate factor of 20 bhp-hr/gal (CARB, 2010).
d Averaging the two longest rail routes from Quemetco's facility to the South Coast AQMD boundary estimates the distance to region boundary value as 125 miles.

Using the EFs in Table D.1-3 and assumptions in Table D.1-4, daily and annual locomotive criteria pollutant and GHG emissions from 2014 baseline year and the proposed Project were quantified. Locomotive emissions result from three (3) rail activities: switch, onsite line-haul and off-site line-haul.

Daily switch emissions were calculated by multiplying the average in-use switch power (in units of brake horse power), the number of switching locomotive hours (in units of hours per year), and the applicable switch EF (in units of gram/bhp-hour) from Table D.1-3. The result was then converted from grams to pounds and divided by a maximum operating schedule of 365 days per year.

Daily onsite line-haul emissions were calculated by multiplying the onsite line-haul rail activity (in units of bhp-hours per year) and the applicable onsite line-haul EF (in units of gram/bhp-hour) from Table D.1-3. The result was then converted from grams to pounds and divided by a maximum operating schedule of 365 days per year.

Daily off-site line-haul emissions were calculated by multiplying the fuel consumptions (in gallons) and the applicable off-site line-haul EF (in units of grams per gallon) from Table D.1-3. The result was then converted from grams to pounds and divided by a maximum operating schedule of 365 days per year.

The sum of the daily switch, onsite line-haul and off-site line-haul emissions provided the total daily emissions. Annual locomotive emissions reflect the total daily emissions multiplied by the maximum operating schedule of 365 days per year. GWPs of 1, 25, and 298 for CO2, CH4, and N2O, respectively, were applied to the CO2, CH4, and N2O emissions to calculate the CO2e emissions (South Coast AQMD, 2017). Criteria pollutants were expressed in units of short tons per year while GHG emissions were expressed in units of metric tons per year.

The difference between the proposed Project and baseline year emissions on a daily and annual basis represent the proposed Project's potential incremental emission increase from locomotives.

Passenger Vehicles

The EMFAC2017 program provides passenger vehicle EFs. The emission calculations reflect the following assumptions in the EMFAC2017 model for both the baseline (year 2014) and proposed Project (year 2019):

- Region – South Coast AQMD;
- Calendar Year – 2019;
- Season – Annual;

- Vehicle Class – LDA, LDT1, LDT2, LHD1, LHD2;[2]
- Fuel – Gasoline and diesel; and
- Speed – Aggregated.

Passenger vehicles in this analysis include vehicle classes of passenger cars, light-duty trucks, and light-heavy-duty trucks. The inclusion of these trucks resulted in a conservative estimate of passenger vehicle emissions. Utilizing the same logic as the truck emission calculation methodology, passenger vehicle emissions for both year 2014 baseline and proposed Project used year 2019 emissions factors; this approach resulted in a greater difference between baseline emissions and the proposed Project's emissions and therefore resulted in the most conservative analysis of the proposed Project's potential impacts.

Additional assumptions that were necessary to calculate the passenger vehicle EFs include:

- Increase of 6 employees from 244 employees in baseline year 2014 to 250 employees in proposed Project year 2019;
- Trip distance for baseline and proposed Project conditions were equivalent to the average of number of trips divided by vehicle miles traveled by vehicle class and fuel type from the EMFAC2017 calendar year 2014 and 2019, respectively; and
- Max hourly increase includes all 6 new employees either arriving or departing in the same hour.

Assuming 244 and 250 passenger vehicles per day for baseline year 2014 and proposed Project year, respectively, the number of trips per day was calculated by multiplying the number of vehicles per day by two, assuming each vehicle makes two one-way trips. Table D.1-5 summarizes these passenger vehicle input parameters and numeric assumptions that were used for all criteria pollutant and GHG emission calculations. Multiplying the daily values in Table D.1-5 by a maximum operating schedule of 365 days per year provided the yearly passenger number of vehicles and trips.

Table D.1-5 Passenger Vehicle Logistic Parameters: Baseline & Proposed Project

Basis	Number of Vehicle (vehicle/day)	Number of Trips (per day)	Trip Length (miles/trip)
2014 Baseline	244	488	7.65
Proposed Project	250	500	7.86

CARB's EMFAC2017 model run for calendar year 2019 provided the weighted average EFs (in units of grams per mile) for light duty passenger vehicles. Table D.1-6 summarizes these EFs. As previously noted, year 2019 fleet EFs were conservatively applied when 2014 baseline and proposed Project emissions were estimated.

[2] Vehicle class acronyms are defined as follows: LDA = Passenger Cars; LDT1 = Light-Duty Trucks (gross vehicle weight rating < 6,000 lbs & equivalent test weight <= 3,750 lbs); LDT2 = Light-Duty Trucks (gross vehicle weight rating < 6,000 lbs & equivalent test weight 3,751-5,750 lbs); LHD1 = Light-Heavy Duty Trucks (gross vehicle weight rating 8,501-10,000 lbs); and LHD2 = Light-Heavy Duty Trucks (gross vehicle weight rating 10,001-14,000 lbs).

Table D.1-6 Passenger Vehicle Emission Factors

Pollutant	ROG	NOx	CO	SOx	PM10	PM2.5	CO2	CH4	N2O
Travel EF[a] (lbs/mile)	5.30E-05	3.44E-04	3.01E-03	9.11E-06	6.51E-06	6.03E-06	9.21E-01	1.50E-05	2.42E-05
Idle EF[a] (lbs/ vehicle-day)	3.16E-05	1.03E-04	2.54E-04	1.37E-07	1.21E-06	1.16E-06	1.41E-02	7.68E-06	1.27E-06

a Emission factors from EMFAC2017 model for calendar year 2019, converted from grams to pounds (CARB, 2020).

While passenger vehicles were anticipated to have no onsite idling time, the EMFAC2017 model run output included idling EFs for light-heavy duty trucks (LHD1 and LHD2) which were included in the passenger vehicle class for this analysis. Thus, these emissions factors conservatively estimated passenger vehicle idling emissions at the Quemetco facility.

Passenger vehicle travel EFs were multiplied by the trip distance and number of trips to calculate the daily and annual criteria pollutant emissions for the baseline and the proposed Project's potential passenger vehicle travel. Passenger vehicle idling EFs were multiplied by the number of vehicles and number of days (1 for daily or 365 for annual) to calculate the daily and annual emissions for the baseline and proposed Project's potential passenger vehicle idling.

GWPs of 1, 25, and 298 for CO2, CH4, and N2O, respectively, were applied to the CO2, CH4, and N2O emissions to calculate the CO2e emissions (South Coast AQMD, 2017). For annual emissions, criteria pollutants were expressed in units of short tons per year while GHGs were expressed in units of metric tons per year consistent with the applicable thresholds.

The sum of daily passenger vehicle travel and idling emissions estimates resulted in the estimated daily passenger vehicle emissions. The sum of annual passenger vehicle travel and idling emissions resulted in the total estimated annual passenger vehicle emissions, with one exception as follows: the total emissions for NOx, ROG, PM10, PM2.5, CO, and CO2 incorporate CARB's off-model adjustment factors for the nearest year available (2021) published pursuant to the Safer Affordable Fuel-Efficient (SAFE) Rule (CARB, 2019; CARB, 2020).[3]

Potential emission increases, calculated as the difference between the proposed Project and baseline year emissions for a given time frame, were quantified for passenger vehicles on a daily and annual basis.

Stationary Source Emissions Assessment

Lead Smelting: Criteria Pollutant and Lead Emissions

The representative process throughput of 510 tpd and the maximum proposed throughput limit of 750 tpd served as the basis for the calculation of criteria pollutant and lead emissions from the lead smelting activities in the baseline year (2014). The throughput rate multiplied by a pollutant-specific EF, generally from a representative source test, was used to calculate total source emissions.

Table D.1-7 summarizes the hourly emission rates utilized in calculating criteria pollutant and lead emissions for the baseline year and the proposed Project year. WESP stack EFs for PM10, CO, VOC, and lead are the maximum values (when normalized by process rate) from three runs of a source test conducted in July 2016. The CEMS installed pursuant to South Coast AQMD

[3] The adjustment factors for NOx, ROG, PM10/PM2.5 and CO are 1.0002, 1.0002, 1.0009, and 1.0005, respectively. The adjustment factor for CO2 is 1.0023.

RECLAIM Program requirements provides the basis for the NOx and SOx EFs. The maximum hourly emission rate from the three CEMS runs was selected as the EF for NOx and SOx. The hourly emission rate for the CEMS runs were based on the average CEMs readings collected for the scenario. The sum of all particulate air toxic emissions measured during the February 2016 source testing represents PM10 emissions from the building ventilation units. January and February 2017 source testing provides building ventilation unit lead emission factors. Both the WESP stack and building ventilation units estimate the PM2.5 emission factors from PM10 emissions assuming a PM2.5 to PM10 ratio of 0.951 for electro reduction, furnace, fluxing, storage, processing based on the Primary and Secondary Metals Category in South Coast AQMD's *Methodology to Calculate Particulate Matter (PM) 2.5 and PM2.5 Significance Thresholds* Appendix A: Updated CEIDARS Table with PM2.5 Fractions (South Coast AQMD, 2006).

Table D.1-7 Lead Smelting Process Emission Rates

Process		ROG	NOx	CO	SOx	PM10	PM2.5	Lead
Lead Smelting Process (lbs/hr)		0.586	4.47	12.5	0.80	0.158	0.150	3.24E-04
Building Ventilation Unit (lbs/hr)	A	-	-	-	-	9.51E-04	9.04E-04	1.98E-05
	B	-	-	-	-	7.02E-04	6.68E-04	1.30E-05
	C	-	-	-	-	5.07E-04	4.82E-04	9.64E-06
	D	-	-	-	-	1.09E-03	1.04E-03	1.42E-05
	E	-	-	-	-	9.47E-04	9.00E-04	1.67E-04
	F	-	-	-	-	1.22E-03	1.16E-03	1.36E-04
	G	-	-	-	-	2.36E-03	2.24E-03	9.09E-06
	H	-	-	-	-	8.81E-04	8.38E-04	1.86E-05
	I	-	-	-	-	7.22E-04	6.87E-04	1.01E-05
	J	-	-	-	-	9.28E-04	8.83E-04	2.90E-05
	K	-	-	-	-	1.31E-03	1.25E-03	3.34E-05

The EFs summarized in Table D.1-7 above were divided by the applicable source test CEMS process throughput and multiplied by the process throughputs of 510 tpd and 750 tpd for the baseline year 2014 and post-Project conditions, respectively, to quantify daily lead smelting emissions. The proposed Project will not affect the hourly process rates, thus utilizing the same emission factors for the baseline and proposed Project conditions is appropriate.

The annual emissions calculation assumes a maximum operating schedule of 365 days per year, thus multiplying the days per year and the emissions per day to calculate emissions per year, leading to a conservative emissions estimate.

The difference between the proposed Project and baseline year emissions on a daily and annual basis reflects the potential emission increases from the lead smelting process with implementation of the proposed Project.

Lead Smelting: GHG Emissions

The Quemetco facility has four sources relating to the lead smelting activities which combust natural gas: rotary/kiln feed dryer, reverberatory furnace, refinery kettles, and RTO. Note that these four sources all vent out from the WESP stack, so CEMS data from the WESP stack includes emissions from these four sources. The WESP CEMS monitors CO2 but does not monitor CH4 or N2O, thus different calculation methods were applied depending on the pollutant.

A CO2 EF produced from CEMS data in the verified 2017 GHG Mandatory Reporting Rule report served as the CO2 EF for the calculation of CO2 emissions at the WESP stack including combustion, process, and scrubber exhaust streams. This data represents the best data available at the time the post-Project emissions were initially quantified and remain representative. The CO2 mass emission rate of 4.45 metric tons per hour was calculated by taking the average of all monthly CO2 CEMS emission rates in 2017. The monthly emission rates were determined by dividing the monthly mass emission rate by the monthly hours of operation.

During the 2017 calendar year, the Quemetco facility processed 345,403,012 pounds of scrap, which equates to approximately 473.15 tons per day. Therefore, the CO2 mass rate of 4.45 metric tons per hour was scaled by the applicable throughput for the baseline year 2014 and proposed Project year 2019 conditions. Specifically, the baseline year 2014 CO2 mass rate was scaled by a factor of 1.08 (510 tpd process throughput in 2014 divided by 473.15 tpd actual process throughput in 2017). Similarly, the post-Project CO2 mass rate was scaled by a factor of 1.59 (750 tpd proposed maximum proposed Project throughput divided by 473.15 tpd actual process throughput in 2017).

The following assumptions were used to calculate GHG emissions from combustion, process, and scrubber open actions:

- Lead smelting activities occur continuously (24 hours per day or 8,760 hours per year);
- CO2 mass rate scales proportionally with process throughput; and
- CH4 and N2O emissions are the result of natural gas combustion, thus CH4 and N2O emissions are not expected from the process nor the scrubber.

Daily and annual CO2 emissions as a result of combustion, process, and scrubber operations were calculated by multiplying the scaled mass emission rates by the applicable number of hours (24 for daily or 8,760 for annual).

Natural gas used and natural gas combustion EFs were used to estimate CH4 and N2O emissions from natural gas combustion. The facility's 2014 GHG Mandatory Reporting (MRR) data report dated August 31, 2015, reflects baseline year 2014 annual, facility-wide natural gas usage. The average percentage of total natural gas usage, by piece of equipment, was estimated using historical fuel usage from each of the four combustion sources from years 2009-2012, which represented the best available data at the time of the analysis and is expected to remain representative.

This source-specific percentage was applied to the facility-wide natural gas usage from baseline year 2014 and proposed Project year 2019 to estimate natural gas usage by equipment. Facility projections estimated a 29% increase in natural gas usage between the baseline and proposed Project scenarios; this is a conservative estimate when considering that all the reverberatory furnace burners stay on and operating to maintain sufficient heat to ensure material in reverberatory furnace molten. Table D.1-8 summarizes the baseline and proposed Project's potential annual natural gas usage.

Table D.1-8 Baseline & Proposed Project Natural Gas Usage by Equipment

Equipment	Baseline Year 2014		Proposed Project	
	Percent of Total Usage (%)	Natural Gas Usage (MMBtu/yr)	Percent of Total Usage (%)	Natural Gas Usage (MMBtu/yr)
Reverberatory Furnace	51.33	142,842	51.33	184,962
Rotary/Kiln Feed Dryer	18.80	52,322	18.80	67,750
Refinery Kettles	23.04	64,122	23.04	83,030
RTO	6.82	18,970	6.82	24,564
Total	100	278,256	100	360,306

In addition to the above annual natural gas usage, the natural gas combustion GHG emissions were quantified based on the following assumptions:

Assuming an operating schedule of 365 days per year, daily natural gas usage was estimated by dividing the annual natural gas usage provided in Table D.1-8 by 365 days. The daily and annual natural gas usage values for the baseline and proposed Project conditions were multiplied by EFs from 40 CFR 98, Table C-2, 1.00E-03 kg CH4 per MMBtu of natural gas combusted and 1.00E-04 kg N2O per MMBtu of natural gas combusted, to estimate daily and annual emissions. Finally, the annual GHG emissions were converted into units of metric tons per year.

Aggregate GHG emissions from lead smelting activities reflect the sum of GHG emissions from the combustion, process, and scrubber exhaust streams. CO2e emissions were calculated assuming GWPs of 1, 25, and 298 for CO2, CH4, and N2O (South Coast AQMD, 2017).

The difference between the proposed Project and baseline year emissions on a daily and annual basis reflects the proposed Project's potential GHG emissions increase from the lead smelting process.

Electricity Usage

An increase in lead smelting throughput corresponds to a potential increase in the amount of electricity required to operate equipment associated with lead smelting activities and would contribute additional GHG emissions.

The following equipment at the Quemetco facility are part of facility's lead smelting activities and require electricity: battery wrecker, LOTOX®, oxygen generation, air quality, electric arc furnace, WESP, filtration system, and overhead operations. The facility's 2014 GHG MRR report dated August 31, 2015, reflects the baseline year 2014 annual facility-wide electricity usage. Averaged historical electricity usage from each of the eight sources from years 2009-2012 (best available data at the time of analysis) was used to estimate the percent of facility-wide electricity used by source. As demonstrated in Table D.1-9, this estimated source-specific electricity percent was applied to the baseline electricity usage as well as the proposed Project's electricity usage, which the facility estimated to increase by 34%[4]. The proposed increase conservatively estimates the post-Project electricity consumption, given the facility already operates 24 hours a day and all air

[4] Currently, the facility operates 24 hours per day, 7 days per week. The furnaces and related equipment affected by the Compliance Stop Period are fueled by natural gas. Although electricity increases would not be proportional to the potential throughput increase associated with the proposed Project, it was estimated the facility electricity usage could increase by 34% to be reasonably conservative.

pollution control systems remain in operation regardless of whether the rotary/kiln feed dryer and reverberatory furnace are operating.

Table D.1-9 Baseline & Proposed Project Electricity Usage by Equipment

Source	Baseline Year 2014		Proposed Project	
	Percent of Total Usage (%)	Annual Electricity Usage (kWh)	Percent of Total Usage (%)	Annual Electricity Usage (kWh)
Battery Wrecker	1.77	687,388	1.77	918,762
LOTOX®	2.33	905,909	2.33	1,210,837
Oxygen Generation	14.37	5,590,758	14.37	7,472,597
Air Quality	14.03	5,458,691	14.03	7,296,077
Electric Arc Furnace	23.57	9,172,175	23.57	12,259,514
WESP	20.70	8,056,272	20.70	10,767,999
Filtration System	3.99	1,553,765	3.99	2,076,759
Overhead	19.24	7,487,045	19.24	10,007,12
Total	100	38,912,004	100	52,009,717

In addition to the above electricity usage, the following emission EFs in Table D.1-10 are from *Table 1.2: Electrical Utility Emission Factors of Greenhouse Gases* from CalEEMod version 2016.3.2[5], Appendix D Default Data Tables provided the emission factors needed to quantify GHG emissions from indirect electricity consumption (CAPCOA, 2017).

Table D.1-10 Indirect Electricity GHG EFs

Pollutant	EF (lb/MWh)
CO2	702.00
CH4	0.029
N2O	0.00614

To determine GHG emissions from indirect electricity usage, the indirect electricity emission factors were multiplied by the baseline and proposed Project's potential electricity usage values. Daily emissions equate to annual emissions divided by 365 operating days. GWPs of 1, 25, and 298 for CO2, CH4, and N2O, respectively, were applied to estimate CO2e emissions (South Coast AQMD, 2017).

The difference between the proposed Project and baseline year emissions on a daily and annual basis reflects the proposed Project's potential indirect GHG emissions increases from electricity usage.

Fugitive Emissions

Fugitive emissions occur during the unloading of cobbled steel, limestone, additives, soda ash, and other applicable materials. Assumptions incorporated into the fugitive emission calculations include:

[5] The electricity utility emission factors of GHGs in CalEEMod Version 2020.4.0 (May 2021) are lower than those in CalEEMod Version 2016.3.2. Therefore, the emission calculations conservatively assume the higher emission factors in Appendix D of CalEEMod Version 2016.3.2.

- Control efficiency of 0%;
- Representative PM EF of 0.0069 lbs/ton from South Coast AQMD guidance for loading, unloading, and conveyor transfer points of aggregate, concrete batching, and others (South Coast AQMD, 2019);
- PM10 equal 50% of total PM emissions and $PM2.5_5$ equal to PM10 emissions per South Coast AQMD's *Final –Methodology to Calculate PM2.5 and PM 2.5 Significance Thresholds, Appendix A* (South Coast AQMD, 2006); and
- One transfer point per material.

Table D.1-11 provides the baseline and proposed Project's material throughputs. Historical records from year 2014 represent baseline conditions. The proposed Project's throughputs for each material were estimated by scaling up the baseline throughputs to quantities that are expected to be needed in order to achieve the overall maximum proposed maximum throughput limit of 750 tpd. Under baseline conditions, calcined coke (bought as chunky and fine calcined coke) are currently used in the furnaces as a smelting reagent and while no incremental increases in the use of these materials are expected to occur as a result of the proposed Project, these materials could potentially be used post-Project. To estimate worst-case emissions for the proposed Project, the calculations assumed that chunky coke and calcined coke would be completely replaced by petroleum coke as a smelting reagent in the furnaces; however, the continued use of calcined coke and chunky coke and the new use of petroleum coke are expected to be used after implementation of the proposed Project with the total amount of combined calcined coke, chunky coke and petroleum coke not exceeding the throughput projections of 11.1 tpd and 4,056.0 tpy in Table D.1-11. Chapter 2 - Proposed Project of the EIR further describes the facility's material usage.

Table D.1-11 Baseline & Proposed Project Fugitive Source Material Throughputs

Material	2014 Baseline		Proposed Project	
	Throughput (tpd)	Throughput (tpy)	Throughput (tpd)	Throughput (tpy)
Cobbled Steel	9.4	3,432.0	13.2	4,812.0
Petroleum coke	3.7	1,333.9	14.8	5,406.5
Calcined Coke (chunky & fine) as a smelting reagent	7.3	2,687	-	-
Other Additives (e.g., Dolomite Lime, Pebble Lime, and Graphite)	3.7	1,311.0	5.2	1,908.0
Soda Ash	58.2	21,252.0	87.3	31,848.0
Limestone	2.4	876.0	3.8	1,392.0

The daily and annual material throughputs were multiplied by the representative EF of 0.0069 lbs/ton, giving the daily and annual emissions of PM. Applying the PM10 ratio of 50% converts the PM emission into PM10 emissions which are assumed to equal PM2.5 emissions. As the control efficiency is 0%, a control efficiency was not incorporated into the calculation.

The difference between the proposed Project and baseline year emissions on a daily and annual basis represents the proposed Project's potential incremental emission increases from fugitive emissions as a result of unloading activities.

Ambient Air Quality Analysis Methodology

The AAQA evaluated whether the proposed Project has the potential to impact ambient air quality by violating the ambient air quality standards or by substantially contributing to an existing or projected air quality standard violation. The analysis was based on dispersion modeling of the proposed Project's potential air quality impacts.

Air Dispersion Model

In order to predict the potential dispersion of emissions from the proposed Project, the AAQA uses the most recent version of the U.S. EPA AERMOD (Version 19191) with Trinity Consultants' (Trinity's) *BREEZE™ AERMOD Suite* software. The AAQA employs all of the regulatory default AERMOD model keyword parameters and are summarized as follows.

The South Coast AQMD modeling division recommends using the Ambient Ratio Method Version 2 (ARM2) conversion of NOx to NO2; thus, the AAQA models followed this recommendation.

Applicable outputs were selected depending on the format and averaging period of the pollutant standard.

Urban Areas

Per South Coast AQMD guidelines, all sources in the analysis assumed an urban setting. The AAQA models incorporate urban boundary layer effects by including an urban area with a population of 9,818,605 (the Los Angeles County 2010 census population) as the majority of the land use surrounding the facility is urban. The model reflects a default surface roughness value of 1 meter.

Coordinate System

The locations of emission sources, buildings, and receptors were represented in the Universal Transverse Mercator (UTM) Zone 11 coordinate system using the World Geodetic System (WGS84) projection. The UTM grid divides the world into coordinates that are measured in north meters (measured from the equator) and east meters (measured from the central meridian of a particular zone, which is set at 500 km).

Terrain Characteristics

The AERMOD terrain preprocessor, AERMAP (version 18081), utilizes terrain data from the United States Geological Survey in the form of National Elevation Dataset (NED) files at 10-meter resolution (1/3 arc second) to produce elevations for the proposed Project's potential receptors, buildings, and emission sources.

Building Downwash

Since some sources are located near existing buildings, the air dispersion modeling included structure-induced downwash (buildings, emission units, piping structures, etc.). The U.S. EPA approved Building Profile Input Program with Plume Rise Model Enhancements (BPIP-Prime) calculates the effects of building downwash. Table D.1-12 lists the buildings included in this analysis.

Table D.1-12 Modeled Building Parameters

Building ID	Building	UTM East[a]	UTM North[a]	Elevation (m)	Height (m)
BLD_1	Offices	409182.56	3765423.61	90.94	3.71
BLD_2	Finished Goods Warehouse & Refinery	409174.05	3765393.49	91.63	8.89
BLD_3	Batch House	409201.54	3765370.32	91.95	10.06
BLD_4	Battery Wrecker West	409249.05	3765346.46	92.07	16.46
BLD_5	Battery Wrecker East	409260.65	3765336.38	92.23	8.23
BLD_6	Scale House	409259.41	3765280.91	93.4	3.43
BLD_7	Maintenance	409205.84	3765312.55	93.24	10.60
BLD_8	Water Quality	409368.2	3765353.29	91.13	6.20
BLD_9	Rotary/Kiln Feed Dryer/Reverberatory Furnace/Refinery Kettle Baghouse Area	409173.99	3765393.35	91.85	11.38
BLD_10	Busch units A-D	409189.14	3765356.05	92.58	8.19
BLD_11	Busch units J-K	409299.22	3765374.78	91.31	11.30
BLD_12	Busch units E-I Duct Work	409290.41	3765404.82	90.7	11.30
BLD_13	Busch units E-I	409277.27	3765380.13	91.46	11.30
BLD_14	WESP	409268.27	3765291.52	93.3	16.11
BLD_15	Mobile Office #1	409202.74	3765255.88	94.65	4.17
BLD_16	Mobile Office #2	409211.34	3765251.47	94.76	3.73
BLD_17	Soda Ash Tank	409173.30	3765345.34	92.88	7.09

a UTM Coordinates are for one corner of the building.

Meteorological Data

The current modeling analysis uses onsite meteorological data for years 2015 through 2019 per South Coast AQMD's protocol to use an approved dataset of five years.[6] Metrological data is processed using AERMET (Version 19191) with the adj_u* function enabled.

Receptors

This AAQA modeled a total of 4,190 receptors in a 10,000 meter x 10,000 meter receptor grid with the following variable density:

- Fenceline receptors – 20 meter spacing
- Up to 1,000 meter – 50 meter spacing
- 1,000 meter to 5,000 meter – 100 meter spacing
- 5,000 meter to 10,000 meter – 250 meter spacing

Emission Source Parameters

The following sections detail the emission source parameters reflected in the AAQA. With a few exceptions as noted in the following discussion, the emission rates modeled generally reflect the proposed daily incremental emission increase converted from pounds per day to grams per second assuming continuous operation.

[6] According to South Coast AQMD Modeling Guidance for AERMOD, modeling should use the most recently available and meteorologically-appropriate 5-year data set. Years 2015 through 2019 represent the most recently available and meteorologically-appropriate 5-year data set at the time of the AAQA.

Point Sources

This AAQA modeled lead smelting exhaust from the combined-source WESP stack as well as the building ventilation Busch stacks and onsite truck idling as point sources. Table D.1-13a provides the locations and elevations of the modeled point sources.

Table D.1-13a Point Source Location Parameters

Source ID	Description	UTM East	UTM North	Elevation (m)
S0001	Busch unit A	409168.7	3765361	92.67
S0002	Busch unit B	409172.7	3765358	92.74
S0003	Busch unit C	409176.6	3765354	92.76
S0004	Busch unit D	409180.6	3765351	92.76
S0005	Busch unit E	409280.9	3765383	91.37
S0006	Busch unit F	409284.3	3765387	91.24
S0007	Busch unit G	409287.7	3765391	91.14
S0008	Busch unit H	409291.1	3765395	91.01
S0009	Busch unit I	409294.5	3765399	90.89
S0010	Busch unit J	409302	3765377	91.25
S0011	Busch unit K	409303.6	3765379	91.18
S0012	WESP Stack	409269.1	3765292	93.28
S0013	Truck Idle	409298.7	3765356	91.86

Table D.1-13b summarizes each point source's release parameters in AERMOD.

Table D.1-13b Point Source Release Parameters

Source ID	Description	Stack Height (m)	Gas Exit Temperature (°F)	Stack Inner Diameter (m)	Gas Exit Velocity (m/s)
S0001	Busch unit A	10.1	109.904	1.18	21.61
S0002	Busch unit B	10.1	109.508	1.18	21.91
S0003	Busch unit C	10.1	121.604	1.18	13.41
S0004	Busch unit D	10.1	123.404	1.18	13.81
S0005	Busch unit E	10.1	99.10399	1.18	17.46
S0006	Busch unit F	10.1	76.09999	1.18	22.27
S0007	Busch unit G	10.1	75.19999	1.18	20.16
S0008	Busch unit H	10.1	82.00399	1.18	12.74
S0009	Busch unit I	10.1	91.00399	1.18	16.11
S0010	Busch unit J	10.1	72.30202	1.18	22.38
S0011	Busch unit K	10.1	71.09599	1.18	23.31
S0012	WESP Stack	21.336	86.19802	2.03	10.39
S0013	Truck Idle	3.658	199.13	0.1	51.71

Annual and short term averaging period emission rates for the Busch units and WESP Stack (S0001 through S0012) equate to the potential maximum daily incremental emission increase for the corresponding emission sources (Building Ventilation Units A-K and Lead Smelting Process) in units of pounds per day, converted to grams per second.

The annual averaging period emission rates for the Truck Idle source (S0013) equate to the potential maximum daily incremental emission increase for the corresponding emission sources (Truck Idling) in units of pounds per day, converted to grams per second. Short term averaging period emission rates for truck idling were calculated based on the maximum hourly incremental emissions increase (in units of pounds per hour), converted to grams per second. Hourly incremental onsite truck idling proposed emission increases reflect 1 truck idling for three 5-minute increments (15 minutes total).

Table D.1-13c lists the emission rates of the modeled point sources.

Table D.1-13c Point Source Emission Rates

Emission Rates for Annual Averaging Period							
Source ID	**Description**	**NOx (g/s)**	**CO (g/s)**	**SOx (g/s)**	**PM10 (g/s)**	**PM2.5 (g/s)**	**Lead (g/s)**
S0001	Busch unit A	-	-	-	4.76E-05	4.52E-05	8.20E-07
S0002	Busch unit B	-	-	-	3.27E-05	3.11E-05	5.33E-07
S0003	Busch unit C	-	-	-	2.36E-05	2.25E-05	3.99E-07
S0004	Busch unit D	-	-	-	5.47E-05	5.20E-05	5.82E-07
S0005	Busch unit E	-	-	-	4.41E-05	4.20E-05	6.84E-06
S0006	Busch unit F	-	-	-	6.09E-05	5.79E-05	5.64E-06
S0007	Busch unit G	-	-	-	1.18E-04	1.12E-04	3.77E-07
S0008	Busch unit H	-	-	-	4.11E-05	3.91E-05	7.62E-07
S0009	Busch unit I	-	-	-	3.61E-05	3.44E-05	4.19E-07
S0010	Busch unit J	-	-	-	2.07E-05	1.97E-05	1.36E-06
S0011	Busch unit K	-	-	-	3.29E-05	3.12E-05	1.57E-06
S0012	WESP Stack	1.98E-01	6.29E-01	3.53E-02	7.18E-03	6.83E-03	1.49E-05
S0013	Truck Idle	2.20E-04	2.11E-04	4.04E-07	5.26E-07	5.04E-07	-
Emission Rates for Short Term Averaging Period							
Source ID	**Description**	**NOx (g/s)**	**CO (g/s)**	**SOx (g/s)**	**PM10 (g/s)**	**PM2.5 (g/s)**	**Lead (g/s)**
S0001	Busch unit A	-	-	-	4.76E-05	4.52E-05	8.20E-07
S0002	Busch unit B	-	-	-	3.27E-05	3.11E-05	5.33E-07
S0003	Busch unit C	-	-	-	2.36E-05	2.25E-05	3.99E-07
S0004	Busch unit D	-	-	-	5.47E-05	5.20E-05	5.82E-07
S0005	Busch unit E	-	-	-	4.41E-05	4.20E-05	6.84E-06
S0006	Busch unit F	-	-	-	6.09E-05	5.79E-05	5.64E-06
S0007	Busch unit G	-	-	-	1.18E-04	1.12E-04	3.77E-07
S0008	Busch unit H	-	-	-	4.11E-05	3.91E-05	7.62E-07
S0009	Busch unit I	-	-	-	3.61E-05	3.44E-05	4.19E-07
S0010	Busch unit J	-	-	-	2.07E-05	1.97E-05	1.36E-06
S0011	Busch unit K	-	-	-	3.29E-05	3.12E-05	1.57E-06
S0012	WESP Stack	1.98E-01	6.29E-01	3.53E-02	7.18E-03	6.83E-03	1.49E-05
S0013	Truck Idle	3.87E-04	3.71E-04	7.11E-07	9.26E-07	8.86E-07	-

Area Sources

This AAQA modeled passenger vehicle emissions and fugitive (material handling) emissions as polygon area sources. Table D.1-14a provides the locations and elevations of the modeled area sources.

Table D.1-14a Area Source Location Parameters

Source ID	Description	UTM East	UTM North	Elevation (m)
PAREA1	Employee Parking	409167.32	3765273.50	94.71
PAREA2	Material Handling	409278.85	3765433.51	90.13

Table D.1-14b summarizes each area source's release parameters within AERMOD.

Table D.1-14b Area Source Release Parameters

Source ID	Description	Release Height (m)	Area (m^2)	Int. Vertical Dimension (m)
PAREA1	Employee Parking	1.0	4,433.97	0
PAREA2	Material Handling	1.0	202.82	0

While AERMOD accepts point and volume source emission rates in units of grams per second, area source emission rates must be normalized across the source area and are entered in units of grams per second per square meter.

Annual and short term averaging period emission rates for Material Handling (PAREA2) equate to the potential maximum daily incremental emission increase for the corresponding emission source (Fugitives) in units of pounds per day, converted to grams per second and divided by the respective source area specified in Table D.1-14b.

The annual averaging period emission rates for Employee Parking (PAREA1) equate to the potential maximum daily incremental emission increase for the corresponding emission source (Passenger Vehicle Travel and Idling) in units of pounds per day, converted to grams per second and divided by the respective source area specified in Table D.1-14b, with one variation from the previously described emission calculation methodology. As the AAQA only modeled onsite air emission impacts, the trip distance for the baseline and proposed Project was reduced from the full travel distance within the South Coast AQMD to a one-way onsite distance of 0.04 miles as measured in Google Earth (travel distance to the center of the parking lot). Additionally, the short term averaging period emission rate for passenger vehicle travel was estimated on a maximum hourly basis assuming 6 one-way trips per hour, then converted to grams per second and divided by the respective source area specified in Table D.1-14b. The short term averaging period did not consider passenger vehicle idling emissions because it is assumed that passenger vehicles would not have idling time.

Table D.1-14c lists emission rates of the modeled area sources.

Table D.1-14c Area Source Emission Rates

Emission Rates for Annual Averaging Period						
Source ID	**Description**	**NOx ($g/s-m^2$)**	**CO ($g/s-m^2$)**	**SOx ($g/s-m^2$)**	**PM10 ($g/s-m^2$)**	**PM2.5 ($g/s-m^2$)**
PAREA1	Employee Parking	9.29E-10	3.51E-09	6.15E-12	1.23E-11	1.16E-11
PAREA2	Material Handling	-	-	-	3.11E-06	3.11E-06
Emission Rates for Short Term Averaging Period						
Source ID	**Description**	**NOx ($g/s-m^2$)**	**CO ($g/s-m^2$)**	**SOx ($g/s-m^2$)**	**PM10 ($g/s-m^2$)**	**PM2.5 ($g/s-m^2$)**
PAREA1	Employee Parking	2.34E-09	2.05E-08	6.21E-11	4.44E-11	4.11E-11
PAREA2	Material Handling	-	-	-	3.11E-06	3.11E-06

Volume Sources

This AAQA models truck and locomotive emissions as lines of volume sources for onsite travel. Source group SLINE1 includes sources L00000001 through L0000053 which represent truck routes while source group SLINE2 includes sources L0000054 through L0000084 which represent rail routes. Table D.1-15a lists the locations and elevations of the modeled volume sources.

Table D.1-15a Volume Source Location Parameters

ID	UTM East	UTM North	Elevation (m)	ID	UTM East	UTM North	Elevation (m)
Truck Travel Volume Sources[a]				L0000041	409331.90	3765405.17	90.39
L0000001	409236.46	3765241.21	94.7	L0000042	409327.42	3765407.04	90.35
L0000002	409240.02	3765244.52	94.61	L0000043	409322.93	3765408.92	90.34
L0000003	409243.58	3765247.82	94.48	L0000044	409318.45	3765410.80	90.38
L0000004	409247.14	3765251.13	94.39	L0000045	409313.97	3765412.67	90.41
L0000005	409250.70	3765254.43	94.3	L0000046	409309.49	3765414.55	90.4
L0000006	409254.26	3765257.74	94.17	L0000047	409305.01	3765416.42	90.37
L0000007	409257.80	3765261.07	94.08	L0000048	409300.52	3765418.30	90.31
L0000008	409260.94	3765264.78	94.02	L0000049	409296.04	3765420.17	90.29
L0000009	409264.08	3765268.49	93.96	L0000050	409291.56	3765422.05	90.31
L0000010	409267.21	3765272.20	93.84	L0000051	409287.08	3765423.92	90.36
L0000011	409270.35	3765275.91	93.73	L0000052	409282.59	3765425.80	90.37
L0000012	409273.49	3765279.62	93.61	L0000053	409278.11	3765427.67	90.3
L0000013	409276.62	3765283.33	93.51	**Locomotive (Rail) Travel Volume Sources[a]**			
L0000014	409279.76	3765287.04	93.4	L0000054	409433.55	3765387.10	89.74
L0000015	409282.90	3765290.75	93.27	L0000055	409426.86	3765389.92	89.74
L0000016	409285.80	3765294.58	93.15	L0000056	409420.16	3765392.75	89.81
L0000017	409286.91	3765299.31	93.05	L0000057	409413.46	3765395.57	89.75
L0000018	409288.02	3765304.04	92.94	L0000058	409406.77	3765398.40	89.69
L0000019	409289.13	3765308.77	92.83	L0000059	409400.07	3765401.23	89.65
L0000020	409290.25	3765313.50	92.78	L0000060	409393.38	3765404.05	89.71
L0000021	409291.36	3765318.23	92.72	L0000061	409386.68	3765406.88	89.68
L0000022	409292.47	3765322.96	92.57	L0000062	409379.99	3765409.70	89.67
L0000023	409293.59	3765327.69	92.45	L0000063	409373.29	3765412.53	89.65

L0000024	409294.70	3765332.42	92.33	L0000064	409366.59	3765415.35	89.64
L0000025	409296.52	3765336.88	92.17	L0000065	409359.90	3765418.18	89.62
L0000026	409298.80	3765341.17	92.06	L0000066	409353.20	3765421.00	89.58
L0000027	409301.08	3765345.47	91.96	L0000067	409346.51	3765423.83	89.56
L0000028	409303.36	3765349.76	91.84	L0000068	409339.81	3765426.66	89.49
L0000029	409305.63	3765354.05	91.75	L0000069	409333.11	3765429.48	89.51
L0000030	409307.91	3765358.34	91.64	L0000070	409326.42	3765432.31	89.48
L0000031	409310.19	3765362.63	91.55	L0000071	409319.72	3765435.13	89.51
L0000032	409312.47	3765366.92	91.47	L0000072	409313.03	3765437.96	89.55
L0000033	409314.74	3765371.22	91.36	L0000073	409306.33	3765440.78	89.54
L0000034	409317.02	3765375.51	91.26	L0000074	409299.63	3765443.61	89.52
L0000035	409319.30	3765379.80	91.15	L0000075	409292.94	3765446.44	89.51
L0000036	409321.58	3765384.09	91.02	L0000076	409286.24	3765449.26	89.51
L0000037	409323.86	3765388.38	90.93	L0000077	409279.55	3765452.09	89.53
L0000038	409326.13	3765392.67	90.77	L0000078	409272.85	3765454.91	89.5
L0000039	409328.41	3765396.97	90.62	L0000079	409266.15	3765457.74	89.48
L0000040	409330.69	3765401.26	90.49	L0000080	409259.46	3765460.56	89.47
ID	**UTM East**	**UTM North**	**Elevation (m)**	**ID**	**UTM East**	**UTM North**	**Elevation (m)**
Locomotive (Rail) Travel Volume Sources[a] (cont.)				L0000083	409239.37	3765469.04	89.43
L0000081	409252.76	3765463.39	89.51	L0000084	409232.68	3765471.87	89.51
L0000082	409246.07	3765466.22	89.49	-	-	-	-

a Significant figures may vary slightly between models, but do not impact model results.

Table D.1-15b summarizes each volume source's release parameters within AERMOD.

Table D.1-15b Volume Source Release Parameters

Source ID	Description	Plume Height (m)	Plume Width (m)	Release Height (m)	Int. Lateral Dimension (m)	Int. Vertical Dimension (m)
L0000001 – L0000053	Truck (53)	3.66	2.44	1.83	2.26	1.70
L0000054 – L0000084	Rail (31)	4.57	3.66	2.29	3.38	2.13

Annual and short term averaging period emission rates for the locomotive sources (L0000054 – L0000084) equate to the potential maximum daily incremental emission increase for the corresponding emission source (Rail) in units of pounds per day, converted to grams per second and divided by the number of volume sources in the rail line (31 sources).

The annual averaging period emission rates for truck travel sources (L00000001 – L0000053) equate to the potential maximum daily incremental emission increase for the corresponding emission source (Truck) in units of pounds per day, converted to grams per second and divided by the number of volume sources in the truck line (53 sources) with one variation from the previously described emission calculation methodology for truck travel. As the AAQA only modeled onsite air emission impacts, the trip distance for the baseline and proposed Project was reduced from the full travel distance within the South Coast AQMD to a one-way onsite distance of 0.16 miles as measured in Google Earth. The short term averaging period emission rate for truck travel was estimated on a maximum hourly basis assuming 2 one-way trips per hour. The resulting emission

rate was converted to grams per second and divided by the number of volume sources in the truck line (53 sources).

Table D.1-15c provides the emission rates for the modeled volume sources.

Table D.1-15c Volume Source Emission Rates

Emission Rate Annual Averaging Period						
Source ID	**Description**	**NOx (g/s)**	**CO (g/s)**	**SOx (g/s)**	**PM10 (g/s)**	**PM2.5 (g/s)**
L0000001 – L0000053	Truck (53)	3.23E-06	3.55E-07	1.25E-08	4.65E-08	4.45E-08
L0000054 – L0000084	Rail (31)	2.21E-04	4.40E-05	1.56E-07	3.44E-06	3.34E-06
Emission Rate Short Term Averaging Period						
Source ID	**Description**	**NOx (g/s)**	**CO (g/s)**	**SOx (g/s)**	**PM10 (g/s)**	**PM2.5 (g/s)**
L0000001 – L0000053	Truck (53)	5.68E-06	6.25E-07	2.20E-08	8.18E-08	7.83E-08
L0000054 – L0000084	Rail (31)	2.21-04	4.40E-05	1.56E-07	3.44E-06	3.34E-06

Model Outputs

Options selected for the AERMOD model outputs included the concentration result and plot file in the applicable format of each pollutant standard (NAAQS and CAAQS).

Ambient Air Quality Analysis Results Evaluation

This AAQA evaluated emissions for each criteria pollutant on a short-term (correlating to pollutant averaging period) and long-term (annual) basis, except for CO which was evaluated only for short-term exposures since there are no long term significance thresholds for CO.

Except for PM10 and PM2.5 models, maximum measured background air concentration were added to the modeled concentration for each criteria pollutant to obtain the maximum predicted potential proposed Project increase. South Coast AQMD is not in attainment with the NAAQS and CAAQS for PM10 and PM2.5, so the South Coast AQMD Significant Change threshold was used for the significance determination. Background concentrations were not required.

Lead emission modeling required a separate post-processing step. Source-specific EFs were input into AERMOD to model monthly concentrations, then the LEADPOST program was utilized to calculate 3-month rolling average concentrations from the monthly concentrations calculated by AERMOD. These concentrations were added to the background concentration data to determine the total concentration for comparison to the significance threshold.

AERMOD modeling output files are available upon request.

Health Risk Assessment Methodology

The HRA is comprised of two components: (1) air dispersion modeling of the affected mobile and stationary sources followed by (2) a health risk evaluation based on the proposed Project's potential short (acute) and long-term (cancer and non-cancer) air quality impacts.

Air Dispersion Model

The air dispersion model for the HRA was set up in AERMOD in a generally consistent manner with the AAQA models discussed above; however, the air dispersion model was run within CARB's Hotspots Analysis and Reporting Program (HARP 2.0) which uses U.S. EPA AERMOD Version 18081.[7] Result plot files were selected for hourly and annual periods.

Additional differences between the AAQA and HRA model setup are discussed in the subsequent sections. These differences involved the receptor grid, terrain file, and polygon area sources, and are expected to have negligible impacts on model results.

Health Risk Model

HARP 2.0 was used to predict health risk impacts in the baseline and proposed Project conditions.

Terrain Characteristics

The AERMOD terrain preprocessor, AERMAP (version 18081), utilizes terrain data from the United States Geological Survey in the form of Digital Elevation Model (DEM) files to produce elevations for the HRA's receptors, buildings, and emission sources.[8]

Receptors

The HRA estimated risk at the following receptors:

- Fenceline receptors – 20 meter spacing;
- Uniform cartesian grid up to approximately 5,500 meters from the facility – 50 meter spacing;
- Census receptors obtained from HARP 2.0; and,
- Receptors at sensitive receptors within a 5,000 meter radius from the facility.

Flagpole receptors were not utilized.

Figures D.1-1 and D.1-2 and Tables D.1-16 and D.1-17 identify the locations of the residential receptors and sensitive receptors within two miles of the Quemetco facility.

[7] The latest version of AERMOD (Version 19191) is not available through HARP 2.0; therefore, the latest available version was used (Version 18081). Updates between the two AERMOD versions (Version 19191 and Version 18081) are not expected to influence the HRA result (U. S. EPA, 2019).

[8] DEM data is used instead of NED data for the HRA because the Air Dispersion and Modeling Risk Tool in HARP 2.0 currently only supports DEM data. The use of DEM files in place of NED files (as used for the AAQA) results in a negligible impact on the source, building, and receptor elevations.

Figure D.1-1 Quemetco Residential Receptors

Table D.1-16 Quemetco Residential Receptor Distances

Direction from Quemetco (red lines)	Distance of Nearest Neighborhood from Quemetco (miles)
North	0.73
Northeast	1.10
East	1.85
Southeast	0.32
South	0.14
Southwest	0.13
West	0.26
Northwest	0.69

Figure D.1-2 Quemetco Sensitive Receptors

Table D.1-17 Quemetco Sensitive Receptor Distances

Pin	Description	Address	Distance from Quemetco (miles)
A	Valley High School	14162 Lomitos Avenue, La Puente, CA 91746	0.57
B	Palm Elementary School	14740 Palm Avenue, Hacienda Heights, CA 91745	0.74
C	Los Robles Elementary School	1530 Ridley Avenue, Hacienda Heights, CA 91745	1.00
D	Don Julian Elementary School	13855 Don Julian Road, La Puente, CA 91746	1.10
E	Orange Grove Middle School	14505 Orange Grove Avenue, Hacienda Heights, CA 91745	1.12
F	Los Altos High School	15325 Los Robles Avenue, Hacienda Heights, CA 91745	1.24
G	Nelson Elementary School	330 N California Avenue, La Puente, CA 91744	1.26

Pin	Description	Address	Distance from Quemetco (miles)
H	Lassalette School	14333 Lassalette Street, La Puenta, CA 91744	1.60
I	Sparks Elementary School	15151 E Temple Avenue, La Puente, CA 91744	1.61
J	Fred M. Sparks Junior High School	15100 E Giordano Street, La Puente, CA 91744	1.71
K	La Puente High School	15616 Nelson Avenue E, La Puente, CA 91744	1.72
L	Kwis Elementary School	1925 Kwis Avenue, Hacienda Heights, CA 91745	1.75
M	Bassett High School	755 Ardilla Avenue, La Puente, CA 91746	1.93
N	Newton Middle School	15616 Newton Street, Hacienda Heights, CA 91745	1.99

Emission Source Parameters

The emission source configurations match the AAQA models with two exceptions: source IDs and polygon area source representations. Table D.1-18 summarizes the point and volume source IDs which differ between the two models. The naming convention differences do not impact the model results.

Table D.1-18 Point and Volume Source Naming Conventions

Source Type	AAQA Source ID	AAQA Description	HRA Source ID
Point	S0001	Busch unit A	S001
Point	S0002	Busch unit B	S002
Point	S0003	Busch unit C	S003
Point	S0004	Busch unit D	S004
Point	S0005	Busch unit E	S005
Point	S0006	Busch unit F	S006
Point	S0007	Busch unit G	S007
Point	S0008	Busch unit H	S008
Point	S0009	Busch unit I	S009
Point	S0010	Busch unit J	S010
Point	S0011	Busch unit K	S011
Point	S0012	WESP Stack	S012
Point	S0013	Truck Idle	S014
Volume	L0000001 - L0000053	Truck	S015 - S067
Volume	L0000054 - L0000084	Rail	S068 - S098

Consistent with previously approved HRAs for the facility, this HRA did not model passenger vehicle emissions and fugitive (material handling) emissions as polygon area sources. Instead, the HRA includes a single, facility-wide emission source which serves to harmonize the calculated

emissions to the monitored emissions at the site (unitized emission rate of 1 g/s divided by area in Table D.1-19b). Table D.1-19a provides the location and elevation of the modeled area source.

Table D.1-19a Area Source Location Parameters

Source ID	UTM East	UTM North	Elevation (m)
S013	409084.5	3765316	93.89

Table D.1-19b summarizes the area source's release parameters within AERMOD.

Table D.1-19b Area Source Release Parameters

Source ID	Release Height (m)	Area (m^2)	Int. Vertical Dimension (m)
PAREA1	3.57	54,343.59	3.57

All emission sources were modeled with a unitized emission rate for the AERMOD dispersion modeling run, then the short and long term emission rates were applied in the health risk analysis. The HRA emission rates were the peak 1-hour (for acute risk) and annual average (for cancer and chronic risk) emission rates calculated for the baseline and proposed Project. For point and volume sources, the AERMOD dispersion modeling unitized emission rate was 1 g/s. For area sources, the unitized emission rate was 1 g/s divided by the source's area as the format of the emission rate is g/s-m^2. Tables D.1-20 and D.1-21 show the emission rates for the AERMOD air dispersion analysis and HRA.

Table D.1-20 AERMOD Unitized Point Source Emission Rates

HRA Source ID	Description	HARP AERMOD Unitized Emission Rate
S0001	Busch unit A	1 g/s
S0002	Busch unit B	1 g/s
S0003	Busch unit C	1 g/s
S0004	Busch unit D	1 g/s
S0005	Busch unit E	1 g/s
S0006	Busch unit F	1 g/s
S0007	Busch unit G	1 g/s
S0008	Busch unit H	1 g/s
S0009	Busch unit I	1 g/s
S0010	Busch unit J	1 g/s
S0011	Busch unit K	1 g/s
S0012	WESP Stack	1 g/s
S0014	Truck Idle	1 g/s
S0013	Monitoring Harmonization Source	1.84E-05 g/s-m^2
S015 - S067	Truck (53)	1 g/s (per volume source)
S068 - S098	Rail (31)	1 g/s (per volume source)

Table D.1-21 HARP HRA Point Source Emission Rates

HRA Source ID	Pollutant	HARP HRA – Baseline		HARP HRA – Proposed Project	
		Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)	Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)
S001	Lead	9.00E-05	0.670066	9.00E-05	0.985391
S001	Benzene	0.000513	3.819798	0.000513	5.61735
S001	Manganese	5.97E-05	0.444526	5.97E-05	0.653715
S001	Mercury	2.39E-07	0.00178	2.39E-07	0.002617
S001	Nickel	0.00072	5.363652	0.00072	7.887723
S001	Copper	0.000134	0.997764	0.000134	1.4673
S001	Zinc	0.00267	19.88082	0.00267	29.2365
S001	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S001	Cr(VI)	2.24E-07	0.001668	2.24E-07	0.002453
S002	Lead	4.05E-05	0.301563	4.05E-05	0.443475
S002	Benzene	0.000498	3.708108	0.000498	5.4531
S002	Manganese	2.62E-06	0.019509	2.62E-06	0.028689
S002	Mercury	2.39E-07	0.00178	2.39E-07	0.002617
S002	Nickel	2.36E-05	0.176023	2.36E-05	0.258858
S002	Copper	6.32E-05	0.470587	6.32E-05	0.69204
S002	Zinc	0.000136	1.012656	0.000136	1.4892
S002	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S002	Cr(VI)	1.85E-07	0.001378	1.85E-07	0.002026
S003	Lead	2.23E-05	0.165971	2.23E-05	0.244076
S003	Benzene	0.000287	2.137002	0.000287	3.14265
S003	Manganese	2.45E-06	0.018243	2.45E-06	0.026828
S003	Mercury	2.39E-07	0.00178	2.39E-07	0.002617
S003	Nickel	1.45E-05	0.108041	1.45E-05	0.158885
S003	Copper	3.21E-05	0.239017	3.21E-05	0.351495
S003	Zinc	0.000206	1.533876	0.000206	2.2557
S003	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S003	Cr(VI)	1.28E-07	0.000953	1.28E-07	0.001402
S003	Beryllium	1.35E-06	0.010052	1.35E-06	0.014783
S003	Selenium	1.03E-05	0.076694	1.03E-05	0.112785
S003	Silver	2.06E-06	0.015339	2.06E-06	0.022557
S004	Lead	1.86E-05	0.138272	1.86E-05	0.203342
S004	Benzene	0.000272	2.025312	0.000272	2.9784
S004	1,3-Butadiene	0.000164	1.221144	0.000164	1.7958
S004	Manganese	4.90E-05	0.364854	4.90E-05	0.53655
S004	Mercury	2.39E-07	0.00178	2.39E-07	0.002617
S004	Nickel	1.87E-05	0.139166	1.87E-05	0.204656
S004	Copper	0.000252	1.876392	0.000252	2.7594
S004	Zinc	0.00415	30.9009	0.00415	45.4425
S004	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S004	Cr(VI)	7.53E-07	0.005607	7.53E-07	0.008245
S005	Lead	0.000211	1.569617	0.000211	2.30826
S005	Benzene	0.000598	4.452708	0.000598	6.5481

HRA Source ID	Pollutant	HARP HRA – Baseline		HARP HRA – Proposed Project	
		Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)	Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)
S005	Manganese	5.21E-05	0.387937	5.21E-05	0.570495
S005	Mercury	2.39E-07	0.00178	2.39E-07	0.002617
S005	Nickel	5.94E-05	0.442367	5.94E-05	0.65054
S005	Copper	3.31E-05	0.246463	3.31E-05	0.362445
S005	Zinc	0.000479	3.566634	0.000479	5.24505
S005	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S005	Cr(VI)	1.03E-06	0.007669	1.03E-06	0.011279
S005	Beryllium	2.44E-06	0.018168	2.44E-06	0.026718
S005	Silver	0.000196	1.459416	0.000196	2.1462
S005	Selenium	1.79E-05	0.133283	1.79E-05	0.196005
S006	Lead	6.40E-05	0.476544	6.40E-05	0.7008
S006	Benzene	0.000635	4.72821	0.000635	6.95325
S006	Manganese	8.21E-06	0.061132	8.21E-06	0.0899
S006	Mercury	3.14E-06	0.02338	3.14E-06	0.034383
S006	Nickel	0.000138	1.027548	0.000138	1.5111
S006	Arsenic	2.03E-06	0.015115	2.03E-06	0.022229
S006	Copper	0.000107	0.796722	0.000107	1.17165
S006	Zinc	0.000437	3.253902	0.000437	4.78515
S006	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S006	Cr(VI)	1.19E-07	0.000886	1.19E-07	0.001303
S006	Beryllium	1.66E-06	0.01236	1.66E-06	0.018177
S006	Silver	3.20E-06	0.023827	3.20E-06	0.03504
S006	Cadmium	6.42E-07	0.00478	6.42E-07	0.00703
S006	Selenium	9.94E-06	0.074013	9.94E-06	0.108843
S007	Lead	6.65E-05	0.495159	6.65E-05	0.728175
S007	Benzene	0.000798	5.941908	0.000798	8.7381
S007	Manganese	8.56E-05	0.637378	8.56E-05	0.93732
S007	Mercury	2.39E-07	0.00178	2.39E-07	0.002617
S007	Nickel	0.000115	0.85629	0.000115	1.25925
S007	Arsenic	1.22E-06	0.009084	1.22E-06	0.013359
S007	Cadmium	1.07E-06	0.007967	1.07E-06	0.011717
S007	Copper	0.000399	2.970954	0.000399	4.36905
S007	Zinc	0.00604	44.97384	0.00604	66.138
S007	Selenium	7.66E-05	0.570364	7.66E-05	0.83877
S007	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S007	Cr(VI)	1.95E-06	0.01452	1.95E-06	0.021353
S008	Lead	3.16E-05	0.235294	3.16E-05	0.34602
S008	Benzene	0.000391	2.911386	0.000391	4.28145
S008	Manganese	1.82E-05	0.135517	1.82E-05	0.19929
S008	Mercury	2.39E-07	0.00178	2.39E-07	0.002617
S008	Nickel	9.65E-05	0.718539	9.65E-05	1.056675
S008	Arsenic	4.78E-07	0.003559	4.78E-07	0.005234
S008	Cadmium	6.15E-07	0.004579	6.15E-07	0.006734
S008	Copper	0.000456	3.395376	0.000456	4.9932

HRA Source ID	Pollutant	HARP HRA – Baseline		HARP HRA – Proposed Project	
		Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)	Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)
S008	Zinc	0.000181	1.347726	0.000181	1.98195
S008	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S008	Cr(VI)	3.82E-07	0.002844	3.82E-07	0.004183
S008	Selenium	4.55E-05	0.338793	4.55E-05	0.498225
S008	Beryllium	9.86E-07	0.007342	9.86E-07	0.010797
S008	Silver	1.97E-06	0.014669	1.97E-06	0.021572
S008	Antimony	3.88E-06	0.02889	3.88E-06	0.042486
S009	Lead	9.59E-06	0.071407	9.59E-06	0.105011
S009	Benzene	0.000396	2.948616	0.000396	4.3362
S009	Manganese	0.000318	2.367828	0.000318	3.4821
S009	Mercury	2.39E-07	0.00178	2.39E-07	0.002617
S009	Nickel	8.79E-06	0.06545	8.79E-06	0.096251
S009	Arsenic	2.76E-07	0.002055	2.76E-07	0.003022
S009	Cadmium	2.54E-07	0.001891	2.54E-07	0.002781
S009	Copper	0.000293	2.181678	0.000293	3.20835
S009	Zinc	0.00545	40.5807	0.00545	59.6775
S009	H2S	1.11E-05	0.082651	1.11E-05	0.121545
S009	Cr(VI)	1.08E-06	0.008042	1.08E-06	0.011826
S010	Lead	1.67E-05	0.124348	1.67E-05	0.182865
S010	Benzene	0.000197	1.466862	0.000197	2.15715
S010	Nickel	1.83E-05	0.136262	1.83E-05	0.200385
S010	Arsenic	3.01E-07	0.002241	3.01E-07	0.003296
S010	Cadmium	3.17E-07	0.00236	3.17E-07	0.003471
S011	Lead	1.88E-05	0.139985	1.88E-05	0.20586
S011	Benzene	0.000277	2.062542	0.000277	3.03315
S011	Nickel	2.21E-05	0.164557	2.21E-05	0.241995
S011	Arsenic	1.43E-06	0.010648	1.43E-06	0.015659
S011	Cadmium	2.59E-07	0.001929	2.59E-07	0.002836
S012	Lead	0.000213	1.283328	0.000213	1.887247
S012	Benzene	0.0113	77.4384	0.0113	113.88
S012	Methyl Bromide	0.0069	58.56739	0.0069	86.12852
S012	Methyl Chloride	0.00345	29.2837	0.00345	43.06426
S012	Ethyl Chloride	0.00517	43.8831	0.00517	64.53398
S012	Vinyl Chloride	0.00378	23.4549	0.00378	34.4925
S012	Acetaldehyde	0.102	604.9875	0.102	889.6875
S012	Vinylid Chlorid	0.00613	52.03161	0.00613	76.51707
S012	TriClFluorMetha	0.00345	29.2837	0.00345	43.06426
S012	CFC-113	0.00517	43.8831	0.00517	64.53398
S012	1,2-DiClPropane	0.00345	29.2837	0.00345	43.06426
S012	Propylene	0.00772	65.52757	0.00772	96.36408
S012	Anthracene	6.73E-07	0.005712	6.73E-07	0.008401
S012	1,2,4TriClBenz	0.00517	43.8831	0.00517	64.53398
S012	Pyrene	4.06E-05	0.243857	4.06E-05	0.358613
S012	Fluoranthene	8.69E-05	0.524943	8.69E-05	0.771975

HRA Source ID	Pollutant	HARP HRA – Baseline		HARP HRA – Proposed Project	
		Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)	Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)
S012	Acenaphthylene	2.40E-05	0.143894	2.40E-05	0.211609
S012	Chrysene	1.46E-05	0.088049	1.46E-05	0.129484
S012	Xylenes	0.0128	108.6468	0.0128	159.7746
S012	Formaldehyde	0.107	634.7715	0.107	933.4875
S012	TetraClEthane	0.0203	125.8374	0.0203	185.055
S012	Acenaphthene	1.84E-05	0.111504	1.84E-05	0.163976
S012	Phenanthrene	0.0058	34.9962	0.0058	51.465
S012	Fluorene	8.45E-05	0.511913	8.45E-05	0.752813
S012	Naphthalene	0.0167	99.7764	0.0167	146.73
S012	2MeNaphthalene	0.00166	10.01487	0.00166	14.72775
S012	o-Xylene	0.00639	54.2385	0.00639	79.7625
S012	Ethyl Benzene	0.00639	54.2385	0.00639	79.7625
S012	Styrene	0.0125	106.1003	0.0125	156.0299
S012	EDB	0.0113	70.17855	0.0113	103.2038
S012	1,3-Butadiene	0.000287	1.97319	0.000287	2.90175
S012	Toluene	0.011	93.36831	0.011	137.3063
S012	Chlorobenzn	0.00668	56.70003	0.00668	83.38239
S012	PCBs	3.45E-05	0.208488	3.45E-05	0.3066
S012	2,3,7,8-TCDD	1.15E-10	6.91E-07	1.15E-10	1.02E-06
S012	1-8OctaCDD	1.64E-10	9.77E-07	1.64E-10	1.44E-06
S012	Manganese	4.69E-05	0.279225	4.69E-05	0.410625
S012	Mercury	0.00187	12.23006	0.00187	17.98538
S012	Nickel	3.88E-05	0.236411	3.88E-05	0.347663
S012	Arsenic	0.000121	0.720915	0.000121	1.06017
S012	Cadmium	4.81E-05	0.299702	4.81E-05	0.440738
S012	Copper	5.30E-05	0.449865	5.30E-05	0.661567
S012	Zinc	0.000265	2.249327	0.000265	3.307834
S012	Selenium	0.000347	2.08488	0.000347	3.066
S012	H2S	0.0754	639.9973	0.0754	941.1725
S012	Cr(VI)	4.93E-06	0.032204	4.93E-06	0.047359
S012	DiClBenzenes	0.0155	131.5644	0.0155	193.4771
S012	1-8OctaCDF	1.27E-10	7.59E-07	1.27E-10	1.12E-06
S012	2,3,7,8-TCDF	1.54E-08	9.29E-05	1.54E-08	0.000137
S012	2-4,7,8PeCDF	1.17E-09	7.06E-06	1.17E-09	1.04E-05
S012	1-3,7,8PeCDF	2.06E-09	1.25E-05	2.06E-09	1.83E-05
S012	1-3,6-8HxCDF	9.56E-11	5.71E-07	9.56E-11	8.40E-07
S012	2-4,6-8HxCDF	6.31E-11	3.76E-07	6.31E-11	5.53E-07
S012	1-4,6-8HpCDF	6.96E-11	4.17E-07	6.96E-11	6.13E-07
S012	1-4,7,8HxCDF	1.95E-10	1.17E-06	1.95E-10	1.73E-06
S013	Lead	0.00122	9.095	0.00122	13.375
S013	Arsenic	1.60E-05	0.119	1.60E-05	0.175
S014	DieselExhPM	N/A[a]	0.136	N/A[a]	0.171251
S015	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S016	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131

HRA Source ID	Pollutant	HARP HRA – Baseline		HARP HRA – Proposed Project	
		Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)	Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)
S017	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S018	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S019	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S020	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S021	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S022	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S023	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S024	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S025	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S026	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S027	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S028	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S029	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S030	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S031	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S032	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S033	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S034	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S035	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S036	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S037	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S038	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S039	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S040	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S041	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S042	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S043	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S044	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S045	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S046	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S047	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S048	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S049	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S050	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S051	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S052	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S053	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S054	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S055	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S056	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S057	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S058	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S059	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S060	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131

HRA Source ID	Pollutant	HARP HRA – Baseline		HARP HRA – Proposed Project	
		Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)	Short Term Emission Rate (lb/hr)	Long Term Emission Rate (lb/yr)
S061	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S062	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S063	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S064	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S065	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S066	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S067	DieselExhPM	N/A[a]	0.012	N/A[a]	0.015131
S068	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S069	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S070	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S071	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S072	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S073	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S074	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S075	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S076	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S077	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S078	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S079	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S080	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S081	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S082	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S083	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S084	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S085	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S086	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S087	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S088	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S089	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S090	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S091	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S092	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S093	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S094	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S095	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S096	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S097	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407
S098	DieselExhPM	N/A[a]	0.93	N/A[a]	1.162407

a As diesel particulate matter does not have acute health effects, placeholder values are included in HARP for the diesel particulate matter hourly emissions. They do not impact the health risk calculations.

The baseline emission rates were based on the 510 tons per day rotary/kiln feed dryer throughput condition and the proposed Project emission rates were based on the proposed Project's 750 tons

per day rotary/kiln feed dryer throughput. Emission rate sources included the following, consistent with the 2019 annual emission inventory report:

- For Busch units (S0001-S0011), arsenic, lead, cadmium, and nickel emissions were from the applicable 2019 Rule 1420.1 compliance test report.
- For WESP (S0012), arsenic, lead, benzene & 1,3-butadiene emissions were from the applicable 2019 Rule 1420.1 compliance test report.
- All other compounds reporting emissions for Busch units and WESP stack sources (S0001-S0012) were from the test report approved by South Coast AQMD for use in the 2016 Risk Reduction Plan. These reflect the latest available emission rates for each compound.
- Fugitive (S0013) lead and arsenic area source emissions were consistent with those developed specifically for the most recent South Coast AQMD-approved HRA and used in the Risk Reduction Plan.

For Busch units and WESP sources (S0001-S0012), the hourly emission rate for both the baseline and proposed Project was the average hourly emission rate from the sources and tests described above. For the Busch units (S0001-S0011), the baseline annual emission rate equated to the hourly rate x 8,760 hours per year. The proposed Project condition reflects a potential increase in annual emissions of approximately 47% (based on the throughput increase from 510 to 750 tons per day).[9] For the WESP source (S0012), the annual emission rate equates to the pound per ton emission rate from the sources and tests described above multiplied by the daily throughput in tons per day (510 tons per day for the baseline and 750 tons per day for the proposed Project) and multiplied by 365 days per year.[10] For the fugitive lead and arsenic area source (S0013), potential annual emissions were estimated to increase by approximately 47%. Truck idling, truck travel, and rail emission rates for diesel particulate matter were consistent with the PM2.5 emissions calculated for the sources. For the groups of line sources representing truck and rail travel, the annual emission rates were divided by the number of sources in each category (i.e., 53 sources for truck travel and 31 sources for rail travel). Hourly emission rates are not applicable for these sources as diesel particulate matter does not have acute health effects.

Health Risk Model Inputs

Analysis Type

The HRA evaluated potential cancer, chronic, and acute risk.

Receptor Type

The HRA estimated the proposed Project's potential risk for individual residents (including sensitive locations) and workers, as well as the potential population-wide risk reflected though the use of census receptors and corresponding populations.

[9] While this equates to over 8,760 operating hours per year, the increase is normalized to just a 47% increase in emissions when the net risk value is determined (i.e., when the baseline risk is subtracted from the proposed Project risk to demonstrate the incremental increase in risk).

[10] This represents a conservative estimation as Quemetco, or any other secondary lead smelter, does not operate 365 days per year due to the occurrence of events like rebuilds, mechanical breakdowns, etc.).

Exposure Duration

Acute risk reflects 1 hour of exposure. Chronic and cancer risk analyses reflect the following default exposure durations:

- Individual residents and sensitive locations: 30 years
- Workers: 25 years

Population-wide cancer risk reflects an exposure duration of 70 years.

For residential receptors, a fraction of time at home adjustment factor can be applied to adjust exposure duration and cancer risk, based on the assumption that exposure to emissions does not occur away from home. For residential cancer risk, the default fraction of time at home option is not selected for ages 16 and greater to reflect time away from home, nor is the fraction of time at home option for ages less than 16 selected. Therefore, the HRA conservatively assumed the residential receptors are at home during all times during the exposure duration (30 years).

For worker cancer risk, a worker adjustment factor was not applied.

Intake Rate Percentile

The HARP 2.0 intake rate percentile utilized for residents was the RMP using the Derived Method option for carcinogenic risk and the OEHHA derived method option for chronic risk. The RMP using the Derived Method option was used for both worker risk scenarios.

Exposure Pathways

Inhalation is the only exposure pathway for acute risk. Default residential, sensitive, and population-wide receptor exposure pathways for chronic and cancer risk include inhalation, dermal, soil, and mother's milk. This analysis considered these pathways in addition to the homegrown produce pathway (with the fraction of homegrown fruits and vegetables consumed set to the default amount of 0.137) for chronic and carcinogenic risk for residential and sensitive receptors. Default worker exposure pathways for chronic and cancer risk include inhalation, dermal absorption, and soil ingestion. The HRA considered these pathways for chronic and carcinogenic risk for worker receptors.

As mentioned above, in addition to the inhalation pathway, worker risks for multipathway substances were modeled with the pathways of soil ingestion and dermal absorption. In order to account for the deposition of particle-bound pollutants, the HRA incorporated deposition to surfaces in a screening mode by assigning a deposition rate of 0.02 m/s (the default value for particulate-controlled and natural gas combustion sources). The assumed soil mixing depth is 0.01 meters and the dermal climate is warm.

HRA Results Evaluation

Plot files of concentrations for the 1-hour and annual periods generated by AERMOD through the air dispersion module of HARP 2.0 were imported into the health risk module of HARP 2.0 wherein pollutant-specific emission rates, included in Table D.1-21, were assigned to adjust the AERMOD-predicted air concentrations calculated with unit emission rates as described in Table D.1-20. The HARP 2.0 risk module was run with the options outlined in the above sections to predict total cancer risk for inhalation and non-inhalation pathways, as well as a hazard index (HI) for chronic non-cancer and acute health effects for each receptor.

Risk at the following locations was evaluated for the baseline and proposed Project conditions: MEIR, MEIW, Chronic Residential Hazard Index (HICR), Chronic Worker Hazard Index (HICW), Acute Hazard Index (HIA), and Cancer burden. The risk values at these receptors from the baseline were subtracted from the risk values at these receptors from the proposed Project resulting in the proposed Project's potential incremental increase in health risk. The potential incremental increase in health risk was then compared to the South Coast AQMD health risk thresholds of significance.

APPENDIX D.2

QUEMETCO SOURCE TESTS
FOR PETROLEUM COKE AND CALCINED COKE
EXPERIMENTAL RESEARCH PERMIT
TECHNICAL REPORT

EMCC LLC

Environmental Management Compliance & Consulting

Source Test Report

Stationary Source Emissions Testing for Petroleum Coke R&D Testing at a Secondary Lead Smelter

Prepared for: Quemetco Inc.
720 S. 7th Avenue
Industry, CA 91746

Response to: The South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765

Test Date(s): 06-15 July 2016

Release Date: 07 September 2016

Document No.: 16b02_RPTd0 **VOLUME 1 – MAIN REPORT**

Submitted by: EMCC LLC
9531 Scotstoun Drive
Huntington Beach, CA 92646

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Document No.: 16b02_RPTd0 **VOLUME 1 – MAIN REPORT**

Submitted by: EMCC LLC
9531 Scotstoun Drive
Huntington Beach, CA 92646

Prepared by:
Mike Fukuda, Manager

NOTICE

This document presents stationary source emissions test results and describes test program design, sampling and analytical procedures, data management procedures, and quality assurance activities to characterize criteria and hazardous air pollutant emissions in gases discharged from point sources operated by a secondary lead smelter.

The primary objective of this project is to satisfy the conditions of the Permit to Construct and Temporary Permit to Operate Experimental Research Operations that was issued for this work. A second objective of this project was to compare the Benzene concentration values reported by an extractive discrete Benzene monitor to reference method tests performed according to CARB Method 410A which is approved for use to determine benzene emissions along with CARB Method 422.102 and EPA Method TO-15 as specified in Rule 1420.1(k)(7).

ABSTRACT

Quemetco, Inc. (Quemetco) operates a secondary lead smelting facility in the City of Industry, California. Emissions from this facility are subject to regulation by the South Coast Air Quality Management District (SCAQMD) that has issued Permits for the various equipment operated by the facility. This facility operates under the conditions of the Permits and also SCAQMD Rules 1420 and 1420.1. Quemetco has proposed using petroleum coke in place of calcined coke in its normal operations. The SCAQMD has authorized stationary source emissions testing and process sampling to assess emissions when petroleum coke is used. The assessment was performed under a Permit to Construct and Temporary Permit to Operate Experimental Research Operations that was issued for this work.

Quemetco retained EMCC LLC to coordinate and conduct field sampling and analysis to characterize stationary source emissions from the WESP Stack and intermediate process conditions at the inlet and outlet of the thermal oxidizer and outlet of the Electric Arc Furnace. The testing included measurements for Benzene using CARB Method 410A in addition to measurements using a direct-interface GC-MS method. Test information and results are presented in this Source Test Report.

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ATTACHMENTS (continued)

1.0 EXECUTIVE SUMMARY

This document describes stationary source emissions testing and other measurements to characterize arsenic, lead, PM_{10}, Benzene and VOC emissions at the Quemetco, Inc. (Quemetco) battery recycling and lead recovery facility in Industry, California. The primary objective of this project is to assess stipulated emissions from the WESP Stack and measure constituent characteristics at intermediate sampling locations while the facility operates using petroleum coke in lieu of calcined coke. A secondary objective of this project was to compare the Benzene concentration values reported by an extractive discrete Benzene monitor to reference method tests performed according to CARB Method 410A which is approved for use to determine benzene emissions along with CARB Method 422.102 and EPA Method TO-15 as specified in Rule 1420.1(k)(7). This section describes the program, and summarizes test results and operating conditions.

1.1 Background

Quemetco operates a battery recycling and lead recovery facility in Industry, California. At this facility, used batteries are received, fragmented and the lead-containing materials are then recovered and purified. Various processes are employed to purify the lead until the final alloys are produced. Four of the processes at the facility include the Rotary Kiln, Reverberatory Furnace, Electric Arc Furnace and Refining Kettles. Together, these four processes account for a majority fraction of the facility's potential air contaminant emissions. In order to comply with the risk reduction requirements of SCAQMD Rule 1402, in 2008 Quemetco installed additional air pollution control equipment to mitigate emissions from these processes. These include a regenerative thermal oxidizer (RTO) to reduce emissions from the Rotary Kiln and a Wet Electrostatic Precipitator (WESP) to reduce emissions from the four main secondary lead smelting processes. In 2012, Quemetco added the combustion exhaust gases from the Refinery Kettles to the gas streams mitigated by the WESP system. The exhaust streams from these processes are combined before treatment by the WESP.

Emissions from this facility are subject to regulation by the South Coast Air Quality Management District (SCAQMD) that has issued Permits for the various equipment operated by the facility. This facility operates under the conditions of the Permits and also SCAQMD Rules 1420 and 1420.1. Quemetco has proposed the use of petroleum coke in lieu of calcined coke as stipulated in the facility's Permit to Operate. In support of this proposal, the SCAQMD authorized source emissions testing to characterize whether the change to use of petroleum coke will impact criteria and hazardous air pollutant (HAP) emissions as stipulated in a Temporary Permit to Operate (AN 582928 dated 24 June 2016). The testing performed herein is intended to satisfy the conditions of the applicable Permit.

1.2 Summary

Quemetco retained EMCC LLC (Emc^2) to coordinate and conduct field sampling and analysis to characterize emissions of listed compounds from the WESP Stack and at intermediate sampling locations including the RTO Inlet and Outlet and EAF Scrubber Outlet (EAF).

The testing was performed using test methods and sampling procedures that have prior approval pursuant to Source Test Protocols that were submitted to and approved by the SCAQMD or promulgated reference test methods, e.g., CARB Method 410A. The testing was performed according to SCAQMD and U.S. EPA guidance and using the sampling and analysis procedures described therein. The testing was performed while the facility was operating at known process operating rates and process conditions were monitored on a periodic basis to verify operating conditions. The testing was performed by Emc^2, Advanced Environmental Compliance LLC (AEC) and analytical laboratories that performed test measurements, collected representative test samples and analyzed the samples. Key project information is summarized in Table 1-1 including the participants, equipment tested, and methodology. The test results are presented in Tables 1-2 through 1-9.

This Source Test Report details the test program, test results and testing critique, describes the equipment tested and operating conditions, the sampling and analysis procedures, and quality assurance and quality control activities and results.

1.3 Discussion

The emissions from the WESP Stack were measured during three operating scenarios as planned. The results of the testing may be compared to past and current test results conducted using the same test methodology to assess whether use of petroleum coke in lieu of calcined coke imparts a significant change in overall emissions. Comprehensive air toxics and criteria pollutant testing was last performed on the WESP Stack in 2014. Subsequent tests of the WESP Stack, specifically for Benzene and Arsenic were performed in 2015. Table 1-10 is a tabular comparison of current data to past data. The emissions of 1,3-Butadiene, Benzene, TGNMO, Carbon Monoxide, Lead and Arsenic observed during the research permit test were less than existing permit conditions and Rule 1420.1 standards. These data indicate that Quemetco can operate in compliance with its existing permit conditions and the current requirements of Rule 1420.1 while using petroleum coke in lieu of calcined coke.

TABLE 1-1. PROJECT SUMMARY

Company	Quemetco, Inc. 720 S. 7th Avenue, Industry, CA 91746 Contact: Mr. Felipe Ortega, tel: (626) 330-2294 ext. 3204
Facility	(same)
Facility ID	SCAQMD ID Number 008547
Equipment Tested	Wet Electrostatic Precipitator (A/N524239) that mitigates emissions from a Rotary Kiln (AN462562) also treated by Regenerative Thermal Oxidizer (AN460790), Reverberatory Furnace Scrubber (AN456814), Electric Arc Furnace Scrubber (AN456815), process emissions and combustion exhaust emissions from seven Refinery Kettles (various AN's).
Permit(s)	(see above); and Temporary Permit to Operate (R&D Permit AN 582928 dated 24 June 2016)
Test Requested by	Quemetco, Inc., Mr. Felipe Ortega, tel: (626) 330-2294 ext. 3204
Test Objective(s)	Characterize Arsenic, Lead, PM_{10}, TGNMO, CO, Benzene, 1,3-Butadiene and Volatile Organic Compound (VOC) emissions at the WESP Outlet (Stack) and upstream sources (RTO and EAF) to satisfy the conditions of R&D Permit. Also compare performance of discrete Benzene monitor to results measured according to reference method CARB Method 410A.
Test Date(s)	06-15 July 2016
Testing Firm	Advanced Environmental Compliance, LLC (AEC) 1347 W. Trenton Ave., Orange, CA 92867 Contact: Mr. Tony Garcia, tel: (714) 288-2892 H&P Mobile Geochemistry, Inc. 2470 Impala Drive, Carlsbad, CA 92010 Contact: Ms. Louise Adams, tel: (760) 804-9678 EMCC LLC (Emc^2) 9531 Scotstoun Drive, Huntington Beach, CA 92646 Contact: Mr. Mike Fukuda, tel: (714) 227-3142
Test Methodology	Sampling and analysis was performed according to sampling and analysis described in the Test Protocol for WESP Air Toxics Testing (STE Source Test File P08413 and applicable addendums), and reference method CARB Method 410A.
Test Personnel	Mike Fukuda of Emc^2; Tony Garcia, Tommy Mai (AEC Project Manager), Daniel Holmstrom, Cesar Magdelano, Hugo C. and Mark A. of AEC.
Regulatory Agency	The South Coast Air Quality Management District 21865 Copley Drive, Diamond Bar, CA 91765 Contact: Mr. Tom Liebel, tel: (909) 396-2554

TABLE 1-2. SUMMARY OF RESULTS – SCENARIO 1 - WESP

Facility: Quemetco, Inc. Test Date(s): 06,07,08 Jul.2016
Unit: **WESP Stack** Checked by: MF 09/02

TEST DATA	units	Average Result	units	Emission Factors, Ef
Run Number	-	(MEAN)	-	(MEAN)
Process Data/Rate				
Rate for:				
Feed Rate, Metals/PM10				
Feed Rate, VOC Tests				
CARB Method 436 (metals)				
CONCENTRATION				
Arsenic, As	ug/dscm	0.341		
Lead, Pb	ug/dscm	1.11		
EMISSION RATE				
Arsenic, As	lb/hr	9.79E-05		
Lead, Pb	lb/hr	3.24E-04		
EPA Method 201A/202 - PM10 & Condensible PM				
PM10 + Condensibles				
Cyclone Cut Size	um	10.53		
Concentration	gr/dscf	1.98E-04		
Concentration	mg/dscm	0.453		
Emission Rate	lb/hr	0.131		
Filterable PM10				
Concentration	gr/dscf	1.34E-04		
Concentration	mg/dscm	0.306		
Emission Rate	lb/hr	0.0881		
TGNMO (and CO) per AQMD M25.x				
TGNMO, as Methane				
PPMV, as measured	PPMv	3.07		
Emission Rate	lb/hr	0.586		
Carbon Monoxide, CO				
PPMV, as measured	PPMv	37.6		
Emission Rate	lb/hr	12.5		
CARB Method 410A				
CONCENTRATION				
Benzene	PPBv	17.3		
EMISSION RATE				
Benzene	lb/hr	0.0161		
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)				
CONCENTRATION				
1,3-Butadiene (39)	PPBv	5.61		
1,3-Butadiene	PPBv	3.22		
Benzene	PPBv	5.64		
EMISSION RATE			EMISSION FACTOR	
1,3-Butadiene (39)	lb/hr	0.00361		
1,3-Butadiene	lb/hr	0.00207		
Benzene	lb/hr	0.00525		

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 1-3. SUMMARY OF RESULTS – SCENARIO 1 - EAF

Facility: Quemetco, Inc. Test Date(s): 06,07,08 Jul.2016
Unit: **EAF Scrubber Outlet** Checked by: MF 09/02

TEST DATA	units	Average Result
Run Number	-	(MEAN)
Process Data/Rate		
Rate for:		
(see WESP Stack)	ton/hr	
TGNMO (and CO) per AQMD M25.x		
TGNMO, as Methane		
PPMV, as measured	PPMv	3.18
Emission Rate	lb/hr	0.200
Carbon Monoxide, CO		
PPMV, as measured	PPMv	51.9
Emission Rate	lb/hr	5.74
CARB Method 410A		
CONCENTRATION		
Benzene	PPBv	11.5
EMISSION RATE		
Benzene	lb/hr	0.00351
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)		
CONCENTRATION		
1,3-Butadiene (39)	PPBv	3.06
1,3-Butadiene	PPBv	1.86
Benzene	PPBv	3.12
EMISSION RATE		
1,3-Butadiene (39)	lb/hr	6.45E-04
1,3-Butadiene	lb/hr	3.93E-04
Benzene	lb/hr	9.53E-04

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 1-4. SUMMARY OF RESULTS – SCENARIO 2 - WESP

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/04**

TEST DATA	units	Average Result	units	Emission Factors, Ef
Run Number	-	(MEAN)	-	(MEAN)
Process Data/Rate				
Rate for: Reverb. Feed				
Feed Rate, Metals/PM10				
Feed Rate, VOC Tests				
CARB Method 436 (metals)				
CONCENTRATION				
Arsenic, As	mg/dscm	1.75		
Lead, Pb	mg/dscm	0.943		
EMISSION RATE				
Arsenic, As	lb/hr	5.18E-04		
Lead, Pb	lb/hr	2.79E-04		
EPA Method 201A/202 - PM10 & Condensible PM				
PM10 + Condensibles				
Cyclone Cut Size	um	10.73		
Concentration	gr/dscf	2.33E-04		
Concentration	mg/dscm	0.533		
Emission Rate	lb/hr	0.158		
Filterable PM10				
Concentration	gr/dscf	1.28E-04		
Concentration	mg/dscm	0.294		
Emission Rate	lb/hr	0.0874		
TGNMO (and CO) per AQMD M25.x				
TGNMO, as Methane				
PPMV, as measured	PPMv	2.07		
Emission Rate	lb/hr	0.421		
Carbon Monoxide, CO				
PPMV, as measured	PPMv	27.0		
Emission Rate	lb/hr	9.58		
CARB Method 410A				
CONCENTRATION				
Benzene	PPBv	30.7		
EMISSION RATE				
Benzene	lb/hr	0.0304		
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)				
CONCENTRATION				
1,3-Butadiene (39)	PPBv	7.48		
1,3-Butadiene	PPBv	3.25		
Benzene	PPBv	22.7		
EMISSION RATE				
1,3-Butadiene (39)	lb/hr	0.00514		
1,3-Butadiene	lb/hr	0.00223		
Benzene	lb/hr	0.0225		

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 1-5. SUMMARY OF RESULTS – SCENARIO 2 - RTO OUTLET

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **RTO Outlet** Checked by: **MF 09/04**

TEST DATA	units	Average Result
Run Number	-	(MEAN)
Process Data/Rate		
Rate for:		
Feed Rate, Metals/PM10		
Feed Rate, VOC Tests		
TGNMO (and CO) per AQMD M25.x		
TGNMO, as Methane		
PPMV, as measured	PPMv	2.90
Emission Rate	lb/hr	0.128
Carbon Monoxide, CO		
PPMV, as measured	PPMv	12.5
Emission Rate	lb/hr	0.963
CARB Method 410A		
CONCENTRATION		
Benzene	PPBv	22.9
EMISSION RATE		
Benzene	lb/hr	0.00490
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)		
CONCENTRATION		
Benzene	PPBv	34.1
EMISSION RATE		
Benzene	lb/hr	0.00726

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 1-6. SUMMARY OF RESULTS – SCENARIO 2 - RTO INLET

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **RTO Inlet** Checked by: **MF 09/04**

TEST DATA	units	Average Result
Run Number	-	(MEAN)
Process Data/Rate		
Rate for:		
Feed Rate, Metals/PM10		
Feed Rate, VOC Tests		
TGNMO (and CO) per AQMD M25.x		
TGNMO, as Methane		
PPMV, as measured	PPMv	434
Emission Rate	lb/hr	17.7
Carbon Monoxide, CO		
PPMV, as measured	PPMv	276
Emission Rate	lb/hr	19.64
CARB Method 410A		
CONCENTRATION		
Benzene	PPBv	1,472
EMISSION RATE		
Benzene	lb/hr	0.291
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)		
CONCENTRATION		
Benzene	PPBv	2,981
EMISSION RATE		
Benzene	lb/hr	0.603

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 1-7. SUMMARY OF RESULTS – SCENARIO 3 - WESP

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/02**

TEST DATA	units	Average Result	units	Emission Factors, Ef
	-	(MEAN)	-	(MEAN)
Process Data/Rate				
Rate for:				
Feed Rate, Metals/PM10				
Feed Rate, VOC Tests				
CARB Method 436 (metals)				
CONCENTRATION				
Arsenic, As	mg/dscm	0.968		
Lead, Pb	mg/dscm	0.639		
EMISSION RATE				
Arsenic, As	lb/hr	2.80E-04		
Lead, Pb	lb/hr	1.85E-04		
EPA Method 201A/202 - PM10 & Condensible PM				
PM10 + Condensibles				
Cyclone Cut Size	um	10.71		
Concentration	gr/dscf	2.40E-04		
Concentration	mg/dscm	0.549		
Emission Rate	lb/hr	0.159		
Filterable PM10				
Concentration	gr/dscf	1.50E-04		
Concentration	mg/dscm	0.342		
Emission Rate	lb/hr	0.0991		
TGNMO (and CO) per AQMD M25.x				
TGNMO, as Methane				
PPMV, as measured	PPMv	2.24		
Emission Rate	lb/hr	0.438		
Carbon Monoxide, CO				
PPMV, as measured	PPMv	23.3		
Emission Rate	lb/hr	7.96		
CARB Method 410A				
CONCENTRATION				
Benzene	PPBv	17.2		
EMISSION RATE				
Benzene	lb/hr	0.0164		
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)				
CONCENTRATION				
1,3-Butadiene (39)	PPBv	9.48		
1,3-Butadiene	PPBv	4.98		
Benzene	PPBv	10.1		
EMISSION RATE				
1,3-Butadiene (39)	lb/hr	0.00625		
1,3-Butadiene	lb/hr	0.00328		
Benzene	lb/hr	0.00957		

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 1-8. SUMMARY OF RESULTS – SCENARIO 3 - RTO OUTLET

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **RTO Outlet** Checked by: **MF 09/03**

TEST DATA	units	Average Result
Run Number	-	(MEAN)
Process Data/Rate		
Rate for:		
Feed Rate, Metals/PM10		
Feed Rate, VOC Tests		
TGNMO (and CO) per AQMD M25.x		
TGNMO, as Methane		
PPMV, as measured	PPMv	2.71
Emission Rate	lb/hr	0.121
Carbon Monoxide, CO		
PPMV, as measured	PPMv	14.0
Emission Rate	lb/hr	1.09
CARB Method 410A		
CONCENTRATION		
Benzene	PPBv	32.5
EMISSION RATE		
Benzene	lb/hr	0.00704
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)		
CONCENTRATION		
Benzene	PPBv	32.7
EMISSION RATE		
Benzene	lb/hr	0.00706

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 1-9. SUMMARY OF RESULTS – SCENARIO 3 - RTO INLET

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **RTO Inlet** Checked by: **MF 09/02**

TEST DATA	units	Average Result
Run Number	-	(MEAN)
Process Data/Rate		
Rate for:		
Feed Rate, Metals/PM10		
Feed Rate, VOC Tests		
TGNMO (and CO) per AQMD M25.x		
TGNMO, as Methane		
PPMV, as measured	PPMv	384
Emission Rate	lb/hr	15.3
Carbon Monoxide, CO		
PPMV, as measured	PPMv	322
Emission Rate	lb/hr	22.4
CARB Method 410A		
CONCENTRATION		
Benzene	PPBv	1,702
EMISSION RATE		
Benzene	lb/hr	0.332
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)		
CONCENTRATION		
Benzene	PPBv	1,702
EMISSION RATE		
Benzene	lb/hr	0.338

TABLE 1-10. COMPARISON OF BENZENE MONITOR AND CARB METHOD 410A

Facility:	Quemetco, Inc.	Project No.:	16b02
City, ST:	Industry, CA	Device ID:	Benzene Monitor
Source:	WESP	Test Start Date:	08 Jul.2016
Location:	Stack (Outlet)	Test End Date:	08 Jul.2016

Run No.	Time (hh:mm) Start	End	**Ref. Method** Benzene (PPBv)	Data Reference	**Benzene DAS Report** Benzene (PPBv)	Data Reference	Difference Benzene (PPBv)	Δ (%)
1	7:58			AEC		no data		
2	8:16		15.70	Data	13.14	DAS	2.56	16.3
3	8:24		15.80	Summary	10.50	DAS	5.30	33.5
4	8:35		9.50		10.00	DAS	-0.50	-5.3
5	8:43		8.70		9.00	DAS	-0.30	-3.4
6	8:52		8.60		8.07	DAS	0.53	6.1
7	9:01		19.60		14.79	DAS	4.81	24.6
8	9:10		19.50		21.00	DAS	-1.50	-7.7
9	9:20		11.70		15.00	DAS	-3.30	-28.2
10	9:29		11.90		19.00	DAS	-7.10	-59.7
11								
12								
	AVERAGE:		**13.44**		**13.39**			
						Difference (d):	**0.06**	**-2.6**

Number of Valid Runs (n):	9
Standard Deviation (Sdev):	3.904
t-value (0.975):	2.306
Confidence Coefficienct (cc):	3.00

Relative Accuracy Test Result: **22.74** % of R.M.

System Bias Test Calculation

SCAQMD RECLAIM Criteria		EPA 40CFR75 Criteria	
Reason: |dl| > |cc|	**Pass**	Reason: |dl| ≤ |cc|	**Pass**
Bias Type:	Low	Bias Type:	Low
Bias Adj. Factor:	**1.004**	Bias Adj. Factor:	**1.004**

TABLE 1-11. COMPARISON OF WESP EMISSIONS TO PAST TEST DATA

Facility: Quemetco, Inc. Test Date(s): 06-15 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/05**

Test @ WESP Stack	units	**Test Results**			**Range of Past Data Obesrved**	
		Scenario 1 Jul.2016	**Scenario 2 Jul.2016**	**Scenario 3 Jul.2016**	MEAN	MAX
Process Data/Rate						
Feed Rate, Metals/PM10						
Feed Rate, VOC Tests						
CARB Method 422.102/EPA Metho TO-14/15 (by on-site mobile GC-MS)						
CONCENTRATION						
1,3-Butadiene (39)	PPBv	5.61	7.48	9.48	15.1	23.3
1,3-Butadiene	PPBv	3.22	3.25	4.98	7.56	10.7
Benzene	PPBv	5.64	22.7	10.1	29.2	49.3
EMISSION RATE						
1,3-Butadiene (39)	lb/hr	0.00361	0.00514	0.00625	0.0103	0.0160
1,3-Butadiene	lb/hr	0.00207	0.00223	0.00328	0.00514	0.00733
Benzene	lb/hr	0.00525	0.0225	0.00957	0.0286	0.0480
CARB Method 410A						
CONCENTRATION						
Benzene	PPBv	17.3	30.7	17.2	(n)	(n)
EMISSION RATE						
Benzene	lb/hr	0.0161	0.0304	0.0164	(n)	(n)
TGNMO (& CO) per AQMD M25.x						
TGNMO, as Methane						
PPMV, as measured	PPMv	3.07	2.07	2.24	2.63	2.63
Emission Rate	lb/hr	0.586	0.421	0.438	0.533	0.533
Carbon Monoxide, CO						
PPMV, as measured	PPMv	37.6	27.0	23.3	36.3	36.3
Emission Rate	lb/hr	12.5	9.58	7.96	12.8	12.8
CARB Method 436 (metals)						
CONCENTRATION						
Arsenic, As	ug/dscm	0.341	1.75	0.968	2.08	2.08
Lead, Pb	ug/dscm	1.113	0.943	0.639	0.159	0.159
EMISSION RATE						
Arsenic, As	lb/hr	9.79E-05	5.18E-04	2.80E-04	6.21E-04	6.21E-04
Lead, Pb	lb/hr	3.24E-04	2.79E-04	1.85E-04	4.77E-05	4.77E-05
US EPA Method 201A/202-PM10 & Condensible PM						
PM10 + Condensibles						
Cyclone Cut Size	um	10.53	10.73	10.71	9.72	9.72
Concentration	gr/dscf	1.98E-04	2.33E-04	2.40E-04	1.53E-04	1.53E-04
Concentration	mg/dscm	0.453	0.533	0.549	0.350	0.350
Emission Rate	lb/hr	0.131	0.158	0.159	0.107	0.107
Filterable PM10						
Concentration	gr/dscf	1.34E-04	1.28E-04	1.50E-04	5.11E-05	5.11E-05
Concentration	mg/dscm	0.306	0.294	0.342	0.117	0.117
Emission Rate	lb/hr	0.0881	0.0874	0.0991	0.0358	0.0358

(i) - This value considered an outlier and is omitted from range calculation.
(n) - not tested.

TABLE 1-11. COMPARISON OF WESP EMISSIONS TO PAST TEST DATA

Facility: Quemetco, Inc. Test Date(s): 06-15 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/05**

Test @ WESP Stack	units	**Test Results**					
		2014Air Toxics HRA Test	**2015 VOC W/RTO**	**2015 VOC W/REV**	**2015 VOC W/EAF**	**2015 VOC W/REF**	**2015 VOC W/KC**
Process Data/Rate							
Feed Rate, Metals/PM10							
Feed Rate, VOC Tests							
CARB Method 422.102/EPA Metho TO-14/15 (by on-site mobile GC-MS)							
CONCENTRATION							
1,3-Butadiene (39)	PPBv	2.24	(i) 16.7	13.6	16.2	23.3	20.1
1,3-Butadiene	PPBv	1.12	(i) 10.3	5.66	10.0	10.7	10.3
Benzene	PPBv	10.8	(i) 137	6.89	49.3	35.2	43.6
EMISSION RATE							
1,3-Butadiene (39)	lb/hr	0.00149	(i) 0.0111	0.00920	0.0109	0.0160	0.0138
1,3-Butadiene	lb/hr	7.46E-04	(i) 0.00686	0.00383	0.00674	0.00733	0.00703
Benzene	lb/hr	0.0103	(i) 0.132	0.00673	0.0480	0.0348	0.0431
CARB Method 410A							
CONCENTRATION							
Benzene	PPBv	(n)	(n)	(n)	(n)	(n)	(n)
EMISSION RATE							
Benzene	lb/hr	(n)	(n)	(n)	(n)	(n)	(n)
TGNMO (& CO) per AQMD M25.x							
TGNMO, as Methane							
PPMV, as measured	PPMv	2.63					
Emission Rate	lb/hr	0.533					
Carbon Monoxide, CO							
PPMV, as measured	PPMv	36.3					
Emission Rate	lb/hr	12.8					
CARB Method 436 (metals)							
CONCENTRATION							
Arsenic, As	ug/dscm	2.08					
Lead, Pb	ug/dscm	0.159					
EMISSION RATE							
Arsenic, As	lb/hr	6.21E-04					
Lead, Pb	lb/hr	4.77E-05					
US EPA Method 201A/202-PM10 & Condensible PM							
PM10 + Condensibles							
Cyclone Cut Size	um	9.72					
Concentration	gr/dscf	1.53E-04					
Concentration	mg/dscm	0.350					
Emission Rate	lb/hr	0.107					
Filterable PM10							
Concentration	gr/dscf	5.11E-05					
Concentration	mg/dscm	0.117					
Emission Rate	lb/hr	0.0358					

(i) - This value considered an outlier and is omitted from range calculation.
(n) - not tested.

2.0 INTRODUCTION

This document describes stationary source emissions testing and other measurements to characterize arsenic, lead, PM_{10}, Benzene and VOC emissions at the Quemetco, Inc. (Quemetco) battery recycling and lead recovery facility in Industry, California. This section describes the program and the format and content of this test report.

2.1 Project Background and Objectives

Quemetco operates a battery recycling and lead recovery facility in Industry, California. At this facility, used batteries are received, fragmented and the lead-containing materials are then recovered and purified. Various processes are employed to purify the lead until the final alloys are produced. Four of the processes at the facility include the Rotary Kiln, Reverberatory Furnace, Electric Arc Furnace and Refining Kettles. Together, these four processes account for a majority fraction of the facility's potential air contaminant emissions. In order to comply with the risk reduction requirements of SCAQMD Rule 1402, in 2008 Quemetco installed additional air pollution control equipment to mitigate emissions from these processes. These include a regenerative thermal oxidizer (RTO) to reduce emissions from the Rotary Kiln and a Wet Electrostatic Precipitator (WESP) to reduce emissions from the four main secondary lead smelting processes. In 2012, Quemetco added the combustion exhaust gases from the Refinery Kettles to the gas streams mitigated by the WESP system. The exhaust streams from these processes are combined before treatment by the WESP. Emissions from this facility are subject to regulation by the South Coast Air Quality Management District (SCAQMD) that has issued Permits for the various equipment operated by the facility. This facility operates under the conditions of the Permits and also SCAQMD Rules 1420 and 1420.1.

Quemetco has proposed the use of petroleum coke in lieu of calcined coke as stipulated in the facility's Permit to Operate. In support of this proposal, the SCAQMD authorized source emissions testing to characterize whether the change to use of petroleum coke will impact certain hazardous air pollutant (HAP) emissions as stipulated in a Temporary Permit to Operate (R&D Permit AN 582928 dated 24 June 2016). The primary objective of this project is to assess stipulated emissions from the WESP Stack and measure constituent characteristics at intermediate sampling locations while the facility operates using petroleum coke in lieu of calcined coke. A secondary objective of this project was to compare the Benzene concentration values reported by an extractive discrete Benzene monitor to reference method tests performed according to CARB Method 410A which is approved for use to determine benzene emissions along with CARB Method 422.102 and EPA Method TO-15 as specified in Rule 1420.1(k)(7) This section describes the program, and summarizes test results and operating conditions.

Quemetco retained EMCC LLC (Emc^2) to conduct test coordination and planning and to conduct comprehensive measurements to meet the project objectives. The testing was performed using test methods and sampling procedures that have prior approval pursuant to Source Test Protocols that were submitted to and approved by the SCAQMD or promulgated reference test methods, e.g., CARB Method 410A. Specifically, the Permit-required testing was conducted in accordance

with the approved Source Test Protocol for WESP Air Toxics Testing (STE Source Test File P08413 and applicable addendums) and CARB Method 410A was performed according to the promulgated method. The testing was performed while the facility was operating at its representative operating rates and process conditions were monitored on a periodic basis to verify operating conditions. Advanced Environmental Compliance LLC (AEC), HP Mobile Geochemistry, Inc. and Emc^2 performed the testing from 06-to-15 July 2016. Upon completion of the sampling activities, the samples were delivered to and analyzed by qualified laboratories according to the respective reference test methods. Testing activities were coordinated with Mr. Felipe Ortega and Mr. Mike Buckantz of Quemetco, Inc., Where applicable, Quemetco personnel collected process samples and recorded process monitoring data.

2.2 Overview of Report

This document is organized as follows. Section 1 is an Executive Summary of the project and test results. Section 2 describes the project background, objectives, and contents of this report. Section 3 presents the test results and performance test results. Section 4 describes the facility, the process, and the sampling locations. Section 5 summarizes the test approach and sampling and analysis procedures. Finally, Section 6 summarizes the quality assurance and quality control (QA/QC) activities. The Appendices contain test data and supporting information including: Certifications of No Conflict-of-Interest, diagrams of sampling locations, test data and calculations, process data, and test equipment calibrations and certifications. The Attachments include laboratory reports for analysis of the samples collected.

3.0 TEST RESULTS AND DISCUSSION

From 06-15 July 2016, Emc^2 and others performed stationary source emissions testing at the WESP Stack and at intermediate sampling locations including the RTO Inlet and Outlet and EAF Scrubber Outlet (EAF). The tests were performed during each of the three scenarios as described in Section 4. The results for the testing are presented in Tables 3-1 through 3-8. A second "A" table presents the emissions factors for each respective source. The test results and performance test results are discussed below. During each test, sampling for constituents was performed on the gases at the subject sampling location along with measurements to determine the respective gas flow rate and moisture content. The process operating rate and conditions were also recorded by the facility's monitoring systems. Detailed test results and calculations are presented in the Appendices. Other quality assurance and quality control (QA/QC) issues are discussed in Section 6.

3.1 Test Discussion, Benzene per CARB Method 410A

Testing for Benzene was performed according to reference method CARB Method 410A wherein an integrated stack gas sample was collected into a Tedlar bag and subsequently analyzed using GC-PID. The tests are also compared to the Benzene tests performed using the direct-interface GC-MS at the same locations. Finally, CARB Method 410A samples were collected for comparison with Benzene measured by the discrete Benzene monitor that sampled and analyzed WESP Stack gases. The following were observed.

SCENARIO 1 – WESP STACK AND ELECTRIC ARC FURNACE SCRUBBER (EAF)

On 06 July 2016, measurements were performed at the WESP Stack and also at the EAF Scrubber Outlet. Three consecutive samples were collected at each location and submitted to the laboratory for analysis.

- Test results for the WESP Stack are presented in Tables 1-2, 3-1 and 3-1A.
- Test results for the EAF Scrubber are presented in Tables 1-3 and 3-2.

SCENARIO 2 – WESP STACK AND RTO INLET AND OUTLET

On 13, 14 July 2016, measurements were performed at the WESP Stack and also at the Inlet and Outlet of the Thermal Oxidizer (RTO). Three consecutive samples were collected at each location each day (total of six test runs) and submitted to the laboratory for analysis.

- Test results for the WESP Stack are presented in Tables 1-4, 3-3 and 3-3A.
- Test results for the RTO Outlet are presented in Tables 1-5 and 3-4.
- Test results for the RTO Inlet are presented in Tables 1-6 and 3-5.

The CARB Method 410A tests performed on 13 July are compared to the direct-interface GC-MS tests at the RTO Inlet whereas the tests performed on 14 July are compared to the direct-interface GC-MS tests at the WESP Stack.

SCENARIO 3 – WESP STACK AND RTO INLET AND OUTLET

On 11, 12 July 2016, measurements were performed at the WESP Stack and also at the Inlet and Outlet of the Thermal Oxidizer (RTO). Three consecutive samples were collected at each location each day (total of six test runs) and submitted to the laboratory for analysis.

- Test results for the WESP Stack are presented in Tables 1-7, 3-6 and 3-6A.
- Test results for the RTO Outlet are presented in Tables 1-8 and 3-7.
- Test results for the RTO Inlet are presented in Tables 1-9 and 3-8.

The CARB Method 410A tests performed on 11 July are compared to the direct-interface GC-MS tests at the WESP Stack whereas the tests performed on 12 July are compared to the direct-interface GC-MS tests at the RTO Inlet.

COMPARISON OF DIRECT BENZENE MONITOR AND CARB METHOD 410A

A temporary Benzene monitor was installed to measure Benzene concentration in the gases discharged through the WESP Stack. The monitor collected a discrete (not-continuous) sample of the stack gas at periodic intervals. On 09 July 2016, a total of ten (10) Tedlar bag “grab“ samples were collected from the sample manifold directly upstream of the discrete Benzene analyzer. These samples were then analyzed for Benzene using CARB Method 410A and the results are compared to the concentrations reported by the Benzene monitor.

- Paired test results are presented in Table 1-10.

3.2 Test Discussion, Benzene and 1,3-Butadiene per direct-interface GC-MS

Testing for Benzene and 1,3-Butadiene was performed using a direct-interface GC-MS according to the previously approved test protocol for air toxics testing of the WESP Stack. At each location, three tests were performed where each test consisted of two consecutive direct-interface GC-MS analyses. The average of the two samples is used for subsequent calculations. The tests are also compared to the Benzene tests performed according to CARB Method 410A at the same locations. The following were observed.

SCENARIO 1 – WESP STACK AND ELECTRIC ARC FURNACE SCRUBBER (EAF)

On 06 July 2016, measurements were performed at the WESP Stack and also at the EAF Scrubber Outlet. Three tests were performed at each location.

- Test results for the WESP Stack are presented in Tables 1-2, 3-1 and 3-1A.

- Test results for the EAF Scrubber are presented in Tables 1-3 and 3-2.

SCENARIO 2 – WESP STACK AND RTO INLET AND OUTLET

On 13, 14 July 2016, measurements were performed at the WESP Stack and also at the Inlet and Outlet of the Thermal Oxidizer (RTO). One mobile laboratory was shared between the WESP Stack and RTO Inlet; therefore, three tests were performed at these locations. The other mobile laboratory was situated at the RTO Outlet for the duration of the testing. Three tests were performed by each mobile laboratory each day.

- Test results for the WESP Stack are presented in Tables 1-4, 3-3 and 3-3A. Three tests were performed on 14 July.
- Test results for the RTO Outlet are presented in Tables 1-5 and 3-4. The RTO Outlet was tested on both days and a total of six tests were performed.
- Test results for the RTO Inlet are presented in Tables 1-6 and 3-5. Three tests were performed on 13 July.

The direct-interface GC-MS tests at the RTO Inlet are compared to CARB Method 410A tests performed on 13 July whereas the tests performed at the WESP Stack are compared to the CARB Method 410A tests performed on 14 July.

SCENARIO 3 – WESP STACK AND RTO INLET AND OUTLET

On 11, 12 July 2016, measurements were performed at the WESP Stack and also at the Inlet and Outlet of the Thermal Oxidizer (RTO). As in Scenario 2, one mobile laboratory was shared between the WESP Stack and RTO Inlet. Three tests were performed by each mobile laboratory each day.

- Test results for the WESP Stack are presented in Tables 1-7, 3-6 and 3-6A. Three tests were performed on 11 July.
- Test results for the RTO Outlet are presented in Tables 1-8 and 3-7. The RTO Outlet was tested on both days and a total of six tests were performed.
- Test results for the RTO Inlet are presented in Tables 1-9 and 3-8. Three tests were performed on 12 July.

The direct-interface GC-MS tests at the WESP Stack are compared to CARB Method 410A tests performed on 11 July whereas the tests performed at the RTO Inlet are compared to the CARB Method 410A tests performed on 12 July.

3.3 Test Discussion, TGNMO and CO per SCAQMD Method 25.1/25.3

Testing for TGNMO and Carbon Monoxide (CO) was performed using SCAQMD Method 25.3 at the WESP Stack and RTO Outlet while SCAQMD Method 25.1 was used at the RTO Inlet due

to higher expected TGNMO concentrations. The testing at the WESP Stack and RTO Inlet were performed according to the previously approved test protocol for air toxics testing of the WESP Stack. The testing at the RTO Outlet was performed using the same procedures as those used at the WESP Stack. Three tests were performed each day at each location. Each test consisted of a matched pair of sampling trains as stipulated by the respective Method.

SCENARIO 1 – WESP STACK AND ELECTRIC ARC FURNACE SCRUBBER (EAF)

On 06 July 2016, measurements were performed at the WESP Stack and also at the EAF Scrubber Outlet. Three tests were performed at each location and samples were submitted to the laboratory for analysis.

- Test results for the WESP Stack are presented in Tables 1-2, 3-1 and 3-1A.
- Test results for the EAF Scrubber are presented in Tables 1-3 and 3-2.

SCENARIO 2 – WESP STACK AND RTO INLET AND OUTLET

On 13, 14 July 2016, measurements were performed at the WESP Stack and also at the Inlet and Outlet of the Thermal Oxidizer (RTO). Three tests were performed at each location each day (total of six test runs per location) and submitted to the laboratory for analysis.

- Test results for the WESP Stack are presented in Tables 1-4, 3-3 and 3-3A.
- Test results for the RTO Outlet are presented in Tables 1-5 and 3-4.
- Test results for the RTO Inlet are presented in Tables 1-6 and 3-5.

SCENARIO 3 – WESP STACK AND RTO INLET AND OUTLET

On 11, 12 July 2016, measurements were performed at the WESP Stack and also at the Inlet and Outlet of the Thermal Oxidizer (RTO). Three tests were performed at each location each day (total of six test runs per location) and submitted to the laboratory for analysis.

- Test results for the WESP Stack are presented in Tables 1-7, 3-6 and 3-6A.
- Test results for the RTO Outlet are presented in Tables 1-8 and 3-7.
- Test results for the RTO Inlet are presented in Tables 1-9 and 3-8.

3.4 Test Discussion, PM_{10} per US EPA Method 201A/AQMD Method 5.2

Testing for PM_{10} was performed at the WESP Stack according to the previously approved test protocol for air toxics testing of the WESP Stack. The filterable PM_{10} fraction was measured using an in-stack cyclone according to reference method US EPA Method 201A while the condensable fraction was measured according to reference method SCAQMD Method 5.2 including a heated probe and filter. The heated probe and filter oven in Method 5.2 was used to

prevent premature condensation and fouling of the PM_{10} backup filter. One test was performed on each of three consecutive days during each planned scenario.

The filter oven temperature in the Method 5.2 portion of the PM_{10} sampling train was maintained at 248°F ±25° during Scenario 1and later reduced to 180°F-200°F for Scenarios 2 and 3. This change was made because maintaining the filter oven temperature at 248°F ±25°F is too high to capture sulfuric acid. On 06 July 2016, the tester proposed to Peter Ko (SCAQMD) that the filter oven temperature be maintained at 180-200°F to capture sulfuric acid as well as to be consistent with past testing that utilized an in-stack back-up filter. This proposal was approved by Peter Ko via email on 07 July 2016) and implemented for Scenarios 2 and 3."

SCENARIO 1 – WESP STACK

On 06-08 July 2016, measurements were performed at the WESP Stack and the completed sampling trains were submitted to the laboratory for recovery and analysis. Test results for the WESP Stack are presented in Tables 1-2, 3-1 and 3-1A.

SCENARIO 2 – WESP STACK

On 13-15 July 2016, measurements were performed at the WESP Stack and the completed sampling trains were submitted to the laboratory for recovery and analysis. Test results for the WESP Stack are presented in Tables 1-4, 3-3 and 3-3A.

SCENARIO 3 – WESP STACK

On 10-12 July 2016, measurements were performed at the WESP Stack and the completed sampling trains were submitted to the laboratory for recovery and analysis. Test results for the WESP Stack are presented in Tables 1-7, 3-6 and 3-6A.

In all cases, the calculated D50 cut size for the PM_{10} fraction within acceptance limits stipulated by the Method (9.0um ≤ D50 ≤ 11.0um). In all cased including Scenario 2 testing, the isokinetic rate was within the acceptance limits of the Method (100%±20%).

NOTICE: Use of the PM_{10} test results reported by AEC in the attached Source Test Report is discouraged because the test data is reported at 68°F (consistent with US EPA standards) and the quantitation of total PM_{10} and condensable PM is corrected for background contaminants in the water blank, a practice which is not specified in SCAQMD Method 5.2.

3.5 Test Discussion, Arsenic and Lead per CARB Method 436

Testing for Arsenic (As) and Lead (Pb) was performed using CARB Method 436 at the WESP Stack according to the previously approved test protocol for air toxics testing of the WESP Stack. Furthermore, the testing was entirely performed by a laboratory that is approved under the SCAQMD Laboratory Approval Program (LAP) stipulated by the Permit and Rules 1420 and 1420.1.

SCENARIO 1 – WESP STACK

On 06-08 July 2016, measurements were performed at the WESP Stack and the completed sampling trains were submitted to the laboratory for recovery and analysis. Test results for the WESP Stack are presented in Tables 1-2, 3-1 and 3-1A.

SCENARIO 2 – WESP STACK

On 13-15 July 2016, measurements were performed at the WESP Stack and the completed sampling trains were submitted to the laboratory for recovery and analysis. Test results for the WESP Stack are presented in Tables 1-4, 3-3 and 3-3A.

SCENARIO 3 – WESP STACK

On 10-12 July 2016, measurements were performed at the WESP Stack and the completed sampling trains were submitted to the laboratory for recovery and analysis. Test results for the WESP Stack are presented in Tables 1-7, 3-6 and 3-6A.

The complete Source Test Report prepared by AEC is attached to this Test Report.

3.6 Comparison of Discrete Benzene Monitor and CARB Method 410A

On 09 July 2016, the temporary discrete Benzene Monitor installed to measure Benzene concentrations in the WESP Stack was compared to corresponding samples that were analyzed according to CARB Method 410A. The results for this testing and the results reported by the Benzene monitor are presented in Table 1-10.

Please note that this assessment is limited to a comparison of the analysis of the gas sample because the CARB Method 410A samples were collected at the sample gas manifold immediately upstream of the Benzene analyzer rather than directly from the WESP Stack.

3.7 Comparison of CARB Method 410A and Direct-Interface GC-MS for Benzene

During this testing, Benzene as measured by the direct-interface GC-MS was compared to corresponding measurements performed according to CARB Method 410A. The following were observed:

SCENARIO 1 – WESP STACK AND ELECTRIC ARC FURNACE SCRUBBER (EAF)

On 06 July 2016, measurements were performed at the WESP Stack and also at the EAF Scrubber Outlet. Three tests were performed at each location. Test results for the WESP Stack and EAF Scrubber Outlet are presented in Table 3-9.

SCENARIO 2 – WESP STACK AND RTO INLET AND OUTLET

On 13, 14 July 2016, measurements were performed at the WESP Stack and also at the Inlet and Outlet of the Thermal Oxidizer (RTO). One mobile laboratory was shared between the WESP Stack and RTO Inlet; therefore, three tests were performed at each of these locations. The other mobile laboratory was situated at the RTO Outlet for the duration of the testing. Three tests were performed by each mobile laboratory each day. Test results for the WESP Stack and RTO Inlet and Outlet are presented in Table 3-10.

SCENARIO 3 – WESP STACK AND RTO INLET AND OUTLET

On 11, 12 July 2016, measurements were performed at the WESP Stack and also at the Inlet and Outlet of the Thermal Oxidizer (RTO). As in Scenario 2, one mobile laboratory was shared between the WESP Stack and RTO Inlet. Three tests were performed by each mobile laboratory each day. Test results for the WESP Stack and RTO Inlet and Outlet are presented in Table 3-11.

3.8 Process Operating Conditions

The testing was performed while the overall process was operated at its maximum operating rate as determined by the feed to the Reverberatory Furnace. The average Reverberatory feed was maintained at or above 25 tons per hour. Other stack gas parameters (flow rate, temperature and moisture content) at the WESP Stack are reported in the appendices and attachments. During these tests, the process utilized petroleum coke in lieu of calcined coke according the respective scenario as planned (see Section 4).

3.9 Test Chronology

The testing was performed on 06-15 July 2016. The major testing activities were conducted as follows:

TEST CHRONOLOGY

Date	Description of Activities or Test Measurements
30-Jun-to 01 Jul.	Precondition process feed petroleum coke to REV and calcined coke to EAF.
02 Jul-to 05-Jul.	Precondition process feed petroleum coke to both REV and EAF.
06-Jul.	Scenario 1 Testing: As, Pb, PM10 and VOCs at WESP Stack. VOCs at EAF.
02 Jul-to 08-Jul.	Scenario 1 Testing: As, Pb, PM10 at WESP Stack.
09-Jul.	Sampling for comparison of discrete Benzene Monitor and CARB Method 410A.
10 Jul.	Scenario 3 Testing: As, Pb, PM10 at WESP Stack.
11 Jul-to 12-Jul.	Scenario 3 Testing: As, Pb, PM10 and VOCs at WESP Stack. VOCs at EAF.
13 Jul-to 14-Jul.	Scenario 2 Testing: As, Pb, PM10 and VOCs at WESP Stack. VOCs at EAF.
15 Jul.	Scenario 2 Testing: As, Pb, PM10 at WESP Stack. Breakdown from site.

TABLE 3-1. TEST RESULTS – SCENARIO 1 - WESP

Facility: Quemetco, Inc. Test Date(s): 06,07,08 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/02**

TEST DATA	units	**Test Results**			**Average**
Run Number	-	**1**	**2**	**3**	(MEAN)
Process Data/Rate					
Rate for:		06 Jul.2016	07 Jul.2016	08 Jul.2016	(MEAN)
Feed Rate, Metals/PM10	ton/hr				
Feed Rate, VOC Tests	ton/hr				
Sampling Data		**S1-m436-1**	**S1-m436-2**	**S1-m436-3**	
		06 Jul.2016	07 Jul.2016	08 Jul.2016	(MEAN)
Stack Temperature	°F				
Moisture	%				
Oxygen	% v/v				
Carbon Dioxide	% v/v				
Gas Velocity	ft/sec				
Stack Flow Rate	wacfm				
Stack Flow Rate	dscfm				
CARB Method 436 (metals)					
		S1-m436-1	**S1-m436-2**	**S1-m436-3**	
CONCENTRATION		06 Jul.2016	07 Jul.2016	08 Jul.2016	(MEAN)
Arsenic, As	ug/dscm	0.580	0.169	0.274	**0.341**
Lead, Pb	ug/dscm	0.650	1.177	1.513	**1.11**
EMISSION RATE					(MEAN)
Arsenic, As	lb/hr	1.635E-04	4.86E-05	8.16E-05	**9.79E-05**
Lead, Pb	lb/hr	1.83E-04	3.38E-04	4.51E-04	**3.24E-04**
EPA Method 201A/202 - PM10 & Condensible PM					
		S1-PM10-1	**S1-PM10-2**	**S1-PM10-3**	
PM10 + Condensibles		06 Jul.2016	07 Jul.2016	08 Jul.2016	(MEAN)
Cyclone Cut Size	um	10.64	10.50	10.44	**10.53**
Concentration	gr/dscf	1.65E-04	2.52E-04	1.76E-04	**1.98E-04**
Concentration	mg/dscm	0.378	0.577	0.403	**0.453**
Emission Rate	lb/hr	0.107	0.166	0.120	**0.131**
Filterable PM10					(MEAN)
Concentration	gr/dscf	1.183E-04	1.818E-04	1.00E-04	**1.34E-04**
Concentration	mg/dscm	0.271	0.416	0.230	**0.306**
Emission Rate	lb/hr	0.0763	0.1196	0.0685	**0.0881**
TGNMO (and CO) per AQMD M25.x					
		S1-W-1	**S1-W-2**	**S1-W-3**	
TGNMO, as Methane		06 Jul.2016	06 Jul.2016	06 Jul.2016	(MEAN)
PPMV, as measured	PPMv	2.72	3.50	2.99	**3.07**
Emission Rate	lb/hr	0.519	0.668	0.572	**0.586**
Carbon Monoxide, CO					(MEAN)
PPMV, as measured	PPMv	25.5	42.7	44.6	**37.6**
Emission Rate	lb/hr	8.52	14.24	14.88	**12.5**

TABLE 3-1. TEST RESULTS – SCENARIO 1 - WESP

Facility: Quemetco, Inc. Test Date(s): 06,07,08 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/02**

TEST DATA	units	**Test Results**			**Average**
Run Number	-	**1**	**2**	**3**	(MEAN)
CARB Method 410A					
		S1w-M410A-1	**S1w-M410A-2**	**S1w-M410A-3**	
CONCENTRATION		06 Jul.2016	06 Jul.2016	06 Jul.2016	(MEAN)
Benzene	PPBv	21.0	15.8	15.1	**17.3**
EMISSION RATE					(MEAN)
Benzene	lb/hr	0.0195	0.0147	0.0141	**0.0161**
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)					
		S3w-VOC-1	**S3w-VOC-2**	**S3w-VOC-3**	
CONCENTRATION	PPBv	06 Jul.2016	06 Jul.2016	06 Jul.2016	(MEAN)
1,3-Butadiene (39)	PPBv	9.85	3.81	3.17	**5.61**
1,3-Butadiene	PPBv	5.97	1.90	1.77	**3.22**
Benzene	PPBv	9.55	3.94	3.43	**5.64**
EMISSION RATE	lb/hr				(MEAN)
1,3-Butadiene (39)	lb/hr	0.00635	0.00245	0.00204	**0.00361**
1,3-Butadiene	lb/hr	0.00385	0.00123	0.00114	**0.00207**
Benzene	lb/hr	0.00888	0.00367	0.00319	**0.00525**

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-1A. EMISSION FACTORS – SCENARIO 1 - WESP

Facility: Quemetco, Inc. Test Date(s): 06,07,08 Jul.2016
Unit: WESP Stack Checked by: MF 09/02

TEST DATA	units	Emission Factors, Ef			Average
Run Number	-	1	2	3	(MEAN)
Process Data/Rate					
Rate for:		06 Jul.2016	07 Jul.2016	08 Jul.2016	
Feed Rate, Metals/PM10	ton/hr				
Feed Rate, VOC Tests	ton/hr				
CARB Method 436 (metals)					
		S1-m436-1	S1-m436-2	S1-m436-3	
EMISSION FACTOR					(MEAN)
Arsenic, As	lb/ton				
Lead, Pb	lb/ton				
EPA Method 201A/202 - PM10 & Condensible PM					
		S1-PM10-1	S1-PM10-2	S1-PM10-3	
PM10 + Condensibles		06 Jul.2016	07 Jul.2016	08 Jul.2016	(MEAN)
Emission Factor	lb/ton				
Filterable PM10					
Emission Factor	lb/ton				
TGNMO (and CO) per AQMD M25.x					
TGNMO, as Methane		S1-W-1	S1-W-2	S1-W-3	
Emission Factor	lb/ton				
Carbon Monoxide, CO					
Emission Factor	lb/ton				
CARB Method 410A					
		S1w-M410A-1	S1w-M410A-2	S1w-M410A-3	
EMISSION FACTOR					
Benzene	lb/ton				
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)					
		S3w-VOC-1	S3w-VOC-2	S3w-VOC-3	
EMISSION FACTOR		06 Jul.2016	06 Jul.2016	06 Jul.2016	(MEAN)
1,3-Butadiene (39)	lb/ton				
1,3-Butadiene	lb/ton				
Benzene	lb/ton				

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-2. TEST RESULTS – SCENARIO 1 - EAF

Facility: Quemetco, Inc. Test Date(s): 06,07,08 Jul.2016
Unit: **EAF Scrubber Outlet** Checked by: MF 08/29

TEST DATA	units	**Test Results**			**Average**
Run Number	-	**1**	**2**	**3**	(MEAN)
Process Data/Rate					
Rate for:		06 Jul.2016	07 Jul.2016	08 Jul.2016	(MEAN)
(see WESP Stack)	ton/hr				
Sampling Data		**S1-EAF-1**	**S1-EAF-2**	**S1-EAF-3**	
		06 Jul.2016	06 Jul.2016	06 Jul.2016	(MEAN)
Stack Temperature	°F				
Moisture	%				
Oxygen	% v/v				
Carbon Dioxide	% v/v				
Gas Velocity	ft/sec				
Stack Flow Rate	wacfm				
Stack Flow Rate	dscfm				
TGNMO (and CO) per AQMD M25.x					
		S1-EAF-1	**S1-EAF-2**	**S1-EAF-3**	
TGNMO, as Methane		06 Jul.2016	06 Jul.2016	06 Jul.2016	(MEAN)
PPMV, as measured	PPMv	< 1.95	5.47	2.12	**3.18**
Emission Rate	lb/hr	< 0.122	0.340	0.137	**0.200**
Carbon Monoxide, CO					(MEAN)
PPMV, as measured	PPMv	63.3	23.0	69.4	**51.9**
Emission Rate	lb/hr	6.90	2.49	7.82	**5.74**
CARB Method 410A					
		S1-EAF-1	**S1-EAF-2**	**S1-EAF-3**	
CONCENTRATION		06 Jul.2016	06 Jul.2016	06 Jul.2016	(MEAN)
Benzene	PPBv	15.30	9.60	9.50	**11.5**
EMISSION RATE					(MEAN)
Benzene	lb/hr	0.00465	0.00291	0.00299	**0.00351**
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)					
		S3w-VOC-1	**S3w-VOC-2**	**S3w-VOC-3**	
CONCENTRATION		06 Jul.2016	06 Jul.2016	06 Jul.2016	(MEAN)
1,3-Butadiene (39)	PPBv	3.83	4.27	1.07	**3.06**
1,3-Butadiene	PPBv	2.298	2.320	ND 0.963	**1.86**
Benzene	PPBv	4.47	3.49	1.41	**3.12**
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)					
EMISSION RATE					(MEAN)
1,3-Butadiene (39)	lb/hr	8.06E-04	8.95E-04	2.33E-04	**6.45E-04**
1,3-Butadiene	lb/hr	4.84E-04	4.86E-04	ND 2.10E-04	**3.93E-04**
Benzene	lb/hr	1.359E-03	1.055E-03	4.43E-04	**9.53E-04**

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-3. TEST RESULTS – SCENARIO 2 - WESP

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/04**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
Process Data/Rate									
Rate for: Reverb. Feed		13 Jul.2016	14 Jul.2016	15 Jul.2016				(MEAN)	
Feed Rate, Metals/PM10	ton/hr								
Feed Rate, VOC Tests	ton/hr								
Sampling Data		**S2-m436-1**	**S2-m436-2**	**S2-m436-3**					
		13 Jul.2016	14 Jul.2016	15 Jul.2016				(MEAN)	
Stack Temperature	°F								
Moisture	%								
Oxygen	% v/v								
Carbon Dioxide	% v/v								
Gas Velocity	ft/sec								
Stack Flow Rate	wacfm								
Stack Flow Rate	dscfm								
CARB Method 436 (metals)									
		S2-m436-1	**S2-m436-2**	**S2-m436-3**					
CONCENTRATION		13 Jul.2016	14 Jul.2016	15 Jul.2016				(MEAN)	
Arsenic, As	mg/dscm	2.000	0.976	2.268				**1.75**	
Lead, Pb	mg/dscm	0.669	0.697	1.463				**0.943**	
EMISSION RATE								(MEAN)	
Arsenic, As	lb/hr	6.00E-04	2.93E-04	6.60E-04				**5.18E-04**	
Lead, Pb	lb/hr	2.01E-04	2.10E-04	4.26E-04				**2.79E-04**	
EPA Method 201A/202 - PM10 & Condensible PM									
		S2-PM10-1	**S2-PM10-2**	**S2-PM10-3**					
PM10 + Condensibles		13 Jul.2016	14 Jul.2016	15 Jul.2016				(MEAN)	
Cyclone Cut Size	um	10.82	10.71	10.64				**10.73**	
Concentration	gr/dscf	2.91E-04	1.74E-04	2.34E-04				**2.33E-04**	
Concentration	mg/dscm	0.666	0.399	0.535				**0.533**	
Emission Rate	lb/hr	0.200	0.120	0.156				**0.158**	
Filterable PM10								(MEAN)	
Concentration	gr/dscf	2.106E-04	7.72E-05	9.70E-05				**1.28E-04**	
Concentration	mg/dscm	0.482	0.177	0.222				**0.294**	
Emission Rate	lb/hr	0.1446	0.0531	0.0646				**0.0874**	

TABLE 3-3. TEST RESULTS – SCENARIO 2 - WESP

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/04**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
TGNMO (and CO) per AQMD M25.x									
		S2w-M25.3-1	**S2w-M25.3-2**	**S2w-M25.3-3**	**S2w-M25.3-4**	**S2w-M25.3-5**	**S2w-M25.3-6**		
TGNMO, as Methane		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	
PPMV, as measured	PPMv	< 1.95	2.08	2.10	2.24	2.08	< 1.95	**2.07**	2.09
Emission Rate	lb/hr	< 0.398	0.423	0.427	0.457	0.424	< 0.398	**0.421**	0.426
Carbon Monoxide, CO								(MEAN)	
PPMV, as measured	PPMv	28.5	19.4	26.9	22.1	33.7	31.4	**27.0**	
Emission Rate	lb/hr	10.13	6.89	9.53	7.85	11.96	11.14	**9.58**	
CARB Method 410A									
		S2w-m410A-1	**S2w-m410A-2**	**S2w-m410A-3**	**S2w-m410A-4**	**S2w-m410A-5**	**S2w-m410A-6**		
CONCENTRATION		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv	20.0	49.6	52.7	15.2	23.3	23.4	**30.7**	20.6
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr	0.0198	0.0491	0.0522	0.0151	0.0231	0.0232	**0.0304**	0.0205
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)									
					S2w-VOC-4	**S2w-VOC-5**	**S2w-VOC-6**		
CONCENTRATION					14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	(MEAN)
1,3-Butadiene (39)	PPBv				14.99	3.57	3.87	**7.48**	
1,3-Butadiene	PPBv				6.32	1.71	1.73	**3.25**	
Benzene	PPBv				15.6	17.4	35.2	**22.7**	22.7
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)									
					S2w-VOC-4	**S2w-VOC-5**	**S2w-VOC-6**		
EMISSION RATE					14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	(MEAN)
1,3-Butadiene (39)	lb/hr				0.01030	0.00245	0.00266	**0.00514**	
1,3-Butadiene	lb/hr				0.00434	0.00117	0.00119	**0.00223**	
Benzene	lb/hr				0.0155	0.0173	0.0349	**0.0225**	0.0225

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-3A. EMISSION FACTORS – SCENARIO 2 - WESP

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: WESP Stack MF 09/04 **MF 09/04**

TEST DATA	units	**Emission Factors, Ef**						**Average**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	**(MEAN)**
Process Data/Rate								
Rate for:		13 Jul.2016	14 Jul.2016	15 Jul.2016				
Feed Rate, Metals/PM10	ton/hr							
Feed Rate, VOC Tests	ton/hr							
CARB Method 436 (metals)								
		S2-m436-1	**S2-m436-2**	**S2-m436-3**				
EMISSION FACTOR								
Arsenic, As	lb/ton							
Lead, Pb	lb/ton							
EPA Method 201A/202 - PM10 & Condensible PM								
		S2-PM10-1	**S2-PM10-2**	**S2-PM10-3**				
PM10 + Condensibles								(MEAN)
Emission Factor	lb/ton							
Filterable PM10								
Emission Factor	lb/ton							
TGNMO (and CO) per AQMD M25.x								
		S2w-M25.3-1	**S2w-M25.3-2**	**S2w-M25.3-3**	**S2w-M25.3-4**	**S2w-M25.3-5**	**S2w-M25.3-6**	
TGNMO, as Methane		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)
Emission Factor	lb/ton							
Carbon Monoxide, CO								
Emission Factor	lb/ton							

TABLE 3-3A. EMISSION FACTORS – SCENARIO 2 - WESP

Facility: Quemetco, Inc.
Unit: WESP Stack

Test Date(s): 13,14,15 Jul.2016
MF 09/04 **MF 09/04**

TEST DATA	units	Emission Factors, Ef						Average
Run Number	-	1	2	3	4	5	6	(MEAN)
CARB Method 410A								
		S2w-m410A-1	S2w-m410A-2	S2w-m410A-3	S2w-m410A-4	S2w-m410A-5	S2w-m410A-6	
EMISSION FACTOR		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)
Benzene	lb/ton							
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)								
					S2w-VOC-4	S2w-VOC-5	S2w-VOC-6	
EMISSION FACTOR					14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)
1,3-Butadiene (39)	lb/ton							
1,3-Butadiene	lb/ton							
Benzene	lb/ton							

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-4. TEST RESULTS – SCENARIO 2 - RTO OUTLET

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **RTO Outlet** Checked by: **MF 09/04**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
Process Data/Rate									
Rate for:		13 Jul.2016	14 Jul.2016	15 Jul.2016	.	.	.	(MEAN)	
Feed Rate, Metals/PM10	ton/hr								
Feed Rate, VOC Tests	ton/hr								
Sampling Data		**S2-OUT-1**	**S2-OUT-2**	**S2-OUT-3**	**S2-OUT-4**	**S2-OUT-5**	**S2-OUT-6**		
		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	
Stack Temperature	°F								
Moisture	%								
Oxygen	% v/v								
Carbon Dioxide	% v/v								
Gas Velocity	ft/sec								
Stack Flow Rate	wacfm								
Stack Flow Rate	dscfm								
TGNMO (and CO) per AQMD M25.x									
		S2o-M25.3-1	**S2o-M25.3-2**	**S2o-M25.3-3**	**S2o-M25.3-4**	**S2o-M25.3-5**	**S2o-M25.3-6**		
TGNMO, as Methane		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	
PPMV, as measured	PPMv	2.58	3.94	3.54	2.74	2.62	< 1.95	**2.90**	2.44
Emission Rate	lb/hr	0.1109	0.1736	0.1546	0.1224	0.1168	< 0.0879	**0.128**	0.109
Carbon Monoxide, CO								(MEAN)	
PPMV, as measured	PPMv	13.87	17.90	12.00	10.49	9.08	11.73	**12.51**	
Emission Rate	lb/hr	1.041	1.376	0.915	0.817	0.707	0.920	**0.963**	

TABLE 3-4. TEST RESULTS – SCENARIO 2 - RTO OUTLET

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **RTO Outlet** Checked by: **MF 09/04**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
CARB Method 410A									
		S2o-m410A-1	**S2o-m410A-2**	**S2o-m410A-3**	**S3o-m410A-4**	**S3o-m410A-5**	**S3o-m410A-6**		
CONCENTRATION		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv	27.8	41.5	27.5	13.2	16.1	11.3	**22.9**	13.5
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr	0.00581	0.00890	0.00585	0.00286	0.00350	0.00247	**0.00490**	0.00294
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)									
		S2o-VOC-1	**S2o-VOC-2**	**S2o-VOC-3**	**S2o-VOC-4**	**S2o-VOC-5**	**S2o-VOC-6**		
CONCENTRATION		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv	48.35	75.2	66.7	5.6	5.5	3.3	**34.1**	4.80
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr	1.012E-02	1.612E-02	1.418E-02	1.219E-03	1.185E-03	7.33E-04	**0.00726**	0.00105

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-5. TEST RESULTS – SCENARIO 2 - RTO INLET

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **RTO Inlet** Checked by: **MF 09/04**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
Process Data/Rate									
Rate for:		13 Jul.2016	14 Jul.2016	15 Jul.2016	.	.	.	(MEAN)	
Feed Rate, Metals/PM10	ton/hr								
Feed Rate, VOC Tests	ton/hr								
Sampling Data		**S2-IN-1**	**S2-IN-2**	**S2-IN-3**	**S3-IN-4**	**S3-IN-5**	**S3-IN-6**		
		13 Jul 2016	13 Jul 2016	13 Jul 2016	14 Jul 2016	14 Jul 2016	14 Jul 2016	(MEAN)	
Stack Temperature	°F								
Moisture	%								
Oxygen	% v/v								
Carbon Dioxide	% v/v								
Gas Velocity	ft/sec								
Stack Flow Rate	wacfm								
Stack Flow Rate	dscfm								
TGNMO (and CO) per AQMD M25.x									
		S2in-M25.1-1	**S2in-M25.1-2**	**S2in-M25.1-3**	**S2in-M25.1-4**	**S2in-M25.1-5**	**S2in-M25.1-6**		
TGNMO, as Methane		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	
PPMV, as measured	PPMv	604	209	546	197	355	696	**434**	453
Emission Rate	lb/hr	25.83	8.42	22.74	7.73	13.78	27.97	**17.7**	19.0
Carbon Monoxide, CO								(MEAN)	
PPMV, as measured	PPMv	284	234	507	202	257	173	**276**	
Emission Rate	lb/hr	21.16	16.48	36.86	13.81	17.37	12.14	**19.6**	

TABLE 3-5. TEST RESULTS – SCENARIO 2 - RTO INLET

Facility: Quemetco, Inc. Test Date(s): 13,14,15 Jul.2016
Unit: **RTO Inlet** Checked by: **MF 09/04**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
CARB Method 410A									
		S2in-m410A-1	**S2in-m410A-2**	**S2in-m410A-3**	**S2in-m410A-4**	**S2in-m410A-5**	**S2in-m410A-6**		
CONCENTRATION		13 Jul.2016	13 Jul.2016	13 Jul.2016	14 Jul.2016	14 Jul.2016	14 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv	1,280	1,820	2,232	1,549	1,295	655	**1,472**	1,777
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr	0.267	0.358	0.453	0.296	0.245	0.128	**0.291**	0.359
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)									
		S2in-VOC-1	**S2in-VOC-2**	**S2in-VOC-3**					
CONCENTRATION		13 Jul.2016	13 Jul.2016	13 Jul.2016				(MEAN)	(MEAN)
Benzene	PPBv	2,076	2,622	4,244				**2,981**	2,981
EMISSION RATE		13 Jul.2016	13 Jul.2016	13 Jul.2016				(MEAN)	(MEAN)
Benzene	lb/hr	0.432	0.515	0.861				**0.603**	0.603

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-6. TEST RESULTS – SCENARIO 3 - WESP

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/02**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
Process Data/Rate									
Rate for:		10 Jul.2016	11 Jul.2016	12 Jul.2016				(MEAN)	
Feed Rate, Metals/PM10	ton/hr								
Feed Rate, VOC Tests	ton/hr								
Sampling Data		**S3-m436-1**	**S3-m436-2**	**S3-m436-3**					
		10 Jul.2016	11 Jul.2016	12 Jul.2016				(MEAN)	
Stack Temperature	°F								
Moisture	%								
Oxygen	% v/v								
Carbon Dioxide	% v/v								
Gas Velocity	ft/sec								
Stack Flow Rate	wacfm								
Stack Flow Rate	dscfm								
CARB Method 436 (metals)									
		S3-m436-1	**S3-m436-2**	**S3-m436-3**					
CONCENTRATION		10 Jul.2016	11 Jul.2016	12 Jul.2016				(MEAN)	
Arsenic, As	mg/dscm	0.461	0.788	1.655				**0.968**	
Lead, Pb	mg/dscm	0.626	0.788	0.504				**0.639**	
EMISSION RATE								(MEAN)	
Arsenic, As	lb/hr	1.34E-04	2.27E-04	4.80E-04				**2.80E-04**	
Lead, Pb	lb/hr	1.81E-04	2.27E-04	1.46E-04				**1.85E-04**	
EPA Method 201A/202 - PM10 & Condensible PM									
		S3-PM10-1	**S3-PM10-2**	**S3-PM10-3**					
PM10 + Condensibles		10 Jul.2016	11 Jul.2016	12 Jul.2016				(MEAN)	
Cyclone Cut Size	um	10.67	10.79	10.67				**10.71**	
Concentration	gr/dscf	2.55E-04	2.10E-04	2.55E-04				**2.40E-04**	
Concentration	mg/dscm	0.583	0.481	0.585				**0.549**	
Emission Rate	lb/hr	0.169	0.139	0.169				**0.159**	
Filterable PM10								(MEAN)	
Concentration	gr/dscf	1.47E-04	1.50E-04	1.52E-04				**1.50E-04**	
Concentration	mg/dscm	0.336	0.344	0.348				**0.342**	
Emission Rate	lb/hr	0.0973	0.0991	0.1008				**0.0991**	

TABLE 3-6. TEST RESULTS – SCENARIO 3 - WESP

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **WESP Stack** Checked by: **MF 09/02**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
TGNMO (and CO) per AQMD M25.x									
		S3w-M25.3-1	**S3w-M25.3-2**	**S3w-M25.3-3**	**S3w-M25.3-4**	**S3w-M25.3-5**	**S3w-M25.3-6**		
TGNMO, as Methane		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	
PPMV, as measured	PPMv	3.48	< 1.95	< 1.95	< 1.95	2.13	< 1.95	**2.24**	2.46
Emission Rate	lb/hr	0.679	< 0.382	< 0.382	< 0.384	0.418	< 0.384	**0.438**	0.481
Carbon Monoxide, CO								(MEAN)	
PPMV, as measured	PPMv	24.4	31.9	22.7	18.2	19.8	22.7	**23.3**	
Emission Rate	lb/hr	8.33	10.88	7.74	6.24	6.77	7.78	**7.96**	
CARB Method 410A									
		S3w-m410A-1	**S3w-m410A-2**	**S3w-m410A-3**	**S3w-m410A-4**	**S3w-m410A-5**	**S3w-m410A-6**		
CONCENTRATION		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv	15.8	11.3	11.4	16.8	24.8	23.0	**17.2**	12.8
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr	0.0150	0.0108	0.0108	0.0161	0.0237	0.0220	**0.0164**	0.0122
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)									
		S3w-VOC-1	**S3w-VOC-2**	**S3w-VOC-3**					
CONCENTRATION		11 Jul.2016	11 Jul.2016	11 Jul.2016				(MEAN)	(MEAN)
1,3-Butadiene (39)	PPBv	15.10	7.00	6.35				**9.48**	
1,3-Butadiene	PPBv	7.22	4.60	3.13				**4.98**	
Benzene	PPBv	12.88	7.73	9.55				**10.1**	10.05
EMISSION RATE								(MEAN)	(MEAN)
1,3-Butadiene (39)	lb/hr	0.00995	0.00461	0.00418				**0.00625**	
1,3-Butadiene	lb/hr	0.00476	0.00303	0.00206				**0.00328**	
Benzene	lb/hr	0.01226	0.00735	0.00908				**0.00957**	0.00957

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-6A. EMISSION FACTORS – SCENARIO 3 - WESP

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: WESP Stack Checked by: **MF 09/02**

TEST DATA	units	**Emission Factors, Ef**						**Average**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	**(MEAN)**
Process Data/Rate								
Rate for:		10 Jul.2016	11 Jul.2016	12 Jul.2016				
Feed Rate, Metals/PM10	ton/hr							
Feed Rate, VOC Tests	ton/hr							
CARB Method 436 (metals)								
		S3-m436-1	**S3-m436-2**	**S3-m436-3**				
EMISSION FACTOR								(MEAN)
Arsenic, As	lb/ton							
Lead, Pb	lb/ton							
EPA Method 201A/202 - PM10 & Condensible PM								
		S3-PM10-1	**S3-PM10-2**	**S3-PM10-3**				
PM10 + Condensibles								(MEAN)
Emission Factor	lb/ton							
Filterable PM10								
Emission Factor	lb/ton							
TGNMO (and CO) per AQMD M25.x								
		S3w-M25.3-1	**S3w-M25.3-2**	**S3w-M25.3-3**	**S3w-M25.3-4**	**S3w-M25.3-5**	**S3w-M25.3-6**	
TGNMO, as Methane		11 Jul 2016	11 Jul 2016	11 Jul 2016	12 Jul 2016	12 Jul 2016	12 Jul.2016	(MEAN)
Emission Factor	lb/ton							
Carbon Monoxide, CO								
Emission Factor	lb/ton							

TABLE 3-6A. EMISSION FACTORS – SCENARIO 3 - WESP

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: WESP Stack Checked by: **MF 09/02**

TEST DATA	units	**Emission Factors, Ef**						**Average**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	**(MEAN)**
CARB Method 410A								
		S3w-m410A-1	**S3w-m410A-2**	**S3w-m410A-3**	**S3w-m410A-4**	**S3w-m410A-5**	**S3w-m410A-6**	
EMISSION FACTOR		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)
Benzene	lb/ton							
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)								
		S3w-VOC-1	**S3w-VOC-2**	**S3w-VOC-3**				
EMISSION FACTOR		11 Jul.2016	11 Jul.2016	11 Jul.2016				(MEAN)
1,3-Butadiene (39)	lb/ton							
1,3-Butadiene	lb/ton							
Benzene	lb/ton							

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-7. TEST RESULTS – SCENARIO 3 - RTO OUTLET

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **RTO Outlet** Checked by: **MF 09/03**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
Process Data/Rate									
Rate for:		10 Jul.2016	11 Jul.2016	12 Jul.2016				(MEAN)	
Feed Rate, Metals/PM10	ton/hr								
Feed Rate, VOC Tests	ton/hr								
Sampling Data		**S3-OUT-1**	**S3-OUT-2**	**S3-OUT-3**	**S3-OUT-4**	**S3-OUT-5**	**S3-OUT-6**		
		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	
Stack Temperature	°F								
Moisture	%								
Oxygen	% v/v								
Carbon Dioxide	% v/v								
Gas Velocity	ft/sec								
Stack Flow Rate	wacfm								
Stack Flow Rate	dscfm								
TGNMO (and CO) per AQMD M25.x									
		S3o-M25.3-1	**S3o-M25.3-2**	**S3o-M25.3-3**	**S3o-M25.3-4**	**S3o-M25.3-5**	**S3o-M25.3-6**		
TGNMO, as Methane		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	
PPMV, as measured	PPMv	2.61	4.60	2.83	2.19	2.05	< 1.95	**2.71**	3.35
Emission Rate	lb/hr	0.1170	0.2060	0.1297	0.0960	0.0899	< 0.0856	**0.121**	0.151
Carbon Monoxide, CO								(MEAN)	
PPMV, as measured	PPMv	18.32	17.70	13.65	11.58	8.76	14.10	**14.0**	
Emission Rate	lb/hr	1.432	1.384	1.090	0.884	0.671	1.078	**1.09**	

TABLE 3-7. TEST RESULTS – SCENARIO 3 - RTO OUTLET

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **RTO Outlet** Checked by: **MF 09/03**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
CARB Method 410A									
		S3o-m410A-1	**S3o-m410A-2**	**S3o-m410A-3**	**S3o-m410A-4**	**S3o-m410A-5**	**S3o-m410A-6**		
CONCENTRATION		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv	28.5	75.8	16.9	18.5	24.1	30.9	**32.5**	40.4
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr	0.00622	0.01654	0.00377	0.00394	0.00516	0.00659	**0.00704**	0.00884
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)									
		S3w-VOC-1	**S3w-VOC-2**	**S3w-VOC-3**	**S3o-VOC-4**	**S3o-VOC-5**	**S3o-VOC-6**		
CONCENTRATION		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv	38.34	27.1	23.8	24.2	54.0	28.5	**32.7**	29.8
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr	0.00836	0.00592	0.00530	0.00517	0.01154	0.00608	**0.00706**	0.00653

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-8. TEST RESULTS – SCENARIO 3 - RTO INLET

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **RTO Inlet** Checked by: **MF 09/02**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
Process Data/Rate									
Rate for:		10 Jul.2016	11 Jul.2016	12 Jul.2016	.	.	.	(MEAN)	
Feed Rate, Metals/PM10	ton/hr								
Feed Rate, VOC Tests	ton/hr								
Sampling Data		**S3-IN-1**	**S3-IN-2**	**S3-IN-3**	**S3-IN-4**	**S3-IN-5**	**S3-IN-6**		
		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	
Stack Temperature	°F								
Moisture	%								
Oxygen	% v/v								
Carbon Dioxide	% v/v								
Gas Velocity	ft/sec								
Stack Flow Rate	wacfm								
Stack Flow Rate	dscfm								
TGNMO (and CO) per AQMD M25.x									
		S3in-m25.1-1	**S3in-m25.1-2**	**S3in-m25.1-3**	**S3in-m25.1-4**	**S3in-m25.1-5**	**S3in-m25.1-6**		
TGNMO, as Methane		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	
PPMV, as measured	PPMv	372	526	(1) 459	244	450	255	**384**	317
Emission Rate	lb/hr	14.9	20.5	(1) 17.8	10.2	18.3	10.3	**15.3**	12.9
Carbon Monoxide, CO								(MEAN)	
PPMV, as measured	PPMv	349	458	277	262	258	327	**322**	
Emission Rate	lb/hr	24.4	31.1	18.7	19.2	18.3	22.9	**22.4**	

TABLE 3-8. TEST RESULTS – SCENARIO 3 - RTO INLET

Facility: Quemetco, Inc. Test Date(s): 10,11,12 Jul.2016
Unit: **RTO Inlet** Checked by: **MF 09/02**

TEST DATA	units	**Test Results**						**Average**	**Comparison**
Run Number	-	**1**	**2**	**3**	**4**	**5**	**6**	(MEAN)	(MEAN)
CARB Method 410A									
		S3in-m410A-1	**S3in-m410A-2**	**S3in-m410A-3**	**S3in-m410A-4**	**S3in-m410A-6**	**S3in-m410A-6**		
CONCENTRATION		11 Jul.2016	11 Jul.2016	11 Jul.2016	12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv	1,579	2,037	1,339	1,431	2,000	1,829	**1,702**	1,753
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr	0.308	0.386	0.252	0.293	0.395	0.358	**0.332**	0.348
CARB Method 422.102/EPA Method TO-14/15 (by on-site mobile GC-MS)									
					S3in-VOC-4	**S3in-VOC-5**	**S3in-VOC-6**		
CONCENTRATION					12 Jul.2016	12 Jul.2016	12 Jul.2016	(MEAN)	(MEAN)
Benzene	PPBv				1,228	2,258	1,622	**1,702**	1,702
EMISSION RATE								(MEAN)	(MEAN)
Benzene	lb/hr				0.251	0.446	0.317	**0.338**	0.338

ND or "<" - None detected, Reporting Limit (RL) is reported.
(1) - Test result based on Run-3B.

TABLE 3-9. TEST RESULTS – BENZENE COMPARISON - SCENARIO 1

Facility: Quemetco, Inc. Test Date(s): 06 Jul.2016
Unit: **EAF & WESP Stack** Checked by: MF 08/30

Test @ WESP Stack		**CONCENTRATION (PPBv)**		Difference	
		CARB M410A	DI-GC-MS	Δ (PPBv)	RPD(%)
WESP	Test #1	21.00	9.55	-11	-75
WESP	Test #2	15.80	3.94	-12	-120
WESP	Test #3	15.10	3.43	-12	-126
WESP	Average	17.30	5.64	-12	-102

Test @ EAF Scrubber Outle		**CONCENTRATION (PPBv)**		Difference	
		CARB M410A	DI-GC-MS	Δ (PPBv)	RPD(%)
RTO Outlet	Test #1	15.30	4.47	-11	-110
RTO Outlet	Test #2	9.60	3.49	-6	-93
RTO Outlet	Test #3	9.50	1.41	-8	-148
RTO Outlet	Average	11.47	3.12	-8	-114

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-10. TEST RESULTS – BENZENE COMPARISON - SCENARIO 2

Facility: Quemetco, Inc. Test Date(s): 13,14 Jul.2016
Unit: **RTO & WESP Stack** Checked by: MF 09/05

Test @ WESP Stack		**CONCENTRATION (PPBv)**		Difference	
		CARB M410A	DI-GC-MS	Δ (PPBv)	RPD(%)
WESP	Test #4	15.2	15.6	0	3
WESP	Test #5	23.3	17.4	-6	-29
WESP	Test #6	23.4	35.2	12	40
WESP	Average	20.6	22.7	2	10

Test @ RTO Outlet		**CONCENTRATION (PPBv)**		Difference	
		CARB M410A	DI-GC-MS	Δ (PPBv)	RPD(%)
RTO Outlet	Test #1	27.75	48.35	21	54
RTO Outlet	Test #2	41.50	75.17	34	58
RTO Outlet	Test #3	27.50	66.68	39	83
RTO Outlet	Test #4	13.15	5.61	-8	-80
RTO Outlet	Test #5	16.10	5.46	-11	-99
RTO Outlet	Test #6	11.30	3.35	-8	-109
RTO Outlet	Average	22.9	34.1	11	39

Test @ RTO Inlet		**CONCENTRATION (PPBv)**		Difference	
		CARB M410A	DI-GC-MS	Δ (PPBv)	RPD(%)
RTO Inlet	Test #1	1,280	2,076	796	47
RTO Inlet	Test #2	1,820	2,622	802	36
RTO Inlet	Test #3	2,232	4,244	2,012	62
RTO Inlet	Average	1,777	2,981	1,203	51

ND or "<" - None detected, Reporting Limit (RL) is reported.

TABLE 3-11. TEST RESULTS – BENZENE COMPARISON - SCENARIO 3

Facility: Quemetco, Inc. Test Date(s): 11,12 Jul.2016
Unit: **RTO & WESP Stack** Checked by: MF 09/05

Test @ WESP Stack		**CONCENTRATION (PPBv)**		Difference	
		CARB M410A	DI-GC-MS	Δ (PPBv)	RPD(%)
WESP	Test #1	15.75	12.88	-3	-20
WESP	Test #2	11.30	7.73	-4	-38
WESP	Test #3	11.40	9.55	-2	-18
WESP	Average	12.82	10.05	-3	-24

Test @ RTO Outlet		**CONCENTRATION (PPBv)**		Difference	
		CARB M410A	DI-GC-MS	Δ (PPBv)	RPD(%)
RTO Outlet	Test #1	28.5	38.3	10	29
RTO Outlet	Test #2	75.8	27.1	-49	-95
RTO Outlet	Test #3	16.9	23.8	7	34
RTO Outlet	Test #4	18.5	24.2	6	27
RTO Outlet	Test #5	24.1	54.0	30	76
RTO Outlet	Test #6	30.9	28.5	-2	-8
RTO Outlet	Average	32.5	32.7	0	1

Test @ RTO Inlet		**CONCENTRATION (PPBv)**		Difference	
		CARB M410A	DI-GC-MS	Δ (PPBv)	RPD(%)
RTO Inlet	Test #4	1,431	1,228	-203	-15
RTO Inlet	Test #5	2,000	2,258	259	12
RTO Inlet	Test #6	1,829	1,622	-208	-12
RTO Inlet	Average	1,753	1,702	-51	-3

ND or "<" - None detected, Reporting Limit (RL) is reported.

4.0 EQUIPMENT AND PROCESS DESCRIPTION

This section describes the test site and sampling locations that were used for field testing. Quemetco, Inc. (Quemetco) operates a battery recycling and lead recovery facility in Industry, California. At this facility, used batteries are received, fragmented and the lead-containing materials are then recovered and purified. The following describes the facility, the process, and the proposed test locations.

4.1 Equipment Description

Various processes are employed to purify the lead until the final alloys are produced. Four of the processes at the facility include the Rotary Kiln, Reverberatory Furnace, Electric Arc Furnace and Refining Kettles. Together, these four processes account for a majority fraction of the facility's potential air contaminant emissions. In order to comply with the risk reduction requirements of SCAQMD Rule 1402, in 2008 Quemetco installed additional air pollution control equipment to mitigate emissions from these processes. These include a regenerative thermal oxidizer (RTO) to reduce emissions from the Rotary Kiln and a Wet Electrostatic Precipitator (WESP) to reduce emissions from the four main secondary lead smelting processes. In 2012, Quemetco added the combustion exhaust gases from the Refinery Kettles to the gas streams mitigated by the WESP system. The exhaust streams from these processes are combined before treatment by the WESP.

4.1.1 PROCESS EQUIPMENT

The equipment under investigation mitigates emissions from four processes including the Rotary Kiln, Reverberatory Furnace, Electric Arc Furnace, and Refining Kettles. These processes are described as follows:

- The Rotary Kiln (a.k.a. Sanitary Kiln, SAN) is a pre-dryer tasked with reducing moisture in the material feed. Moisture-laden material is fed to the kiln where a natural gas-fired burner vaporizes water, drying the material. The burner is rated at 10 MMBtu/hr maximum heat input and the process incorporates oxygen enrichment. The rotary dryer exhaust temperature is limited to no more than 330°F. The dried material exiting the Rotary Kiln is conveyed to the Reverberatory Furnace where the solids are converted to molten metal. Rotary Kiln exhaust gases are routed through a baghouse and then treated by the new regenerative thermal oxidizer (RTO) before they are routed to the WESP for further treatment.
- The Reverberatory Furnace (Reverb, REV) converts solid materials to molten metal. The molten material exiting the Reverb is conveyed to the refining kettles where they are purified into final product. Reverb process gases are routed through a baghouse, quench tank, and scrubber before they are routed to the WESP for further treatment. Fugitive emissions from this process are captured by a total enclosure, treated separately by Busch Unit C, then discharged to the atmosphere.

- Some of the molten material from the Reverberatory Furnace is directed to the Electric Arc Furnace (EAF), also known as the Slag Reduction Furnace (SRF). The EAF processes these materials to recover lead and to reduce contaminants. The processed material exiting the EAF is conveyed to the refining kettles where they are purified into final product. EAF process gases are routed through a baghouse and a scrubber before they are routed to the WESP for further treatment. Fugitive emissions from this process are captured by a total enclosure, treated separately by Busch Unit H, and then discharged to the atmosphere.

- Quemetco currently operates seven refinery kettles where molten lead is purified and refined into final alloys before casting. There are three types of emissions that can be generated in the Refinery: kettle process emissions, fugitive emissions and refinery burner combustion exhaust gases. The kettles are equipped with ventilation hoods to capture process emissions from the refining activities. These process emissions are treated by the Refinery Baghouse (Device C21) before they are routed to the WESP for further treatment. And, the kettles are operated within a total enclosure that captures any fugitive emissions and routes the captured gases to a Busch unit (baghouse) that treats the fugitive emissions and discharges the cleaned gases to the atmosphere. Finally, the kettles are heated by natural gas-fired burners and these combustion gases are collected in discharged through a common exhaust. Since the 2010 test of the WESP and RTO an additional emissions source has been added upstream of the WESP. The Refinery Kettles Combustion Exhaust which was previously vented to atmosphere is now controlled by the WESP.

4.1.2 PROCESS WESP AND ROTARY KILN RTO

The first component of the APCD under investigation is the RTO which receives contaminant-laden gases from the Rotary Kiln and treats them to remove organic contaminants. These treated gases are combined with the vent streams from the other three processes into a single gas stream that is treated by a wet electrostatic precipitator (WESP) before the treated gases are finally vented to atmosphere. The following describe the APCDs.

- The RTO is designed to reduce organic gases from the sanitary kiln. The high degree of heat recovery achieved is the result of regenerative heat transfer. The VOC-laden process air enters a porous bed filled with high-temperature, low-pressure drop-ceramic heat transfer media. The incoming VOC-laden process air is preheated by the first heat recovery bed, passes through a central combustion chamber where the hydrocarbons are oxidized at 1500 degrees F to carbon dioxide and water vapor, and then exits a second heat-recovery bed where heat is transferred from the purified hot air back into the second bed. In order to provide even temperature distribution throughout the dual-chamber RTO, the process gas flow direction is changed at regular intervals by automatic valve flow control switching mechanism. This maintains an even temperature profile between the dual chambers of the ceramic media.

- The WESP is designed to treat the gases from the Sanitary Kiln, Reverberatory Furnace, Electric Arc Furnace and the Refinery Kettles based on the historical gas characteristics. The WESP is an upflow design with a Condenser/Absorber (C/A) in the lower section. This will allow the gas to be sub-cooled prior to entering the collection section of the WESP, which has hexagonal collection tubes. Sub-cooling in the C/A offers several advantages. Water is condensed on the fine particulate, which results in higher collection efficiency in the WESP. The gas volume is reduced which allows the WESP collection section to be smaller. Also, sub-cooling ensures that the condensable components in the gas stream are condensed as much as possible prior to entering the collection section of the WESP. This is important because only condensed components, along with solids and gases attached to their surfaces, will be collected. Lastly, the gas is cooled to 100°F or lower which will eliminate virtually the entire water vapor plume.

4.2 Sampling Locations

The sampling locations identified for testing are shown in Figure 4-1 and summarized below. These locations include gas sampling at the WESP Outlet (Stack) and intermediate locations for the RTO Outlet (RTO), Electric Arc Furnace (EAF), Kettle Burner Combustion Stack (KC), Refinery Kettle Process Vents (REF) and Reverberatory Furnace (REF). The sampling locations are described below.

SUMMARY OF GAS SAMPLING LOCATIONS

Sample Type	Sample Location	Unusual Sampling Conditions?	Comments
GAS	WESP Outlet (Stack)	NO	Keep Centroid Clear to avoid interfering with CEMS
GAS	RTO Outlet	NO	Round Duct (2-ports)
GAS	EAF Scrubber Outlet	NO	Round Duct (2-ports)

4.3 Process Operating Conditions During Testing

The key operating rate is the Feed Rate of material to the Reverberatory Furnace. Other process operating conditions were also reported, where applicable. Generally, testing was performed while the applicable processes were operated at their maximum sustainable operating rates and within normal operating parameters. In rare cases, the planned process operating rate could not be sustained due to equipment malfunction. When this occurred, sampling was interrupted or temporarily postponed until planned operating rates were restored. These “upsets” did not affect overall test results.

4.3.1 PLANNED OPERATING SCENARIOS

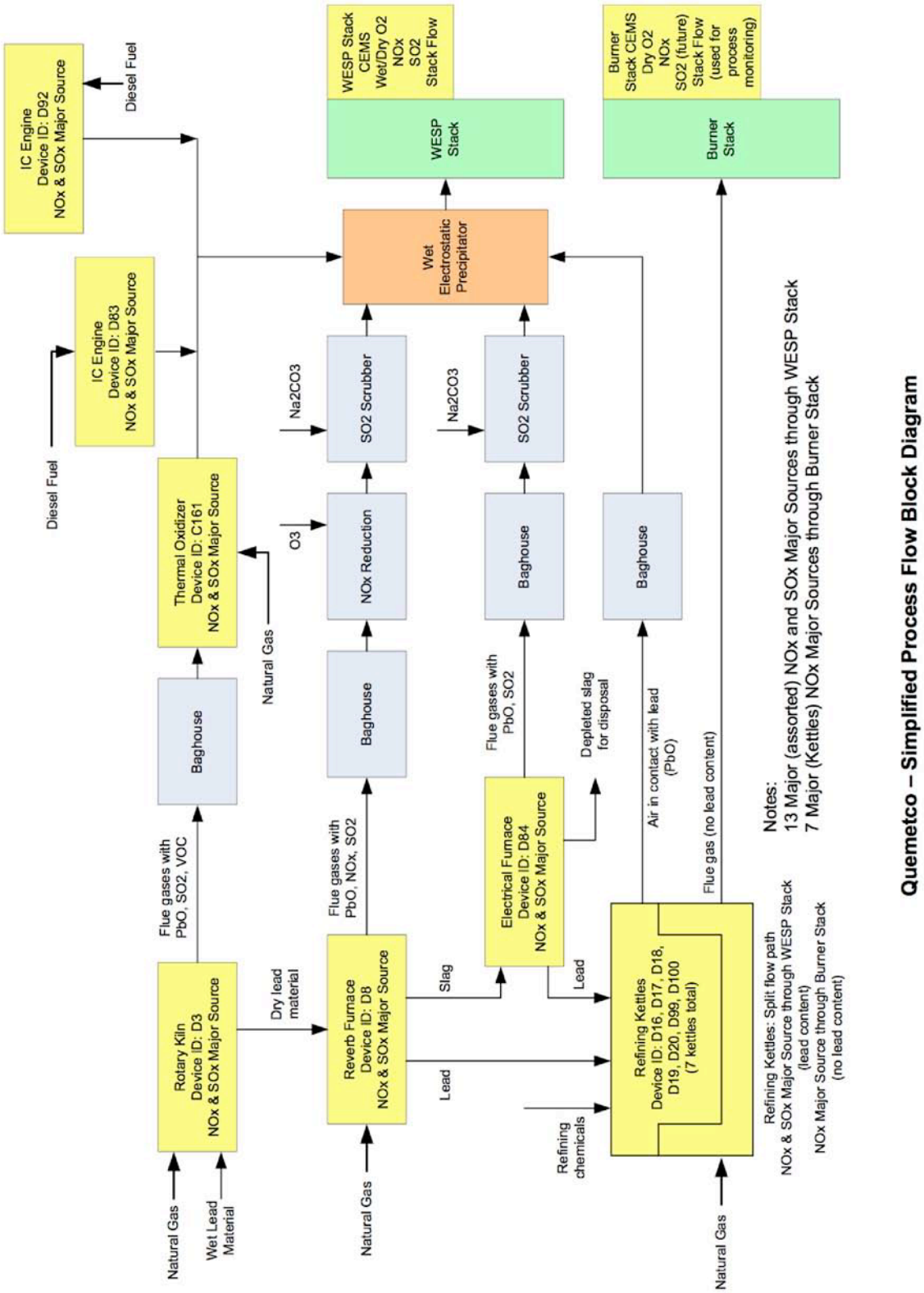
The objective of this project is to assess target constituents at the WESP Stack and at intermediate process emissions when the facility utilizes petroleum coke in lieu of calcined coke. According to the test plan, three scenarios were investigated including:

- Scenario 1 where petroleum coke was charged to the EAF and calcined coke was charged to the REV.
- Scenario 2 where petroleum coke was charged to the REV and calcined coke was charged to the EAF.
- Scenario 3 where petroleum coke was charged to both the REV and EAF and no calcined coke was used in these processes.

TABLE 4-1. PROCESS OPERATING CONDITIONS

[SEE ATTACHMENT 22]

Figure 4-1. Process Overview



5.0 SAMPLING AND ANALYSIS METHODOLOGY

Sampling and analysis were performed according to reference methods promulgated by the SCAQMD, CARB, or U.S. EPA. The following include discussions of the test approach and brief descriptions of applicable test procedures including any modifications to reference procedures necessary for this test program.

The overall sampling and analysis program includes testing at four locations: WESP Stack, EAF Scrubber Outlet and RTO Inlet and Outlet. Tests were conducted according to applicable reference test methods while process operating conditions were monitored and recorded to ensure that the test results are representative of planned operations. The testing incorporated pretest planning and coordination, pretest preparations, field sampling, process monitoring, sample analysis, data reduction and validation, and reporting activities as described below.

5.1 Flue Gas Sampling and Analysis Procedures

Sampling and analysis were performed according to reference methods promulgated by the South Coast Air Quality Management District (SCAQMD), the California Air Resources Board (CARB), or the US Environmental Protection Agency (EPA), except as noted below. The following include discussions of the test approach and brief descriptions of applicable test procedures including any modifications to reference procedures necessary for this test program.

5.1.1 TEST APPROACH

The testing characterized criteria and hazardous air pollutant emissions from the WESP Stack (vent to atmosphere), the EAF Scrubber Outlet and the RTO Inlet and Outlet. The testing included measurements for O_2, CO_2, stack gas temperature, pressure, molecular weight, and moisture to characterize the flue gas conditions during the testing. In general, test measurements were performed in triplicate and other measurements were performed as single tests or replicate tests where applicable. The flue gas sampling and analysis methodology are summarized below (these methodology are discussed further in the referenced Test Protocol and specified reference methods.

5.1.2 SAMPLING PARAMETERS AND TOXIC AIR CONTAMINANTS

- *Sampling Locations and Stack Gas Parameters* including sample traverse points, volumetric flow rate and moisture content were measured during isokinetic testing, where applicable; otherwise, concurrent measurements of stack gas parameters were performed according to SCAQMD Methods 2 through 4.

- *Stack Constituents, O_2 and/or CO_2*, were determined using a CEMS or measured in an integrated sample that was analyzed according to SCAQMD Method 3.1 (Orsat) or assumed to be equal to air, where applicable.

- *Benzene and 1,3-Butadiene* were measured at the WESP Stack and Process Vents in samples collected via a direct interface per CARB Method 422.102; however, the constituent was identified and quantified by a GC-MS according to US EPA Method TO-15 in lieu of the referenced GC-TCD or FID. Each test run consisted of a two consecutive "direct-injections" where an injection was a measured volume of the stack gas flowing DIRECTLY from the sample line into the sample loop of the analyzer. To clarify, the SAMPLE was NOT collected into a Tedlar bag or Summa-passivated canister. A total of six injections were analyzed and consecutive pairs were averaged to determine three tests at each location. The respective sampling system was installed and maintained by the source test firm while the samples were analyzed via a dedicated on-site GC-MS.

- *Benzene* was also measured at the WESP Stack and other locations using time-integrated Tedlar bag samples and GC-PID analysis according to CARB Method 410A. Each sample was collected over 60 minutes where the sampling rate was controlled in an "evacuated-lung" sampler.

- *Reactive Organic Gases (ROG), as TGNMO, and Carbon Monoxide (CO)* were measured at the WESP Stack and RTO Outlet according to SCAQMD Method 25.3. Per the EPA stipulation, a bias factor of 1.086 is included in the quantitation. TGNMO was measured at the RTO Inlet according to SCAQMD Method 25.1. At each location, a single test measurement consisted of a paired duplicate per the Method. Three tests were performed at each location.

- *Particulate Matter less than 10 microns (PM_{10}), filterable PM_{10} and condensable PM* were measured at the WESP Stack according to US EPA Method 201A where the condensable fraction (back-half) were recovered and analyzed according to the applicable procedures of SCAQMD Method 5.2. Three tests were performed according to the referenced methodology where the sampling time varied according to the sampling conditions required to maintain the proper particle separation, "cut size".

- *Arsenic (As) and Lead (Pb)* were measured at the WESP Stack according to CARB Method 436. Three ten-hour isokinetic tests were performed concurrently at the respective locations. Per recent guidance stipulated by SCAQMD, a laboratory that is approved under the Laboratory Approval Program (LAP) performed the arsenic and multi metals testing (report attached).

5.1.3 SAMPLE ANALYSIS

The direct-interface GC/MS samples were immediately analyzed by an onsite GC/MS according to U.S. EPA Method TO-15. Other collected samples were recovered and/or transported to analytical laboratories for recovery and analysis, where applicable. Samples collected during field testing were tracked in a formal Sample Handling and Custody Program that incorporates "cradle-to-grave" custody procedures. Samples were separated into common groups by analytical requirements, maintained under applicable storage conditions, packed and shipped or delivered to the respective laboratory. At the laboratory, the samples were inspected, logged-into

the laboratory's sample tracking system, and then analyzed according to the respective Method. Test results were reported in a formal laboratory report that includes a data package (e.g. Level-4 QC Data Package) containing all data necessary to validate test results.

5.2 Process Monitoring

Applicable process parameters were monitored to document process operation during the testing. This data is required to document the process rates and operating conditions during testing and includes collection of process samples, if applicable. Generally, these data are consistent with normal operations. If the process data are not consistent with normal operations, then the respective testing must be qualified and bias, if any, must be assessed. Generally, sampling did not proceed if the facility was not operating at the desired testing conditions. Key process monitored parameters include:

- Petroleum Coke Feed (Rotary Dryer, Reverberatory Furnace and EAF)
- Process Feed (Reverberatory Furnace and Rotary Kiln) including supporting data (e.g., Loadrite)
- Gaseous Feed (Natural Gas, Propane, Combustion Air, Enrichment Oxygen)
- WESP Operating Data (WESP cell voltage, pH, scrubber liquid temperature, and recirculation flowrates for all WESP towers)
- Thermal Oxidizer Firing Rate (gas consumption)
- Thermal Oxidizer Temperature, Inlet and Outlet
- WESP Stack RECLAIM NOX/SOX CEMS data
- Multiple-Metals CEMS data
- Benzene Monitor Data
- Other process data necessary to establish operating conditions during testing.

Documenting the process design and operating conditions is two-fold. First, the equipment conditions and process operating conditions (e.g. load) were recorded before and after testing; and, key process parameters were monitored, either by instrumentation or by hand, during test periods, where applicable. Then, the process data were reduced to characterize key process parameters on an hourly-average basis. Particular attention was given to parameters that could be used to determine representative emissions factors. Finally, any abnormal conditions or problems are noted so that their impact on test results, if any, can be assessed.

5.2.1 PROCESS OPERATION

Process operating conditions for the testing program were considered carefully prior to testing. A key project objective was to ensure the testing was performed under conditions that are representative of normal operation. For this facility, the normal operating conditions are consistent with near-maximum production rates. Prior to testing, site-specific process operating

parameters and applicable ranges were proposed. Then, during testing, sampling was performed unless any of the critical process parameters exceed the minimum or maximum target values for more than a pre-defined period of time (typically 15 minutes). In the latter case, sampling was postponed or suspended until normal conditions were reestablished.

5.2.2 PROCESS MONITORING AND DATA COLLECTION

During testing, the process operating parameters were monitored and recorded to document test conditions. Recording was generally performed by automatic monitoring and recording systems (e.g. continuous process monitoring system, CPMS) or recorded by hand, if applicable. The recording intervals varied based on parameter characteristics but were generally at least 15-minutes or more frequently, if applicable. Upon completion of testing, average values of each parameter were calculated for periods corresponding to sample collection periods.

5.2.3 PROCESS SOLIDS AND LIQUIDS SAMPLING

For certain projects, process samples unrelated to the proposed air quality performance testing (e.g. product samples or feed samples) are collected and analyzed to verify applicable parameters (e.g. feed moisture content or fuel sulfur content). In this project, the no additional process samples were collected and analyzed.

- Petroleum Coke process samples were collected and analyzed for: water, total sulfur, and total hydrocarbon content. The hydrocarbons were further analyzed to determine volatile organic compounds (VOC), Benzene, and Polynuclear Aromatic Hydrocarbons (PAHs) where applicable.
- WESP Scrubber Liquids process samples were collected from each of the five WESP scrubber sumps during the testing for Arsenic emissions. These samples were analyzed for: arsenic, cadmium and lead concentrations.

5.3 Data Reduction, Validation and Reporting

Once sampling and analysis were completed, the data was thoroughly inventoried and reviewed, then tabulated and entered into respective data-reduction spreadsheets and emissions test results were calculated. Generally, the three-run average and respective process data were used to calculate emission factors for each operating condition. All data collected in this test program were validated using raw field data, laboratory reports, calibration data, process data, and other applicable information to ensure that the respective results are accurate and representative of actual values. Any omissions, deficiencies or issues identified during this validation are discussed in Sections 3 and 6 of this Report, as applicable.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL

Source testing requires stringent quality assurance (QA) and quality control (QC) procedures to ensure the validity of test measurements. The overall QA objective is to ensure that measurements and data are representative of actual emissions. This section discusses general and test-specific QA/QC including the validity of test results and any limitations regarding the use of the data, if applicable.

6.1 Quality Assurance Program – Overview

This project was conducted in accordance with a strict quality assurance program (QAP). The QAP incorporates reference methods, performance standards, and internal standard operating procedures (SOPs) to ensure that all measurements are valid and representative of test conditions and that the measurements are technically defensible. Generally, the QAP follows guidelines promulgated by the U.S. EPA in its *Quality Assurance Handbook for Air Pollution Measurement Systems*, Volume I through III. The SOPs include written field data sheets, programs for calculators and spreadsheets for test planning, pre-surveys, calculations, testing, data analysis, and reporting. The QAP incorporates the activities and QC checks described below.

6.1.1 TEST PLANNING

This test program was performed in accordance with a site-specific test plan (i.e. Protocol). The test plan describes the test objectives, sampling and analysis procedures, process operation and monitoring during testing, QA/QC checks and other parameters necessary to ensure successful completion of the test program. Generally, the Protocol specifies the following:

- Sampling locations
- Number of samples
- Duration and frequency of sampling activities
- Sampling and Analysis Procedures
- Sample handling requirements (preservation and chain-of-custody)
- QA/QC activities (e.g. leak checks, field blanks, calibrations, etc.)

The test plan was approved by program participants (but not specifically approved by the SCAQMD) prior to testing to ensure that the test program meets the objectives of the end users. In lieu of a formal Test Protocol, the sampling and analyses were conducted using test methods and sampling procedures that have prior approval pursuant to Source Test Protocols that were submitted to and approved by the SCAQMD or promulgated reference test methods, e.g., CARB Method 410A. In general, sampling and analysis was performed according to sampling and analysis described in the Source Test Protocol for WESP Air Toxics Testing (STE Source Test File P08413 and applicable addendums). The additional testing was performed in accordance

reference method CARB Method 410A (California Air Resources Board, Source Test Methods, Volume III).

6.1.2 SAMPLING AND ANALYSIS

Test preparations, sampling and analysis were performed by qualified personnel to ensure that all measurements were conducted in accordance with the Protocol and reference methodology. QA procedures conducted to ensure the validity and acceptability of test results may include:

- Field test data were recorded on field data forms.
- Minimum sample volumes and operating conditions were met.
- Equipment was properly maintained and calibrated.
- Applicable QC samples (e.g., field blanks) were collected and analyzed.
- Sampling or analysis issues were noted and data are qualified or rejected, as necessary.

Sampling was performed in accordance with referenced methodology using equipment that meets the accuracy and calibration requirements of the applicable test method or standard. Generally, the equipment is calibrated and maintained in accordance with Chapter III of the SCAQMD's *Source Test Manual* and Volume III of the U.S. EPA's *Quality Assurance Handbook for Air Pollution Measurement Systems*.

6.1.3 DATA AND REPORTING

During and immediately following testing, all data including supporting information (e.g., equipment calibration data) were reviewed for completeness, accuracy, and representativeness. Where applicable, standardized calculations and computer spreadsheets were used to reduce test data and ensure accuracy and consistency. Any issues or circumstances that could bias the data are noted and addressed or the data is qualified, as necessary. Data quality requirements are typically specified by the applicable reference method or the Protocol.

6.1.4 QUALITY ASSURANCE INDICATORS

Acceptable QA/QC ensure that measurements are accurate, precise, and complete and usable for their intended purposes. The overall quality of a measurement is generally assessed with respect to quality assurance objectives or QA indicators (QAI) which are goals for test data completeness, accuracy, precision, and representativeness. Completeness, accuracy and precision are defined quantitatively, while representativeness is qualitative.

- *Completeness* is a measure of the amount of valid data compared to the amount that was expected to be obtained under correct operating conditions.
- *Accuracy* is the degree of agreement of a measurement (or average of measurements) with an accepted reference or true value.

- *Precision* is a measure of mutual agreement of replicate measurements.
- *Representativeness* is the degree to which data accurately and precisely represent the frequency distribution of a particular variable in the population.

QA objectives or QA indicators (QAI) should be defined for **all** of the critical measurements of the test program and should be based on the limitations and requirements of the test methods and number of tests performed, where available. If quality assurance objectives are not met, then the respective data may be flagged and are evaluated by the project participants to determine its consequences toward meeting the project objectives (e.g. bias or reliability). Generally, a failure to meet a specific QAI is not an automatic disqualification of data acceptance but rather an indicator that the data requires additional review or its applicability may be limited.

6.2 Data Quality Summary

The quality of the data is based on its completeness, accuracy, precision and representativeness (i.e., applicability to the respective process). Generally, replicate testing is performed and the average result is used to calculate the respective emission factor. The representativeness of test measurements is based on the specific operating conditions observed during the respective test measurements. Overall data quality is high, especially considering the breadth and scope of the measurements. General QAI are summarized below whereas measurement-specific QA/QC are discussed in subsequent sections, where applicable.

6.2.1 COMPLETENESS

Completeness objectives were proposed in the Protocol and/or stipulated by the referenced methodology. These objectives ensure that a sufficient number of measurements are performed to accurately measure emissions at the respective process operating conditions. The overall scope of testing was completed in accordance with the Protocol. All tests were completed as planned except for the following:

6.2.2 ACCURACY

Generally, test performance is consistent with the Protocol and proposed methodology. Accuracy is assessed with respect to equipment calibration data and QC samples (e.g. spikes and laboratory analysis QC samples). No deficiencies were noted.

- The accuracy for test measurements was assessed for Benzene as well as Cyclohexane, Toluene and Chlorobenzene using matrix spike (MS) performance tests. The benzene reported by both the direct-interface GC-MS and CARB Method 410A GC-PID were acceptable.

6.2.3 PRECISION

Test precision was generally acceptable where replicate testing was performed. Where applicable, the overall result is based on the average of the three measurements, with adjustments for none-detected values as discussed in the Protocol. Precision was also assessed for analytical measurements where applicable; of these, there was one minor deficiency, as follows:

- Relative precision of test measurements in terms of relative percent deviation (RPD) for duplicate tests and relative standard deviation (%RSD) for three or more tests was good. For HAPs testing near the detection limit, high RPD or RSD is common. When the RPD or %RSD exceed 20% (or more per the respective method guidance), then the data is verified to determine if the variation is due to external factors or is characteristic of the process stream.

6.2.4 REPRESENTATIVENESS

Per the Protocol, the testing was performed at operating conditions that are consistent with near-maximum production rate and normal plant operations. Except as noted below, testing was performed as planned and the test data are representative of the target operating conditions.

6.3 Project-Specific Quality Assurance

This project incorporated specific QA/QC to ensure that the test results meet the project objectives. The following are highlights of these QA/QC and performance checks.

Quality control (QC) activities are those which accompany testing, engineering and other procedures to maintain data quality and integrity, and to quantify and document the quality of data resulting from those procedures. For example,

- All sampling and analysis were performed in accordance with the sampling and analysis procedures proposed in the Protocol and as described above.
- Sampling equipment was leak-checked (before and) after testing.
- Field blanks were collected and analyzed, as applicable.
- Reagent blanks were analyzed, as applicable.
- Sampling equipment was calibrated before use and after use, as required.
- Samples were maintained in accordance with proposed methodology and tracked using a cradle-to-grave chain-of-custody procedure.

Test-specific QA included the following.

6.3.1 QA/QC FOR VELOCITY AND FLOW MEASUREMENTS

Appropriate QA is necessary to confirm that testing will generate representative data. In the subject project, the sampling location exhibits high temperature, pulsating flow, dilution with

ambient air and other characteristics that might affect measurements accuracy and precision. The following QC checks was performed:

- Sampling system leak checks were performed after velocity traverses to ensure that flow measurements were accurate.
- A flow stratification test was performed to verify the absence of cyclonic flow and the absence of reverse flow.
- Stack gas constituents (O_2 & CO_2) were measured in a composite (i.e., canister or Tedlar bag) sample using a GC-TCD US EPA Method 3C.

6.3.2 QA/QC FOR CARB Method 410A (Tedlar Bags)

Integrated stationary source emissions samples were collected into new purged Tedlar bags using an "evacuated lung sampler" as stipulated in the Method. The sample flow rate was controlled by throttling the downstream pump draw rate using a rotameter and valve between the evacuated container and the vacuum pump. The samples were maintained under chain-of-custody procedures and delivered to the laboratory for analysis. Other QC checks included:

- Clean TFE tubing was used for sampling probes. The tubing was inspected before use and replaced if discolored or if moisture droplets were found.
- A separate QA/QC performance test sample was collected at the sampling port of the direct-interface GC-MS analyzer. This sampling location was under positive pressure and the sampling rate could not be controlled. It is believe that the sample collected at this location is more representative of a 5-min. or 10-min. grab samples rather than a 60-minute integrated sample.

6.3.3 QA/QC FOR ON-SITE GC-MS TESTING

Samples were transported to the respective on-site mobile laboratory via a heated sampling line maintained above the dewpoint of the sample gas according to CEMS protocols. The driver was a stainless steel and TFE diaphragm sampling pump to ensure sample gas integrity. Other QC checks included:

- Leak-checks were performed before testing to ensure sampling system integrity (leak check results are documented in the tester's notes).
- A system bias check of the vacuum side of the sampling system was not performed due to unavailability of an applicable audit gas. Instead, the sampling system was leak-checked and one or more pre-test samples (baseline checks) were performed to ensure sample integrity.
- Periodic visual inspections to ensure that the sampling system was acceptable.

- 1,3-Butadiene was quantified using mass-39 and separately mass-54 as the primary ion for quantitation. This approach is used because the mass ratios of secondary and tertiary quantitation ions suggest interference is present with one or the other primary ion. In this test, the GC-MS observed interference when mass-39 was used. Since the 1,3-Butadiene was also quantified using mass-54 as the primary ion and in general, the quantitation using mass-54 did not suffer from the aforementioned interference and yielded lower verifiable values for 1,3-Butadiene, the mass-54 data is recommended for emissions and risk calculations. The results for both mass-39 and mass-54 are presented in the results tables.
- Field Blank ("FB") or Baseline ("BG" = background) samples were performed at the beginning of each day and periodically to assess the concentrations of 1,3-Butadiene and Benzene in the ambient air or due to bias in the heated sampling system.
    - On 13 July 2016, the pretest BG sample at the RTO Inlet did not achieve non-detect levels. In this case, the testing proceeded on schedule because the observed concentration in the pretest sample (7-PPBv) was negligible relative to the PPMv-range concentrations measured in the RTO Inlet.
    - On 14 July 2016, the pretest BG sample at the WESP Stack did not achieve non-detect levels despite considerable effort including cleaning and rebuilding the sampling pump. A new TFE sample line was installed and a pretest check measured background concentrations of <2-PPBv but still above the reporting limit. In this case, the testing proceeded on schedule; however, the reported stack emissions may be slightly biased high (1-to-2 PPBv) due to background contamination.

This Methodology was developed and refined in a cooperative effort with SCAQMD over several consecutive projects and years and has been proven to yield accurate and precise test results when implemented correctly. The SCAQMD has approved numerous benzene and 1,3-butadiene test program results based on this method. Benzene and 1,3-Butadiene emission rates obtained through the use of this method were utilized by SCAQMD to develop the Benzene and 1,3-Butadiene emission limits contained in SCAQMD Rule 1420.1. Particular care has been taken to ensure that no part of the sampling system allows moisture in the sample gas to condense in transit. The specific measures are proprietary; generally, the sampling system was thoroughly heated and allowed to sample ambient air for several minutes. Then, prior to testing, the air was analyzed to verify that "baseline" concentrations were at or below the target detection limits. Once these criteria were met, the sampling probe was inserted into the test location and the testing commenced. During testing, the sample gas was continuously drawn and delivered to the GC in a "bypass" loop. Thus, the GC was able to sample that stack gas at any time.

6.3.4 QA/QC FOR SCAQMD METHOD 25.1 AND 25.3

A qualified laboratory provided the sampling apparatus and the analysis for these methods. The approved laboratory must have equipment, experienced personnel and excellent QA/QC for this particular method. Emc2's recommended QA/QC emphasizes sampling, recovery and

transporting the samples to the Laboratory. The sampling procedure and QA/QC for this method were strictly followed to maintain the integrity and the validity of all samples. Emc2 employed specific procedures to improve QC for this method including equipment preparation, pretest determination, field sampling, and chain of custody as well as packing, storage, and transporting the samples to the laboratory for analysis. These QC checks included:

- Verification that the sampling equipment were clean and free of by grease, oil, solvents, etc.
- Maintain valid calibration documents and historical data for the tanks and traps.
- Dry ice was used for sampling, storing and transporting Method 25.1 traps.
- Leak-checks were performed prior to testing to ensure sampling system integrity.
- Ensure that the sampling probe is pointed downstream to minimize collection of PM.
- Ensure that the trap or impinger is properly cooled prior to initiating sampling.
- Upon recovery, ensure that trap ends are properly capped to prevent sample loss.
- Samples per Method 25.3 were collected at the WESP Stack and RTO Outlet because the anticipated concentration was less than 50 PPMv. Per EPA guidance, a bias factor of 1.086 was applied to the test results.
- Samples per Method 25.1 were collected at the RTO Inlet due to anticipated high concentrations of condensable organics.

6.3.5 QA/QC FOR PARTICULATE MATTER (PM_{10})

Quality control measures included a successful leak-check of BOTH the sample train (after removal of the sampling head) and Pitot tube after the testing. Other QC included collection of reagent blanks, and maintaining the isokinetic sampling rate within acceptable limits (i.e. 100% +/- 20%). The following QC issues were observed, for each test:

- The “interpolated” isokinetic sampling rate was within 100%±20%.
- The sample volume 20% of the target sample volume of 250 DSCF.
- A reagent blank (water) was analyzed but no blank corrections were made. AEC data appears to apply a blank correction for water; therefore, use of AEC data is not recommended.
- A reagent blank (acetone) was analyzed and the analysis results were corrected for acetone residue, where applicable.
- The test results include Total PM_{10}, as defined and calculated per SCAQMD Methods; additionally, the Filterable PM_{10} value does not include the condensable PM fraction.
- The cyclone cut size, based on the sampling data, was within ±10% of 10 microns.

6.3.6 QA/QC FOR CARB METHOD 436

Quality control measures included a successful leak-check of BOTH the sample train and Pitot tube after the testing. Other QC included collection of reagent blanks, and maintaining the isokinetic sampling rate within acceptable limits (i.e. 100% +/- 10%). The following QC issues were observed, for each test:

- Per guidance from SCAQMD, the testing was performed by AEC who is approved under the SCAQMD Laboratory Approval Program (LAP).
- The isokinetic sampling rate for each test was within 100%±10%.
- The sample volume was consistent with the proposed target.
- A Method reagent blank was analyzed and a blank correction was made, if applicable. In this case, the reagent blank did not contain detectable quantities of As or Pb.
- A field blank was collected and analyzed. The field blank at the WESP Stack contained 5 ug of Pb.

See the attached Source Test Report prepared by AEC for test-specific information.

6.4 Performance Tests: Direct-Interface GC-MS and CARB Method 410A

Test results for Performance Tests are summarized in Table 6-1.

6.4.1 FIELD SPIKE/MATRIX SPIKE SAMPLES

A matrix spike (MS) demonstrates whether test results obtained using a test method is accurate and representative of actual emissions. During this program, two Field MS tests were performed to assess the accuracy of each methodology. The FS/MS sample was collected simultaneously with a normal test sample (a duplicate) so that the test sample would provide the background concentration of benzene in the matrix. The MS sample was then “spiked” with a mixture of VOCs including benzene at a volume that would not affect the characteristics of the matrix. The MS and field sample were maintained under the same conditioned until analyses were completed. The difference between a specific VOC (i.e., benzene) measured in the MS sample and the same VOC measured in the field sample is the recovery for that compound and the percent recovery is calculated expected recovery calculated for the MS. In these samples, the spiking material was a 1-PPMv calibration standard mix injected to the Tedlar bag immediately upon test completion and sample recovery. The target spike concentration is calculated based on the measured results of other VOCs not detected in the field sample.

- For S3-W-4DUP/MS, the spike value was 36-PPBv and the percent recovery for Benzene was 89% and 147%, respectively, for the direct-interface GC-MS method and for CARB Method 410A.

- For S3-W-4DUP/MS, the spike value was 43-PPBv and the percent recovery for Benzene was 94% and 132%, respectively, for the direct-interface GC-MS method and for CARB Method 410A.
- In both cases, the percent recovery was calculated at the spike value of 36-PPBv that was calculated for the direct-interface GC-MS method using Carbon Tetrachloride, Toluene and Chlorobenzene as surrogate compounds.

6.4.2 SAMPLING SYSTEM ASSESSMENT

The direct-interface sampling system was assessed using CARB Method 410A. In this case, an integrated Tedlar bag was collected from the sampling system at the GC MS sampling port and then the sample was analyzed by the GC-MS and also by CARB Method 410A. This performance test (PT) was performed during WESP test S2-W-6.

- For the direct-interface GC-MS, the Benzene concentration in the PT sample was 42.4 PPBv whereas the concentration in the WESP Stack sample was 14.9 PPBv.
- For CARB Method 410A, the Benzene concentration in the PT sample was 52.1 PPBv whereas the concentration in the WESP Stack sample was 23.4 PPBv.
- During the sampling period, the direct-interface GC-MS measured Benzene concentrations of 51.5 PPBv (first injection S2-W-11) and 18.8 PPBv (second injection S2-W-12) in the WESP Stack gas.

The Benzene concentration in the PT sample was most likely biased toward the early part of the sampling period because the sampling system delivers the gas at positive pressure. This condition made the Tedlar bag sampling rate difficult to control such that the bag filled quickly at the beginning and more slowly in the latter part of the sampling period. The analysis results are consistent with this explanation.

TABLE 6-1. METHOD PERFORMANCE TEST RESULTS

Facility: Quemetco, Inc. Test Date(s): 12,14 Jul.2016
Unit: **WESP Stack** Checked by: MF 09/05

S3-W-4 / S3-W-4 DUP/MS		**CARB M410A Results**			**Direct-Interface GC-MS**				Spike
Sample	Compound	(PPBv)	Δ(PPBv)	%Rec	(ug/cu.M)	(PPBv)	Δ(PPBv)	%Rec	Value(PPBv)
S3-W-4	Benzene (78.12)	**16.80**			65	**19.70**			
S3-W-4	C-Cl4 (153.8)				ND 13	2.00			
S3-W-4	Toluene (92.15)				40	10.28			
S3-W-4	Chlorobenzene (112.56)				ND 23	4.84			
S3-W-4DUP/MS	Benzene (78.12)	**69.00**	52.20	**147**	170	**51.53**	31.83	**89**	
S3-W-4DUP/MS	C-Cl4 (153.8)				220	33.87	32		36
S3-W-4DUP/MS	Toluene (92.15)				170	43.69	33		
S3-W-4DUP/MS	Chlorobenzene (112.56)				220	46.28	41		

S2-W-4 / S2-W-4 DUP/MS		**CARB M410A Results**			**Direct-Interface GC-MS**				Spike
Sample	Compound	(PPBv)	Δ(PPBv)	%Rec	(ug/cu.M)	(PPBv)	Δ(PPBv)	%Rec	Value(PPBv)
S2-W-4	Benzene (78.12)	**15.20**			36	**10.91**			
S2-W-4	C-Cl4 (153.8)				ND 13	2.00			
S2-W-4	Toluene (92.15)				45	11.56			
S2-W-4	Chlorobenzene (112.56)				ND 23	4.84			
S2-W-4DUP/MS	Benzene (78.12)	**72.60**	57.40	**132**	170	**51.53**	40.62	**94**	
S2-W-4DUP/MS	C-Cl4 (153.8)				300	46.19	44		43
S2-W-4DUP/MS	Toluene (92.15)				210	53.96	42		
S2-W-4DUP/MS	Chlorobenzene (112.56)				230	48.39	44		

Sampling System Comparison		**CARB M410A Results**		**Direct-Interface GC-MS**		
Sample	Compound	(PPBv)		(ug/cu.M)	(PPBv)	Comments/Observations
S2-W-6 (M410A)	Benzene (78.12)	**23.40**		49	**14.85**	
S2-W-6(GC) (M410A)	Benzene (78.12)	**52.10**	(*see note —>)	140	**42.44**	Most of sample (GC) was collected at
S2-W-11 (D.I. GC-MS)	Benzene (78.12)			170	**51.53**	beginning of hour. Sample expected to
S2-W-12 (D.I. GC-MS)	Benzene (78.12)			62	**18.79**	correspond with S2-W-11 (DI GC-MS).

PPBv = ug/cu.M * 23.68/MWi

APPENDIX E

LEAD SCRAP RECYCLING MARKET TRENDS

MEMORANDUM

DATE: April 2021

TO: South Coast AQMD

FROM: Quemetco, Inc.

SUBJECT: Lead Scrap Recycling Market Trends

This memorandum was prepared by Quemetco for the Capacity Upgrade EIR. To address the United States trends in exports of used lead-acid batteries, this memorandum includes a summary of the Battery Council International's (BCI) 2019 National Recycling Rate Study for lead scrap (including secondary lead-acid batteries) [1] and further considers the effects of United States lead scrap exports. BCI is a not-for-profit trade association whose members include lead battery manufacturers and recyclers, marketers and retailers, suppliers of raw materials and equipment, and expert consultants. BCI members account for over 98% of United States lead battery production and recycling capacity (BCI, 2020). The analysis below utilizes BCI's recycling study coupled with proprietary market industry data, vehicle registration data and United States Census Bureau and Border Protection trade statistics. BCI's lead scrap and export data indicates that large volumes of United States and California-generated spent lead-acid batteries are being exported overseas. The increasing exports of spent lead-acid batteries and secondary sources of lead scrap may be attributed to a variety of factors, including but not limited to the following:

1. The United States and California do not have the domestic capacity to recycle the volume of generated spent batteries;
2. Domestic recycling costs are increasing as large capital investments are required to meet stringent regulatory requirements; and
3. Overseas recycling costs are lower due to the absence of environmental systems and controls.

Sources of Lead Scrap Generated

The United States generated nearly 1.7 million metric tons of lead scrap in 2019.[2] Of these 1.7 million metric tons, 83% can be attributed to automotive (lead acid) batteries, while the remaining 17% can be attributed to industrial batteries or non-battery-related scrap. Therefore, the vast majority of lead scrap generated in the United States is automotive battery-related (approximately 1.4 million metric tons).

To examine the portion of lead scrap generated from automotive batteries on a state-level, the analysis assumes that the quantity of scrap generated in each state is directly proportional to the number of vehicles registered. California recorded over 30 million vehicle registrations in 2017, accounting for more

[1] BCI, 2019. National Recycling Rate Study. https://cdn.ymaws.com/batterycouncil.org/resource/resmgr/2020/BCI_482347-20_2019-Study.pdf. Accessed April 2021.
[2] Source: BCI, 2019 and Quemetco Internal Analysis

than 11% of all vehicle registrations in the United States.[3] By correlating state automotive battery-related scrap generation (approximately 1.4 million metric tons) to vehicle registration, there was an estimated 154,000 metric tons of automotive battery-related lead scrap generated in California in 2019. California leads in the generation of lead scrap in the United States.

Export Distribution

The Harmonized Tariff System (HTS) is an internationally standardized system of describing all goods in trade for duty, quota, and statistical purposes. In the United States, the HTS is maintained and published by the United States International Trade Commission. The HTS follows a 10-digit system to designate commodities, and there are five HTS codes relevant to the lead scrap export market.[4]

Analysis of the market data associated with the lead scrap export HTS codes suggests that spent batteries are increasingly dominating the lead scrap export distribution market.[5] For example, spent batteries have comprised over 90% of the total lead scrap export distribution in the last nine (9) out of 10 years.[6] Furthermore, market data associated with the lead scrap export HTS codes shows a 29% growth in the number of exported spent batteries between 2017 and 2020, indicating the export of spent batteries may continue to increase in the future.[7]

Currently, the United States does not recycle lead scrap, including spent lead batteries, at the same rate it is generated. The analysis of BCI's proprietary industry data estimates that over 22% of all lead scrap generated in the United States in 2019 was exported elsewhere.[8] This gap between generation rate and recycling capacity represents carbon leakage from the United States lead scrap pool.

In California, this gap is even wider. The Quemetco facility is the only lead acid battery recycling facility in California. In 2019, the Quemetco facility recycled approximately 109,000 metric tons of lead scrap compared to the estimated 188,000 metric tons generated in California (which includes the estimated 154,000 metric tons of automotive battery-related lead scrap). Based on these metrics, Quemetco estimates that 30-40% of lead scrap generated in California is being sent out of state with some portion exported overseas.[9]

Export Destinations

Market data from the five (5) lead scrap export HTS codes shows Mexico, Korea, Canada, India, and Ecuador as the largest export destinations for United States-generated lead scrap.[10] When specifically

[3] Source: Statista Research Department, 2018. Number of U.S. Motor Vehicle Registrations in 2017, by State and Type. https://www.statista.com/statistics/196512/number-of-private-and-public-motor-vehicles-in-the-us-by-state/. Accessed April 2021.
[4] The five HTS codes relevant to lead scrap exports are 780200 0030, 780200 0060, 854810 0540, 854810 0580, and 854810 2500. The US Census stopped recording code 780200 0030 in 2018.
[5] Source: US Census Bureau, February 2021
[6] Including 2021 year to date metrics.
[7] Source: US Census Bureau, February 2021.
[8] Source: BCI, 2019 and Quemetco Internal Analysis
[9] The difference between the total estimated lead scrap generated in California (188,000 metric tons) and the amount recycled at the Quemetco facility in 2019 (approximately 109,000 metric tons) is 79,000 metric tons. As the only lead acid battery recycling facility in California, the 79,000 metric tons generated but not recycled in California is sent elsewhere (either to another state or overseas). 79,000 metric tons of excess lead scrap generated but not recycled in California divided by the total estimated 188,000 metric tons of generated lead scrap is approximately 42%, which represents the estimated percentage of lead scrap sent either out of state or overseas. The analysis rounds down to an estimated conservative range of 30-40%.
[10] Source: US Census Bureau, February 2021.

examining spent lead acid batteries (and not lead scrap as a whole), Mexico, Korea, and Canada are the first, second, and third largest export destinations, respectively.[11]

Of the aforementioned export destinations, the United States has the most stringent regulatory framework covering secondary lead smelters, and within the United States, California has established and enforces more stringent limits than the federal standards. Furthermore, the United States has the most stringent ambient air quality standard for lead compared to the largest export destinations for United States-generated lead scrap. The ambient air quality standards are summarized in Table E-1 below.

Table E-1 Summary of Ambient Lead Air Quality Standards

Averaging Time	Ambient Lead Air Quality Standard (µg/m3)					
	United States & California[a]	Mexico[d]	Korea[f]	Canada[g]	India[h]	Ecuador[g]
24 hours	-	-	-	-	1	-
30-Day Average	1.5[b]	-	-	-	-	-
Calendar Quarter	1.5	-	-	-	-	-
3-Months	0.15[c]	1.5[e]	-	-	-	-
Annual	-	-	0.5	-	0.5	-

a Source: CARB, 2016a.
b California ambient air quality standard for lead.
c Based on rolling 3-month average.
d Source: Occupational Knowledge and Fronteras Comunes, 2011.
e Based on 3-month arithmetic average.
f Source: Air Korea, 2018.
g No ambient air quality standard for lead identified.
h Source: Indian Economic Service Officers, 2015.

As demonstrated in Table E.1-1, Mexico, for example, has a regulatory ambient air standard for lead which is 10 times less stringent than that in the United States. The lack of equally stringent regulatory requirements in Mexico do not force capital repairs or emission control technology advancements at secondary lead smelters. As a result, lead emissions reported by lead acid battery recycling plants in Mexico are approximately 20 times higher than from comparable plants in the United States.[12]

Quemetco's analysis of BCI's lead scrap recycling study suggests the exports of United States- and California- generated lead scrap overseas is increasing. Without equivalent environmental frameworks and stringency in effect, diverting lead scrap overseas not only hurts domestic companies (and in turn domestic jobs) which must make large capital investments to meet rising regulatory requirements, but also increases pressures on overseas secondary lead smelters where less stringent environmental regulations lead to increased pollution and harm to workers and local communities.

[11] Source: US Census Bureau, February 2021.
[12] Source: Occupational Knowledge and Fronteras Comunes, 2011. Exporting Hazards: U.S. Shipments of Used Lead Batteries to Mexico Take Advantage of Lax Environmental and Worker Regulations. https://www.ohchr.org/Documents/Issues/ToxicWaste/RightToInformation/OccupationalKnowledgeInternational2.pdf. Accessed April 2021).

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Appendix F - Cumulative Air Toxics Evaluation

INTRODUCTION

This technical appendix evaluates the cumulative air toxics baseline and projected conditions. This evaluation relies on the following technical resources:

1) South Coast AQMD, 2021a. MATES V. Multiple Air Toxics Exposure Study in the South Coast AQMD, Final Report, August 2021. This study analyzed emissions toxic air contaminants in the ultrafine particle, PM 2.5, total suspended particulate, volatile organic compound and polycyclic aromatic hydrocarbons categories. Report accessed on October 6, 2021 at http://www.aqmd.gov/home/air-quality/air-quality-studies/health-studies/mates-v

2) South Coast AQMD, 2021b. South Coast AQMD Community Investigations - Air Monitoring Webpage for Quemetco. This document focuses on ambient levels of arsenic and lead from monitoring stations at or near the Quemetco facility. Webpage accessed on October 6, 2021 at http://www.aqmd.gov/home/news-events/community-investigations/quemetco/air-monitoring

3) South Coast AQMD, 2012, MATES IV. Multiple Air Toxics Exposure Study in the South Coast AQMD, Final Report, May 2015. This study analyzed emissions toxic air contaminants in the ultrafine particle, PM 2.5, total suspended particulate, volatile organic compound and polycyclic aromatic hydrocarbons categories. Report accessed on October 6, 2021 at https://www.aqmd.gov/docs/default-source/air-quality/air-toxic-studies/mates-iv/mates-iv-final-draft-report-4-1-15.pdf?sfvrsn=7

4) South Coast AQMD, 2005. Staff Report for Proposed Rule 1401.1 – Requirements for Facilities near Schools, http://www.aqmd.gov/home/governing-board/agendasminutes (Nov. 4, 2005 Board Meeting).

5) South Coast AQMD Rule 1420.1 accessed on October 6, 2021 at https://www.aqmd.gov/docs/default-source/rule-book/reg-xiv/rule-1420-1.pdf?sfvrsn=24

6) The HRAs prepared for the proposed Project as described in Appendix D.1 and summarized in Section 4.2 of this EIR

7) Office of Environmental Health Hazard Assessment's chronic relative exposure level for inhalation of arsenic is included for reference here*:* https://ww2.arb.ca.gov/sites/default/files/classic/toxics/healthval/contable.pdf.

BACKGROUND: SUMMARY OF MATES V FINDINGS

The Multiple Air Toxics Exposure Study (MATES) V and MATES IV report the monitored and modeled concentrations of air toxics and estimated the carcinogenic risks from ambient levels of air toxics. Chronic non-cancer health impacts were also estimated from the monitoring data and MATES V includes an exploratory analysis of chronic non-cancer health impacts (e.g.,

cardiovascular, respiratory, neurological health outcomes, etc.). The chronic non-cancer health impacts, typically expressed as a hazard index, is an indicator of whether non-cancer health effects can occur due to long-term exposure to toxic air contaminants. A hazard index that is less than or equal to one indicates that non-cancer health effects are not likely to occur over a lifetime of exposure. Annual average concentrations were used to estimate a lifetime risk from exposure to these levels, consistent with guidelines established by the Office of Environmental Health Hazard Assessment (OEHHA) of the California Environmental Protection Agency (CalEPA). Given the generally decreasing air pollution levels in the region, ambient concentrations of some pollutants can sometimes be lower than what air quality monitoring instruments can detect. Therefore, statistical techniques are required to calculate average concentrations and provide an estimate of actual levels. Modern statistical techniques were used to analyze the MATES V data, and to provide the MATES V study's comprehensive comparison of pollutant trends. MATES II, MATES III, and MATES IV measurements were also re-analyzed as part of MATES V using these same techniques.

In addition to new measurements and updated modeling results, several other key updates were implemented in MATES V. First, MATES V estimates cancer risks by taking into account multiple exposure pathways, including both inhalation and non-inhalation pathways, which includes soil exposure. Exposure from non-inhalation pathways result from substances that deposit on the ground in particulate form and contribute to risk through the ingestion of soil or homegrown crops, or through dermal absorption. Utilizing this multiple exposure pathways approach is consistent with how cancer risks are estimated under South Coast AQMD's programs such as permitting, Air Toxics Hot Spots (AB2588), and California Environmental Quality Act (CEQA) compliance. Second, along with cancer risk estimates, MATES V also includes information on the chronic non-cancer health impacts from inhalation and non-inhalation pathways.

Recognizing that air toxics can have both cancer as well as non-cancer health effects, MATES V included an exploratory evaluation of chronic non-cancer health impacts using the measurement data. To assess the potential for chronic non-cancer health impacts, the average air toxics levels from the monitoring stations were used to calculate the hazard index (HI) for pollutants that have a chronic Reference Exposure Level (REL), using methods established by OEHHA. The HI is calculated separately for each target organ system. An HI that is less than one indicates that the air toxics levels are not expected to cause such health effects. An HI greater than one does not mean that such health effects are expected, but rather that the likelihood of experiencing adverse health effects increases. Although the likelihood of experiencing an adverse non-cancer health effect may not scale linearly with the HI, a larger HI would generally indicate a greater likelihood of experiencing those health effects in the exposed population.

Although MATES is not able to evaluate acute non-cancer health impacts, other South Coast AQMD programs, such as the AB 2588 Air Toxics Hot Spots Program, do address acute health impacts.

MATES V applied the risk assessment guidance recommended by OEHHA and the annual average measured or modeled air toxics concentration to calculate health risks. This

methodology has long been used to estimate the relative risks from exposure to air toxics in California and is useful as a yardstick to compare potential risks from varied sources and emissions and to assess any changes in risks over time that may be associated with changing air quality. Figures F-1 and F-2 illustrate the following key findings from MATES V, which include:

1) The levels of air toxics in the Basin continued to decline compared to previous MATES iterations. Specifically, based on measurement data at 10 fixed site monitoring locations, the air toxics cancer risk declined throughout the Basin: MATES V found a 40% decrease in risk since MATES IV, and an 84% decrease since MATES II. The estimated Basin-wide population-weighted cancer risk calculated from the modeling data (as opposed to fixed site monitoring data) similarly found a 54% decrease since MATES IV. This risk refers to the expected number of additional cancers over a 70-year lifetime in a population of one million individuals if they were continuously exposed to these levels for 30 years. In contrast to past MATES iterations where only exposure via inhalation was considered, this analysis considers additional exposure pathways, but nonetheless concluded that risks have been declining over time. (Refer to Figure F-2 (Figure ES-3 in MATES V).
2) As in previous MATES iterations, MATES V determined that diesel PM is the largest contributor to overall air toxics cancer risk. However, monitoring data showed that the average levels of diesel PM in MATES V are 53% lower at the 10 fixed site monitoring locations as compared to MATES IV and 86% lower as compared to MATES II.
3) The main sources of cancer risk in the Basin are neither lead nor arsenic (refer to Figure F-1 (Figure ES-2 from MATES V)). Most monitors indicated concentrations of lead and arsenic also continued an overall downward trend in MATES V as compared to MATES IV (see Table IV-37 for arsenic and Table IV-52 for lead in MATES V (South Coast AQMD, 2021a)).

Figure F-1 Average MATES V Cancer Risk

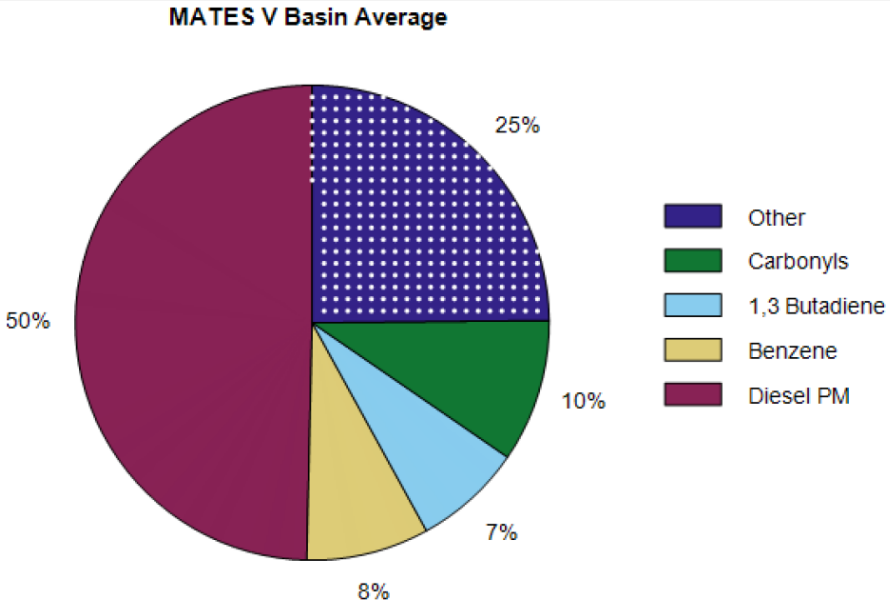


Figure ES-2: Average MATES V Cancer Risk at MATES Monitoring Sites by pollutant type. The "Other" category is marked with gray dots because some species in this category have higher uncertainty due to incomplete data or a large fraction of measurements below detection limits. Numbers may not sum to 100 due to rounding.

Source: South Coast AQMD, 2021a

Figure F-2 Trend in Average Cancer Risk by Monitoring Site

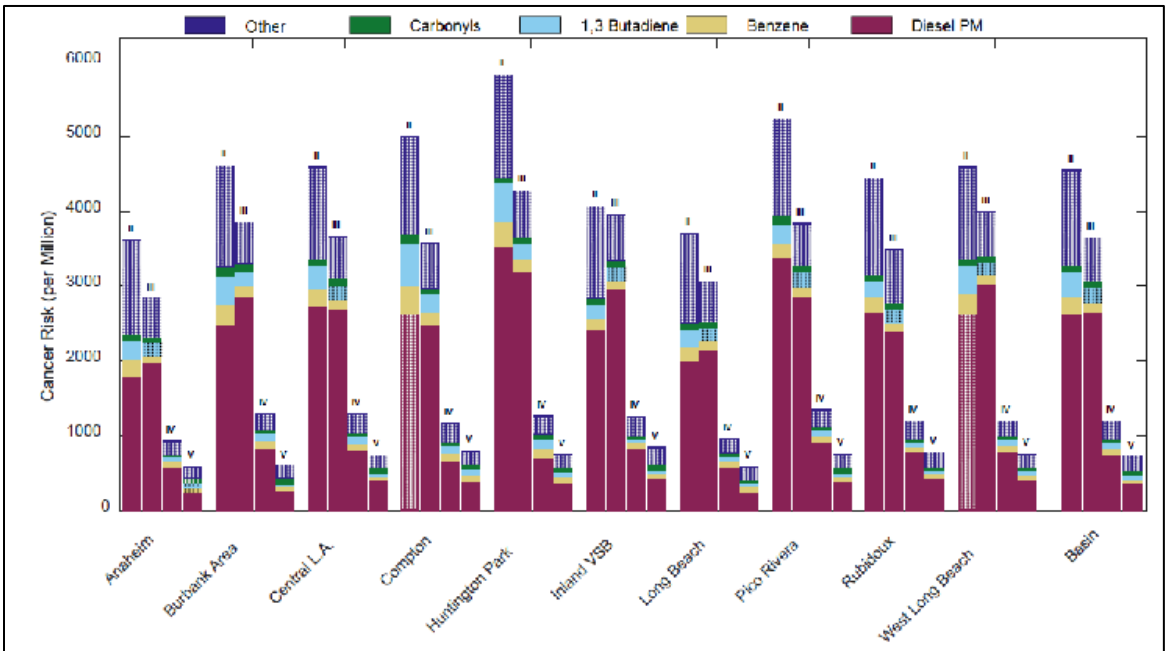


Figure ES-3: Trend in Average Cancer Risk at MATES Monitoring Sites. Segments marked with dots have higher uncertainty due to incomplete data or a large fraction of measurements below detection limits.

Source: South Coast AQMD, 2021a

However, TAC impacts from facilities are localized impacts, given that exposures to TACs typically decline by approximately 90 percent at 300 to 500 feet from the emissions source (South Coast AQMD, 2005). The Pico Rivera Monitoring Station is the closest fixed site monitoring station to the Quemetco Facility. As illustrated in Figure F-2 above, data generated over the last several decades at the Pico Rivera Monitoring Station shows a substantial reduction in total air toxics emissions and associated cancer risks in this location. However, an increase in arsenic levels was identified at this monitoring station between MATES IV (measurements conducted 2012-2013) and MATES V (measurements conducted 2018-2019).

The change in modeled population-weighted cancer risk within communities experiencing environmental injustices (EJ communities) was also evaluated in MATES V using the SB535 definition of disadvantaged communities. Between MATES IV and MATES V, air toxics cancer risk decreased by 57% in EJ communities overall compared to a 53% reduction in non-EJ communities.

Figure F-3 Modeled Air Toxics Cancer Risks in South Coast AQMD Jurisdiction

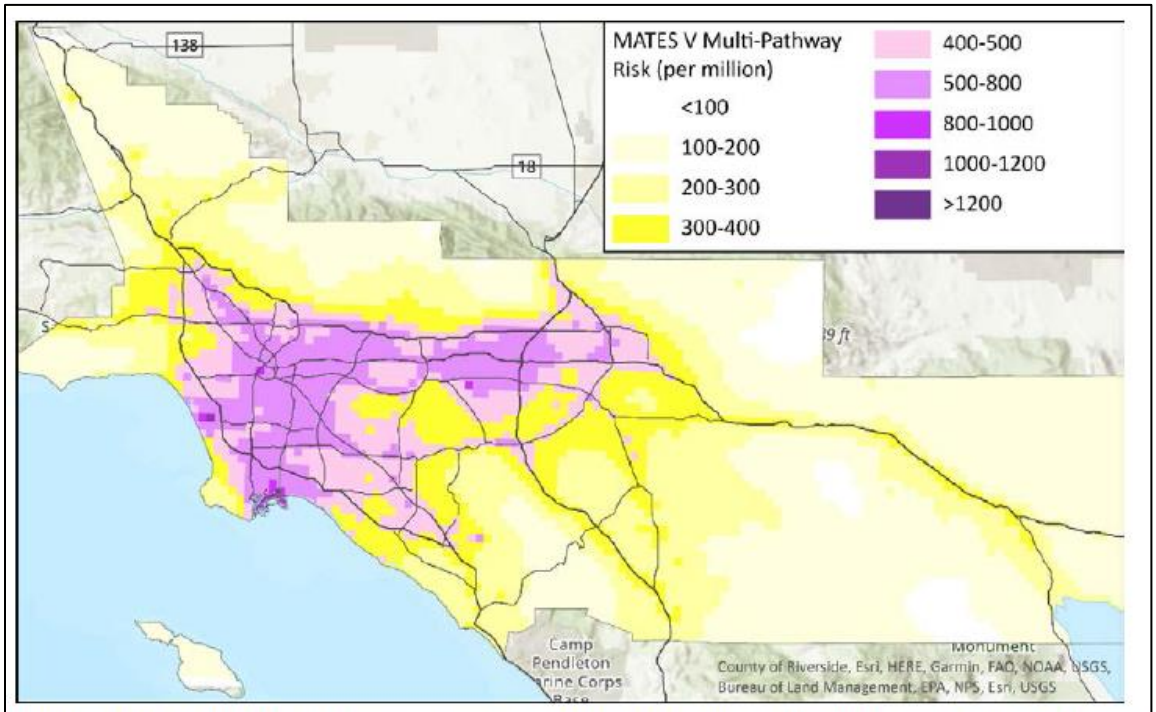


Figure ES-6: Modeled Air Toxics Cancer Risk for MATES V (multiple exposure pathways)

Source: South Coast AQMD, 2021a

While overall air toxics emissions and risks have been declining, the health risks do continue to be high, especially near sources of toxic emissions such as the ports and transportation corridors as illustrated in Figure F-3 above. Despite the overall reduction in air toxics emissions over the past 20 years, the population weighted average air toxics cancer risks are still estimated to be about 4 to 5 times (and in some locations over 10 times) the significant risk levels established in the AB 2588 Air Toxics Hot Spots program, which is 100 in a million. For these reasons, the cumulative baseline air toxic conditions would be considered to be cumulatively significant in the South Coast Air Basin as well as in the vicinity of the proposed Project.

QUEMETCO AIR MONITORING STATION AT CLOSET WORLD

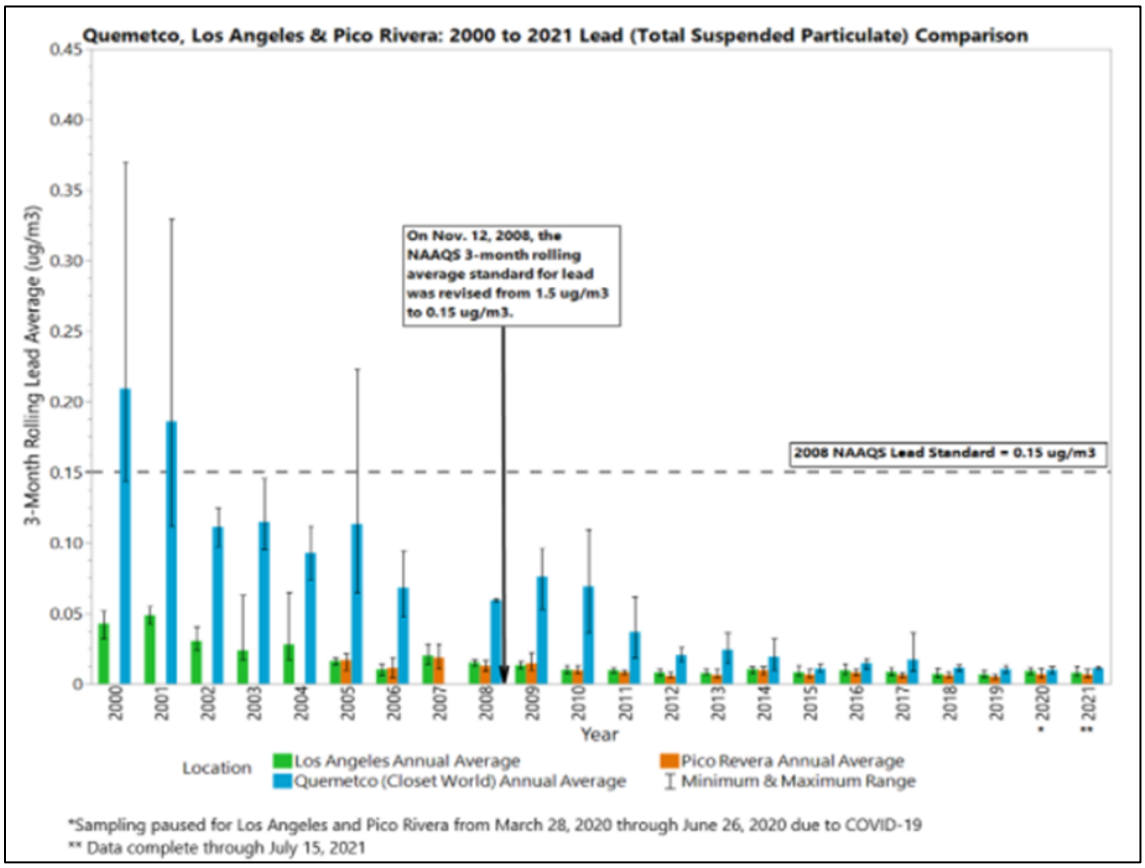
Lead measurements are compared against the National Ambient Air Quality Standards (NAAQS) established by the U.S. Environmental Protection Agency (U.S. EPA) and are defined as a three-month rolling average of 0.15 ug/m^3. South Coast AQMD's closest air monitoring station to Quemetco is located at Closet World. This location is expected to record the highest impacts from Quemetco of any offsite monitoring location in South Coast AQMD's monitoring network. Figures F-4 and F-5 below depict both the lead and arsenic measurements for each year since 1997 at the Closet World air monitoring station. Levels are compared to the NAAQS standard for lead and arsenic relative exposure levels (RELs) established by the OEHHA. Longer term ambient total suspended particulate (TSP) lead levels collected at monitoring locations in Los Angeles and Pico Rivera, the network stations closest to Quemetco, are provided as a reference. The Los Angeles and Pico Rivera Stations are located away from potential emission sources.[1]

U.S. EPA regulation requires local agencies to conduct ambient air lead monitoring near lead sources which are expected to or have been shown to contribute to a maximum lead concentration in ambient air in excess of the NAAQS, taking into account the logistics and potential for population exposure. At a minimum, there must be one source-oriented State and Location Air Monitoring Station (SLAMS) site located to measure the maximum lead concentration in ambient air resulting from each non-airport lead source which emits 0.50 or more tons per year (TPY) and from each airport which emits 1.0 or more TPY based on the most recent National Emission Inventory (NEI) or other scientifically justifiable methods and data (such as improved emissions factors or site-specific data). The Quemetco (Closet World) SLAMS is the most closely located to the facility. This near source monitor demonstrates the local nature of the metals emissions from the Quemetco facility as the Closet World monitoring results for lead are higher than those for the Pico Rivera Station which is the next closest. Lead concentrations based on the Los Angeles (North Main St. Station) annual average are also lower than those recorded at the Closet World SLAMS.

[1] Additional information regarding the Quemetco monitoring station is available in the South Coast AQMD air monitoring network plan, located here: http://www.aqmd.gov/home/air-quality/clean-air-plans/monitoring-network-plan.

Figure F-4 depicts a bar plot with the mean, minimum, and maximum three-month rolling lead averages observed at Los Angeles, Pico Rivera, and Quemetco monitoring stations. The NAAQS for the three-month rolling lead average is included as reference. Figure F-4 illustrates declining ambient lead levels at these three monitoring stations from the year 2000 through 2021.

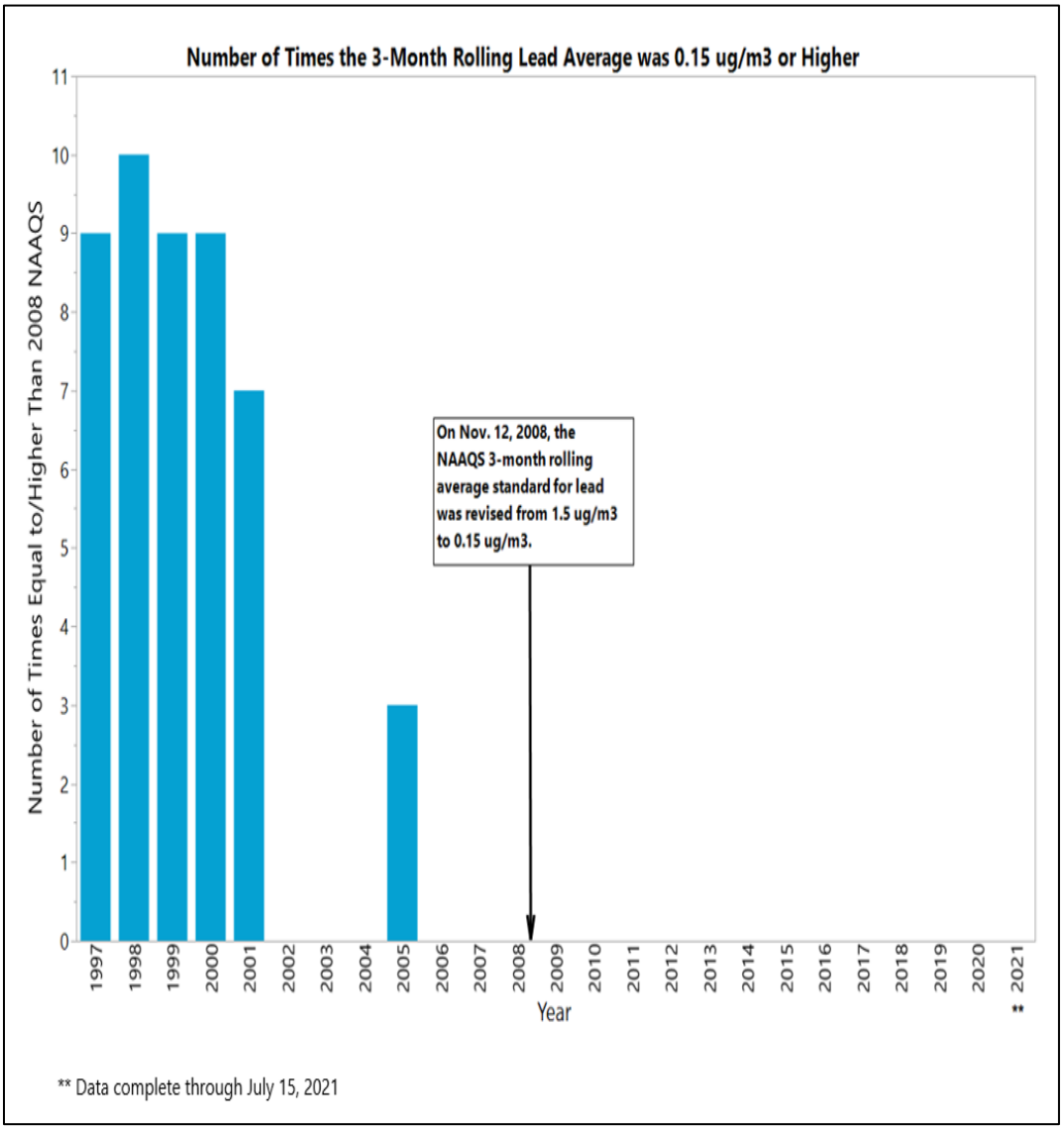
Figure F-4 Three-Month Rolling Averages for Lead Observed at Los Angeles, Pico Rivera, and Quemetco Monitoring Stations



Source: South Coast AQMD, 2021b

Figure F-5 depicts a plot showing no exceedances at Quemetco (Closet World) for the current NAAQS 3-month rolling average 0.15 ug/m3 lead standard. There were no exceedances of the previous 1.50 ug/m3 lead standard from 1997 through the 2008 revision.

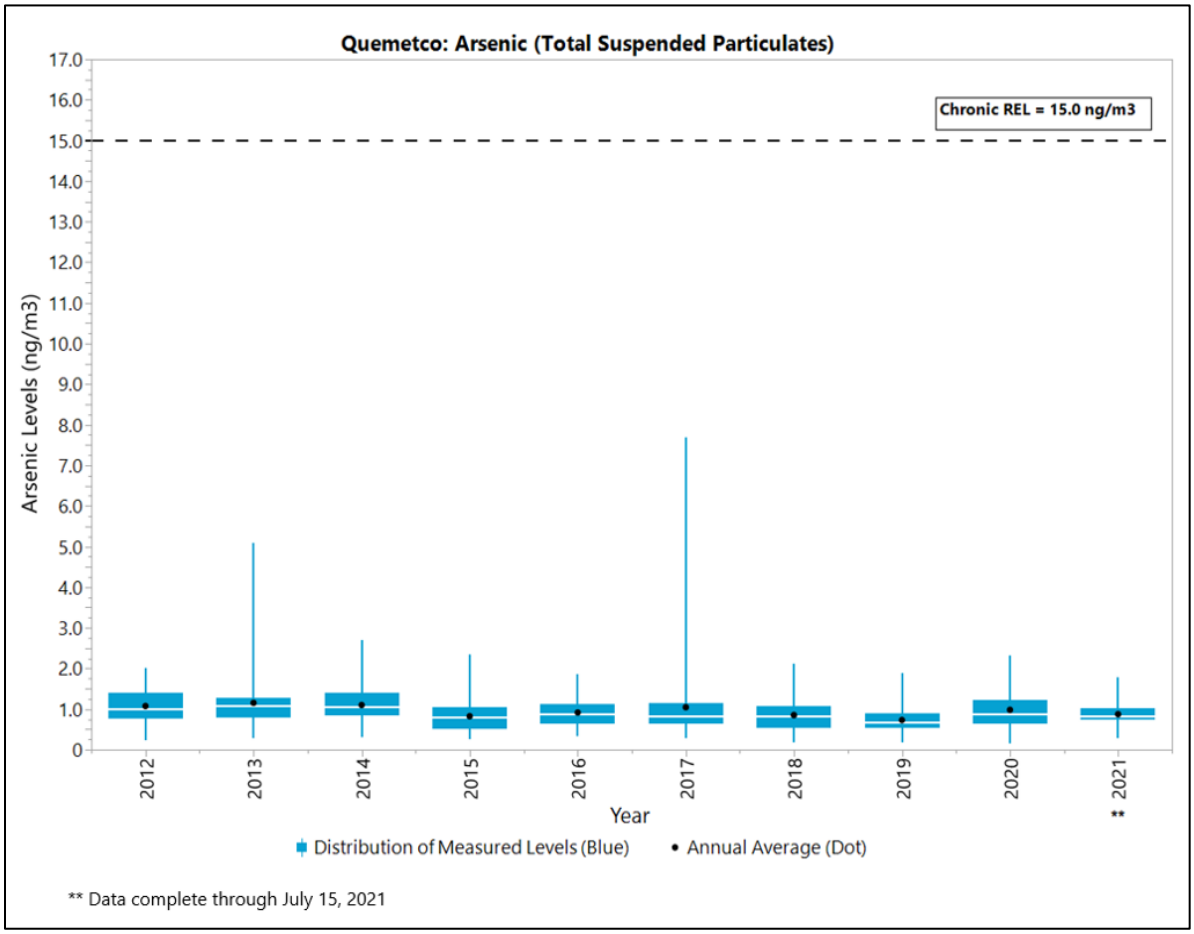
Figure F-5 Exceedances of Three-Month Rolling Lead Average of 0.15 ug/m3



Source: South Coast AQMD, 2021b

Monitoring efforts near Quemetco have been ongoing for more than three decades for lead and since 2012 for arsenic. South Coast AQMD takes samples at a facility downwind of Quemetco. Samples are collected every six days and analyzed in South Coast AQMD's laboratory. Figure F-6 is a box whisker plot showing the minimum, first quartile (25%), median (50%), third quartile (75%), maximum, and average arsenic values observed at Quemetco (Closet World) monitoring station. The Office of Environmental Health Hazard Assessment's chronic relative exposure level for inhalation of arsenic is included for reference here: https://ww2.arb.ca.gov/sites/default/files/classic/toxics/healthval/contable.pdf.

Figure F-6 Arsenic Levels Compared to Chronic Inhalation REL of 15 ng/m3



Source: South Coast AQMD, 2021b

All measured levels at this monitoring station have been below the SCAQMD Rule 1420.1 fenceline threshold for arsenic (10.0 ng/m3) and are typically between 1 and 2 ng/m3. The MATES II study indicated arsenic concentrations at the Pico Rivera monitoring station were approximately 3.5 ng/m3. In MATES III the Pico Rivera monitoring station arsenic

concentration was between 1.0 and 1.5 ng/m3. MATES IV and V results for arsenic at the Pico Rivera monitoring station were between 0.5 and 1 ng/m3.

PROPOSED PROJECT CUMULATIVE TOXIC AIR CONTAMINANT IMPACTS

Chapter 4 of the EIR describes the Health Risk Assessments ("HRAs") prepared for the proposed Project. These included separate HRAs for the baseline (year 2014) and proposed Project conditions so as to determine the Project's incremental increase in health risk from mobile and stationary sources during normal operations. These findings are described in detail Section 4.2 of the EIR. The methodologies applied in these studies are described in the EIR in Section 4.2 and Appendix D.1: Technical Air Quality Methods and Emissions Assumptions. Sensitive receptors within a 5,000-meter radius distance from the proposed Project site were included in the residential receptor analysis (also referred to as a 10-kilometer grid (equivalent to 6.2 miles)).

Table 4.2-8 in the EIR shows that the net cancer risk impacts, inclusive of both stationary and mobile sources during normal operations, resulting from the proposed Project would be less than the South Coast AQMD threshold for MEIR and MEIW receptors. Non-cancer risk net impacts, which are represented as Maximum Chronic Hazard Index and Maximum Acute Hazard Index, are also less than their respective South Coast AQMD significance thresholds. For these reasons, the net health risk impact from the proposed Project would not generate significant public health impacts from toxic air emissions.

Furthermore, the EIR's analysis concluded that all of the proposed Project's potential impacts, including potential impacts to public health relating to air quality and GHGs, and hazards and hazardous materials, accidental releases or fire hazards, would be less than significant. The net health risk impact from the proposed Project would not generate significant public health impacts from toxic air emissions and mitigation measures for the proposed Project's direct public health impacts are not required.

The potential for new, future sources of TAC emissions in the immediate vicinity of the proposed Project site is low, given that the City of Industry, and the area surrounding the facility site specifically, is already fully developed. In the unlikely event that potential new development applications for a project within the vicinity of Quemetco with a new source of air toxics are submitted, they would be reviewed through the City of Industry's Conditional Use Permit application process, CEQA, and South Coast AQMD air permitting authority including AB2588 New Source Review, and potentially by DTSC. However, no such projects are currently known, and any examination of cumulative impacts associated with a future unknown or hypothetical project in the immediately vicinity is too speculative to meaningfully analyze.

Cumulative TAC Contributions of Cumulative Projects

The operational impacts of the cumulative projects would be cumulatively significant if their combined emissions would exceed the SCAQMD significance thresholds for health risk assessments.

As described in MATES V, the South Coast AQMD determined that the South Coast Air Basin's cumulative air toxics cancer risks are still estimated to be about 4 to 5 times the significant risk levels established in the AB 2588 Air Toxics Hot Spots program, which is 100 in a million South Coast AQMD, 2021a). While data from the nearest fixed monitoring station to the proposed Project site indicates that existing background levels are below the applicable thresholds for lead and arsenic, nonetheless and in an abundance of caution, exposure to toxic air contaminates associated with cumulative projects within the area is considered to be cumulatively significant.

The Project involves allowing the facility to realize greater capacity through the elimination of several hours of facility idle time each day. The hourly processing of material is not expected to increase, only the number of operating hours per day. As a result, hourly emissions are not expected to increase. Because acute risk is based on hour emissions, acute health risks are not expected to change as a result of the Project.

The MATES V analysis identifies arsenic as the main driver of chronic HI throughout the Basin. Sources of arsenic include paved road dust, construction dust, mineral processes, metal processes, refineries and fuel combustion. There were large decreases in chronic HI at all sites from MATES III to IV. However, changes from MATES IV through V were more modest, with a slight decline on average and small increases at three sites. Since MATES III, chronic HI has decreased, but the overall chronic HI still exceeds one, indicating that these levels may increase the chances of adverse non-cancer health effects in the general population over a lifetime. Based on the MATES V monitoring data, the estimated chronic non-cancer hazard indices range from about 5 to 9. Five stations (Burbank Area, Central LA, Compton, Huntington Park, and Long Beach) had chronic hazard indices between 5 and 6. West Long Beach had a chronic hazard index of approximately 6.5. The estimated chronic hazard indices for Pico Rivera and Rubidoux stations were approximately 7. The Inland Valley San Bernardino station had the highest chronic hazard index of 9.

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