RAD-5706

RADCO FIELD EVALUATION REPORT

Report No. RAD-5706
Project No. C3274A

On-Site Product Evaluation and Performance Testing of a Gas-Fired Cremation Oven

Tested and Evaluated for Commercial Application in
General Conformance to:

NFPA 86 Standard for Ovens and Furnaces
NFPA 54National Fuel Gas Code

Tested and Evaluated for
American Crematory Equipment Co
14530 Anson Ave.
Santa Fe Springs, CA 90670

Tested and Evaluated at:
Cortez Cremations & Funeral Services
100 W. 35th Street, Suite A
National City, CA 91950

by:

RADCO
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Issued: July 2015

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1.0 INTRODUCTION

At the request of American Crematory Equipment Co., RADCO, a Testing Laboratory and Quality Assurance Agency accredited by IAS (International Accreditation Services, Inc.), conducted a third-party field evaluation and performance testing program on a Gas-Fired Cremation Oven, which was installed at Cortez Cremations & Funeral Services in National City, CA.

The construction, installation, and operating characteristics of this equipment was evaluated for compliance with the applicable portions of the following codes and/or nationally recognized standards:

- NFPA 86 Standard for Ovens and Furnaces
- NFPA 54 National Fuel Gas Code

The product evaluation and the performance testing was conducted from July 3rd, 2015 through July 13, 2015 under RADCO Project Number C3274A.

2.0 OBJECTIVE

2.1 Product Evaluation

The objective of the product evaluation was to determine whether the construction and installation of the unlisted equipment described in this report was in general compliance with applicable portions of the codes and standards indicated in the introduction. The evaluation was also to verify that the critical safety components employed in the make up of the safety systems are listed components and/or are suitable for the use intended, and that all components utilized are installed in accordance with their listing, the codes and standards stated above and /or sound engineering and industry accepted practices.

2.2 Performance Testing

The objective of the performance testing was to determine whether the operation of the unlisted equipment meets with sound engineering practices by evaluating the equipment's operating characteristics with applicable portions of the performance requirements of the NFPA standard. The testing was also to verify that all the installed safety related components functioned as intended and that the normal use of the equipment will not have adverse effects on their surroundings.

3.0 SUMMARY

Based on the results of RADCO's product evaluation and performance testing program, and with implementing and strictly adhering to the requirements stated in Appendix A of this report, it has been determined that the construction, installation, and operation of the unlisted gas-fired cremation oven described in this report complies with the applicable portions of the codes and standards indicated in the introduction. Further it has been determined that all operating and safety related controls function as intended and that the normal operation of the equipment will not have an adverse effect on its surroundings. RADCO authorizes the application of our Field Evaluation Services Label, bearing the RADCO Registered Trademark. This label, similar to the sample shown in Appendix B of this report, is applied directly to the control panel for this appliance, and is an indication that RADCO recommends that a variance to accept the unlisted equipment be granted.

4.0 CONSTRUCTION & INSTALLATION EVALUATION

A brief summary of RADCO's evaluation findings is detailed in sections 4.1 through 4.8 below.

4.1 Product Description and Theory of Operation

The gas-fired cremation oven is a direct-fired oven, manufactured by American Crematory Equipment Co., Model: A-200 HT, S/N 071014-A. The oven has been installed at Cortez Cremation Services, in National city, CA. The oven is installed in a room at the northeast corner of the building.

The oven is used for the cremation of caskets. The exterior dimensions of the oven are 151" long (not including blower), 63" wide (not including control panel), 80" high in the back (not including gas valves), and 98" high in the front. The oven utilizes natural gas as its fuel source, to supply two burners with a combined input rating of 1,750,000 Btu/Hr.

The crematory burner is equipped with two Eclipse Thermjet Direct Fired Burners. The crematory burner fires into the oven's main chamber. From there the heated air, which includes the products of combustion, is ducted to an afterburner chamber, into which the afterburner fires. The air is then exhausted through the vent pipe on top of the unit. An listed industrial control panel is installed on the side of the oven.

4.2 Gas Supply

The source of the natural gas is located on the northeast side of the building. The gas is supplied by San Diego Gas and Electric Company with a gas regulator. Downstream of the regulator is a gas meter and a shutoff valve. Following the gas meter assembly, the Schedule 40 gas pipe for the oven branches off , and is routed through the exterior wall of the building. The gas pipe is then run along the wall and to the oven . The exterior gas piping has been supported at intervals and has been painted for corrosion protection.

Inside, the gas piping for the oven is provided with a dedicated ball valve that serves as an equipment isolation valve. Gas is supplied to the batch oven valve train through steel pipe at low supply pressure (less than ½ PSI). All the low pressure pipe employs threaded connections. The supply piping has been installed in a clean and workmanlike manner in accordance with local codes.

4.3 Burner Valve Train Assembly

The cremation oven is equipped with a crematory burner, with an input rating of 750,000 Btu/Hr and an afterjet burner with an input rating of 1,000,000 Btu/Hr. Both burners are Eclipse Thermjet Direct Fired Burners.

Following the equipment isolation valve, a suitable service regulator that serves both burner assemblies has been installed. From that point, the gas train splits to supply the two burners. The gas trains for the oven are equipped with the following components, listed in the order in which they are installed beginning from the upstream side, and meet with the requirements of the NFPA 86 Standard.

- Crematory Burner Valve Train
  - A listed automatic safety shut off valve with visual position indication
  - A listed high/low gas pressure switch
  - A second listed automatic safety shut off valve with visual position indication and proof of closure interlock
  - A listed ratio regulator (adjusts gas pressure to match combustion air pressure)
  - The Eclipse burner assembly

- After Burner Valve Train
  - A listed automatic safety shut off valve with visual position indication
  - A listed high/low gas pressure switch
  - A second listed automatic safety shut off valve with visual position indication and proof of closure interlock
  - A listed modulating valve
  - The Eclipse Burner Assembly

- After Burner Pilot Valve Train Assembly
  - Two listed gas solenoid valves
  - A listed ball valve

4.4 Operating & Safety Controls

The oven is provided with the following operating and safety related controls. These controls are mounted either on the appliance, or inside the control panel. The control panel is mounted on the side of the oven.

- Operating temperature controllers w/ built in high temperature limit set points (2)
- Ignition controls (2) with built-in post purge
- Ignition transformers (2)
- Combustion blower airflow proving switch
- Hearth and throat air timers
- High and low gas pressure switches
- Main gas valve proof of closure interlocks (2)
- Front door closed interlock switch

The operating and safety control systems serving the equipment meet with the requirements of the NFPA 86 Standard. The installation of the safety controls on this unit were verified to be in accordance with the manufacturers' ratings and certification requirements. The manual operation of a push button is required in order to start the oven, or to restart the oven following the activation of a safety control.

4.5 Thermal Oxidizers

The crematory oven is equipped with an afterburner. This type of oven is considered to be a type A furnace, however the explosion relief requirements do not apply.

The maximum input rate of the oven is 1,750,000 Btu/Hr. The required safety ventilation rate for the products of combustion is therefore approximately 320 SCFM. The oven is equipped with a blower that has a rated capacity of 1400 CFM, which exceeds the ventilation requirements for products of combustion.

The materials burned inside the oven will vary. The manufacturer has specified in their instructions specific requirements for the means of burning several styles of caskets. These instructions are to be followed by the oven operator.

4.6 Venting of Equipment

The chimney for the oven is refractory lined and is rated for a temperature of 2300°F. The chimney has an outer diameter of 26" and an inner diameter of 22". The chimney runs vertically out through the ceining, and terminates 10 feet above the roof. The flue gases entering the chimney are diluted with fresh air in order to reduce the combined flue temperature. During the performance testing of the oven, the afterburner temperature reached a temperature of 1650°F. The maximum flue gas temperature observed was 760°F.

An opening has been cut into the ceiling so that a 7" clearance is maintained on all sides of the chimney. Where the chimney penetrates the ceiling, a metal collar with 1" clearance has been installed.

The service regulator for the oven has been vented to the roof. The vent line is terminated with two elbows and a screened cover in order to prevent the entry of water or insects into the vent line.

4.7 Equipment Surroundings

The oven is installed indoors on a concrete floor. The walls of the room have been lined with gypsum board. The equipment is installed with adequate space between the appliance and the walls such that the temperatures on the surface of the walls and ceiling remain sufficiently low during operation of the oven.

Fresh air is brought in from the roof by a duct that directly feed into combustion blower.

4.8 Control Panel

The industrial control panel for the cremation oven has been manufactured by Calhoun & Poxon Co., Inc. and listed by Underwriters Laboratories in accordance with UL 508A. As this panel was already listed, RADCO's field evaluation did not cover the wiring methods used inside of the panel.

RADCO did review the installation of the panel to verify that they were installed in accordance with the panel listing requirements. A Photo of the control panel ratings plate is included in Appendix C.

5.0 PERFORMANCE TESTING

5.1 Gas Leak Test

RADCO verified the gas tightness of the accessible portions of the indoor fuel gas train with the use of a handheld combustible gas detector. No leaks were detected

5.2 Input Rate Measurement

The rated input for the two burners installed is 750,000 Btu/Hr and 1,000,000 Btu/Hr. The total input rate for the cremation oven is 1,750,000 Btu/Hr. The oven was turned on so that both the crematory and afterburners were operating at high fire conditions during the initial oven warmup period. The gas input rate was measured at the building's gas meter. Based on this measurement, the input for the oven was found to be approximately 1,720,000 Btu/Hr, which is within 2% of the nameplate rating.

5.3 Functionality Tests

The operation of the following operating and safety controls were tested by RADCO. The following devices were found to function as intended:

- Operating temperature controls
- High and Low gas pressure switches
- Valve proof of closure switches
- Purge timer
- Combustion Air Proving Switch

5.4 Combustion Test

Samples of the flue products were taken from the chimney, and the products of combustion were analyzed using a handheld combustion analyzer. ANSI and UL standards for natural gas equipment with similar input rates as the oven typically specify a maximum Carbon Monoxide concentration of 400 ppm in an air-free sample. The Air Free Carbon Monoxide (AFCO) measured in a sample of the exhaust gas for the oven was found to be 35 ppm. This carbon monoxide level was well below the maximum permissible limit, and was considered acceptable.

5.5 Temperature Test

The operating temperature of the oven is adjustable, depending upon the type of casket that is to be burned. A common operating temperature is 1700°F. The oven was adjusted to its this normal operating temperature, and allowed to operate until steady state surface temperatures were observed. The outside surfaces of the oven and nearby combustible materials were scanned with a digital infrared thermometer and a K type surface probe style thermocouple. The maximum temperatures observed during the test are shown in Table 5.5.

TABLE 5.5 SURFACE TEMPERATURES

Location	Maximum Temperature (°F)	Allowable Temperature (°F)
Ambient Temperature	80	
Front of Oven- Oven Door	90	160
Left Side of Oven	85	160
Right Side of Oven	87	160
Rear of Oven	85	160
Chimney Exterior Surface (at Oven Vent Outlet)	185	N/A
Chimney Exterior Surface (Adjacent to Ceiling)	141	N/A
Wall at Ceiling Penetration	92	160
Room Walls	85	160
Air Intake Pipe	85	N/A

All adjacent combustible surfaces remained at temperatures that were well below the allowable 160°F. Accessible surfaces of the oven exterior also remained below 160°F. The exterior portions of the chimney did reach temperatures in excess of 160°F, however these areas are located above the oven and are not subject to accidental contact during normal operation of the oven.

6.0 RECOMMENDATIONS

Based on RADCO's product evaluation and performance testing, and with implementing and adhering to the requirements in Appendix A of this report, it is RADCO's recommendation that a variance to accept the unlisted equipment described in this report be granted.

APPENDIX A

REQUIREMENTS

The following items must be implemented and adhered to for RADCO's continued recommended acceptance of the equipment described in this report.

1. The equipment is to be operated and maintained by personnel fully trained in the operating and safety features of the equipment and the hazards involved in their operation.
2. The area within 3 feet surrounding the oven is to be maintained free of combustible materials. Do not store Gasoline, Kerosene, Paint Thinners, Solvents or other flammable liquids or combustible materials, in the vicinity of the furnaces. Keep all such materials well away.
3. Establish a routine maintenance and testing programs for the equipment, and maintain records of this routine maintenance, as recommended by the equipment manufacturer.
4. Maintain the set points of operating and limit controls, in accordance with the manufacturer's recommendations, or as described in this report.

APPENDIX B
COPY OF FIELD APPLIED LABEL

3220 East 59TH Street, Long Beach, CA 90805
(562) 272-7231
www.radcoinc.com

COMPLIANCE EVALUATION ACCEPTANCE

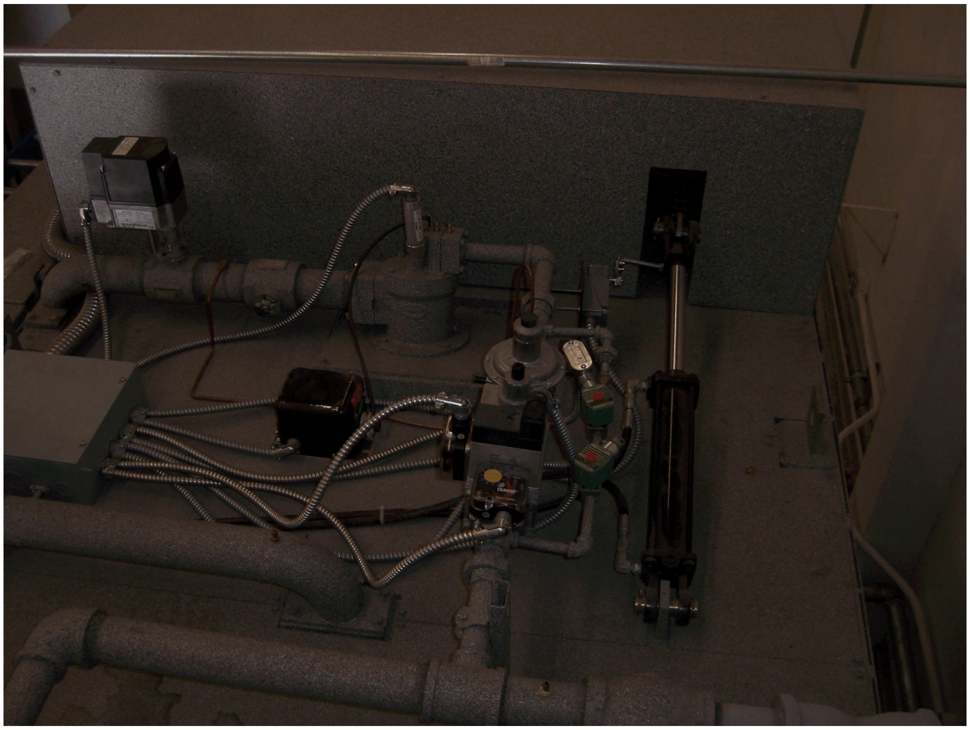
TL-209 **RADCO FIELD EVALUATION SERVICES** AA-650

UNIT EVALUATED: **Gas Fired Cremation Oven** **Label Number: 5706-001**
Model: A-200-HT, Serial #:071014-A
EVALUATED FOR: **American Crematory Equipment, Santa Fe Springs, CA 90670**
EVALUATED AT: **CORTEZ CREMATION SERVICES, NATIONAL CITY, CA 91950**
EVALUATED TO: **NFPA 86 Standard for Ovens and Furnaces**

RADCO WORK ORDER NUMBER C3274A

Refer to RADCO Report RAD-5706. RADCO's field evaluation programs are limited to those features and characteristics apparent at the installation site at the time of the evaluation. Issued: JULY, 2015

APPENDIX C
PHOTOS




American
CREMATORY EQUIPMENT CO.
1-800-396-2254
Model # A-200-HT Trilogy
Serial # 071014-A
Maximum Blower Capacity: 1400 CFM @13" W.C.
Max Fuel Rating: 1.75 MM BTU/HR
Fuel Type: Natural Gas or LPG
Fuel Input: 1666 C.F.H.
Fuel Pressure Required: 14" W.C.
Voltage: 220 Volt Single Phase 60Hz
Control Voltage: 120 Volt
Full Load Amp: 43
Pre Purge Time: 3 Minutes
Cortez Cremations & Funeral Service National City, CA 91950
UL 508A, NFPA 54 & 86, CMC, CEC
A-200-HT Trilogy

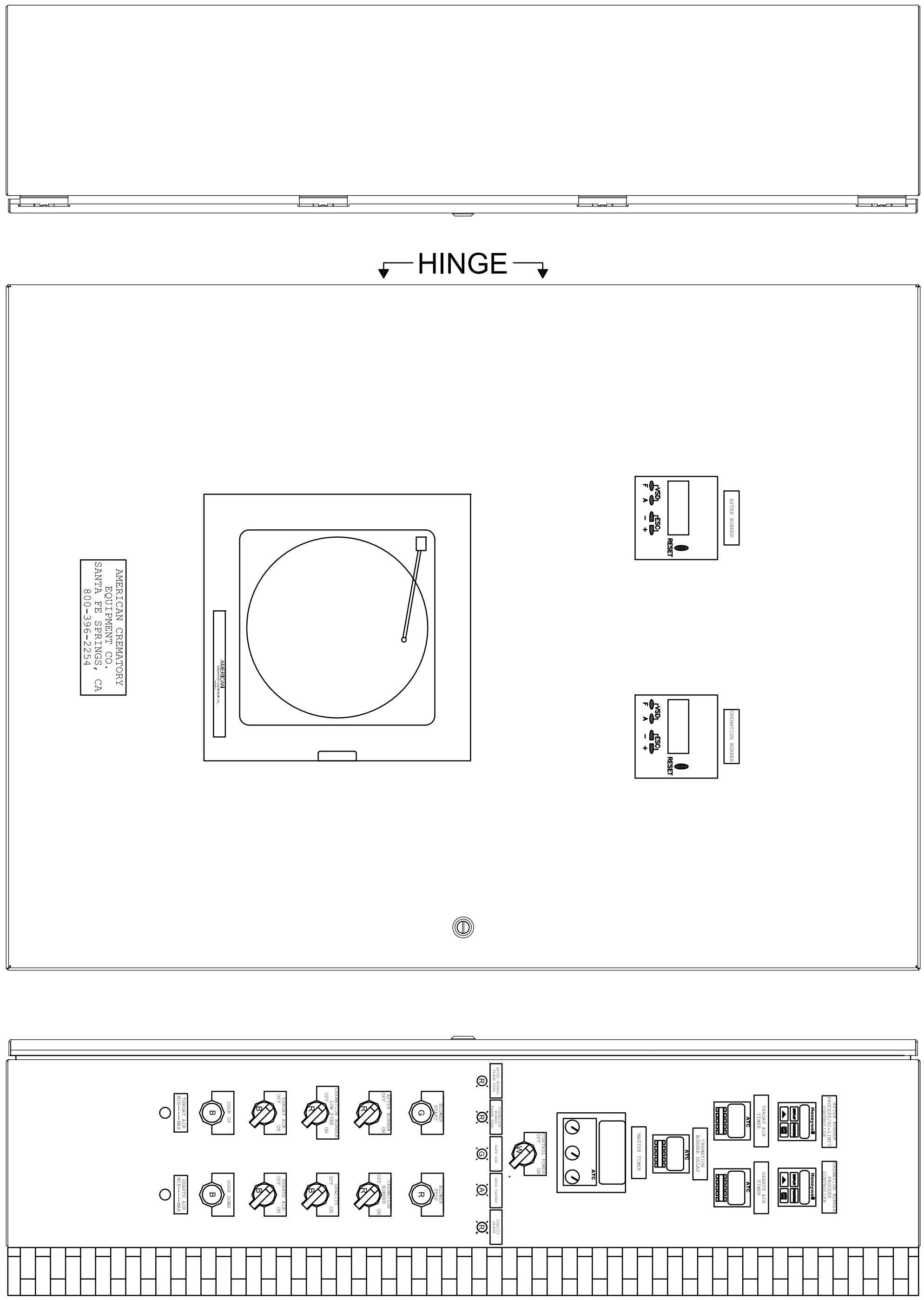
ENCLOSURE: NEMA TYPE 1
SCCR: 5,000 AIC
MANUF.: WEIGMANN
PART #: N412423610C

THIS RENDERING REPRESENTS THE MANUFACTURER'S BEST ESTIMATE OF THE PROJECT LAYOUT PRIOR TO FABRICATION LAYOUT IS SUBJECT TO CHANGE AS NECESSITATED BY FABRICATION CONSIDERATIONS

DRAWING NOTES

1. FIELD DEVICE WIRING DETAILS ARE SHOWN FOR CONVENIENCE ONLY. INSTALLING CONTRACTOR SHALL REFERENCE DEVICE INSTALLATION MANUAL.

HINGE



LEFT HAND MOUNT

Calhoun & Poxon Co., Inc. Electrical Equipment	SALES ORDER NUMBER 42787	DESIGNED KO	07.17.13	WIRTH GAS EQUIPMENT
Los Angeles, CA 90032		DRAWN KO	08.14.13	AMERICAN CREMATORY
5330 Alhambra Ave.	SALES ORDER DATE 08.14.13	CHECKED AN	08.14.13	CORTEZ
Ph. (323) 225 2328	CUSTOMER PO 14019	APPROVED AR	PENDING	EXTERIOR ELEVATION
Fx. (323) 221 4930	CUSTOMER PO DATE 08.13.13	SALES ENG. AN	05.09.13	

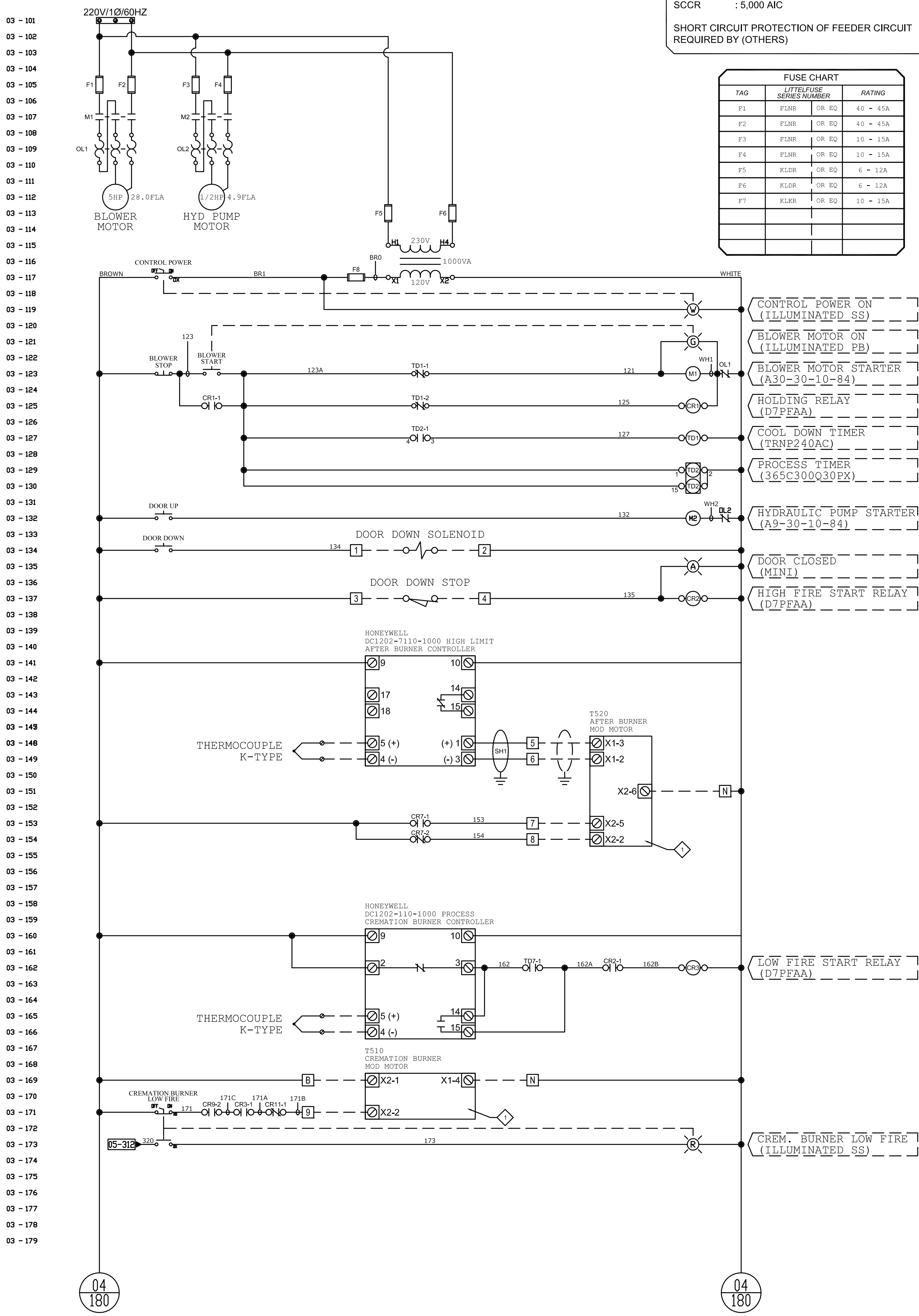
DRAWING FILE 01-42787-A
SHEET REFERENCE NUMBER 01
REVISION 1D

Mark	Description	Date	DWN.
1	RELEASED FOR FABRICATION	08.14.13	KO
1A	CR9/CR2 CONTACT CORRECTIONS	09.13.13	KO
1B	ELEVATION UPDATE	09.18.13	KO
1C	ELEVATION UPDATE (OVEN)	02.05.14	KO
1D	FIELD DEVICE DEPICTION CORRECTION	02.20.14	KO

ASSEMBLY : NEMA TYPE 1
SCCR : 5,000 AIC

SHORT CIRCUIT PROTECTION OF FEEDER CIRCUIT REQUIRED BY (OTHERS)

FUSE CHART			
TAG	LITTELFUSE SERIES NUMBER		RATING
F1	FLNR	OR EQ	40 - 45A
F2	FLNR	OR EQ	40 - 45A
F3	FLNR	OR EQ	10 - 15A
F4	FLNR	OR EQ	10 - 15A
F5	KLDR	OR EQ	6 - 12A
F6	KLDR	OR EQ	6 - 12A
F7	KLKR	OR EQ	10 - 15A



SEE SH01 FOR DRAWING NOTES.

DRAWING FILE	03-42787-A
SHEET REFERENCE NUMBER	03
REVISION	1D

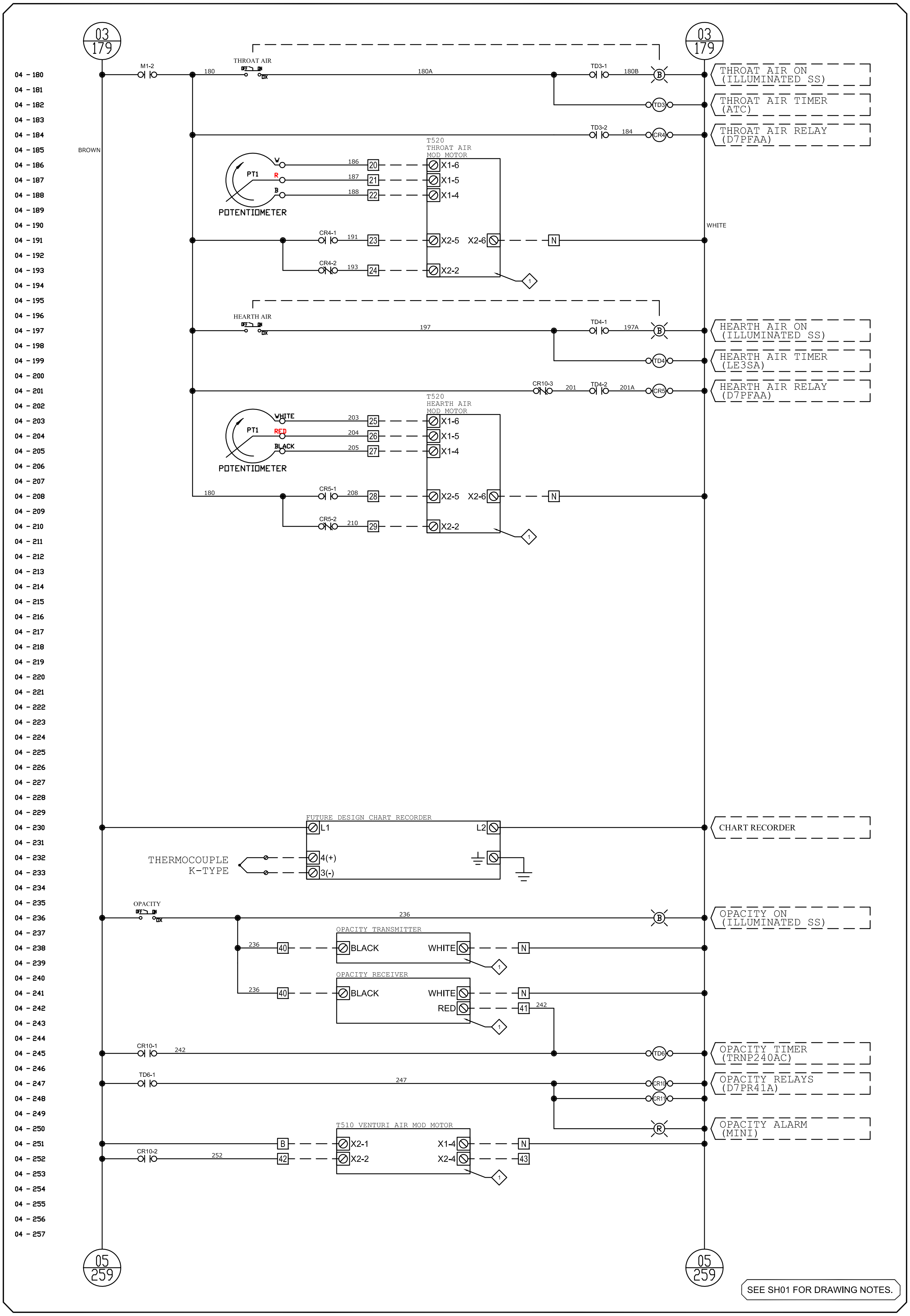
Calhoun & Poxon Co., Inc.
Electrical Equipment

Los Angeles, CA 90032
5330 Alhambra Ave.
Ph. (323) 225 2328
Fx. (323) 221 4930

SALES ORDER NUMBER 42787	DESIGNED KO	07.17.13	
	DRAWN KO	08.14.13	
SALES ORDER DATE 08.14.13	CHECKED AN	08.14.13	
CUSTOMER PO 14019	APPROVED AR	PENDING	
CUSTOMER PO DATE 08.13.13	SALES ENG. AN	05.09.13	

WIRTH GAS EQUIPMENT
AMERICAN CREMATORY
CORTEZ
STARTERS AND CONTROLLERS

Mark	Description	Date	DWN.
1	RELEASED FOR FABRICATION	08.14.13	KO
1A	CR9/CR2 CONTACT CORRECTIONS	09.13.13	KO
1B	ELEVATION UPDATE	09.18.13	KO
1C	ELEVATION UPDATE (OVEN)	02.05.14	KO
1D	FIELD DEVICE DEPICTION CORRECTION	02.20.14	KO



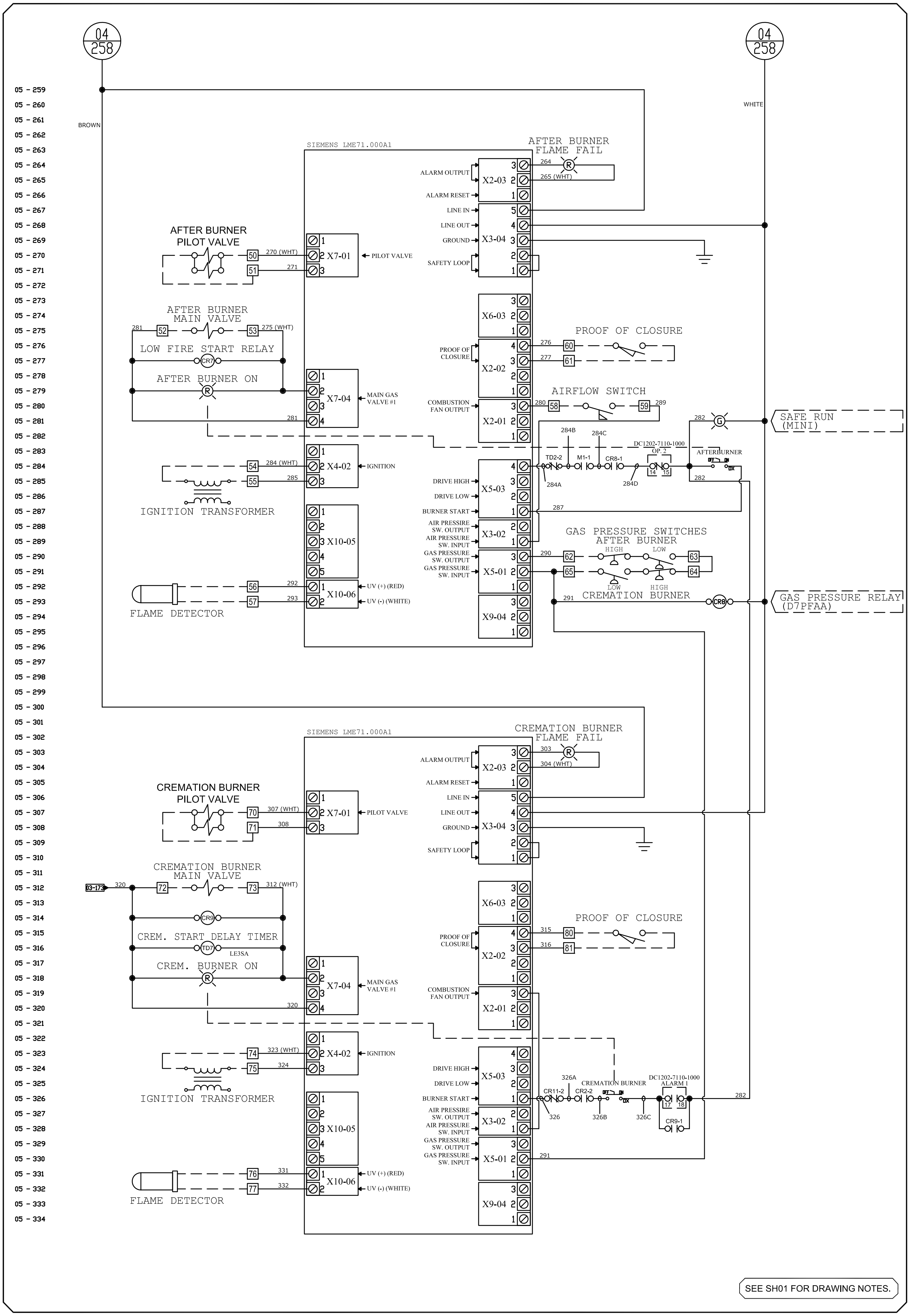
DRAWING FILE	04-42787-A	
SHEET REFERENCE NUMBER	04	
REVISION	1D	

Calhoun & Poxon Co., Inc.
Electrical Equipment
Los Angeles, CA 90032
5330 Alhambra Ave.
Ph. (323) 225 2328
Fx. (323) 221 4930

SALES ORDER NUMBER: 42787	DESIGNED: KO	07.17.13	
	DRAWN: KO	08.14.13	
SALES ORDER DATE: 08.14.13	CHECKED: AN	08.14.13	
CUSTOMER PO: 14019	APPROVED: AR	PENDING	
CUSTOMER PO DATE: 08.13.13	SALES ENG.: AN	05.09.13	

WIRTH GAS EQUIPMENT
AMERICAN CREMATORY
CORTEZ
OPTIONS

Mark	Description	Date	DWN.
1	RELEASED FOR FABRICATION	08.14.13	KO
1A	CR9/CR2 CONTACT CORRECTIONS	09.13.13	KO
1B	ELEVATION UPDATE	09.18.13	KO
1C	ELEVATION UPDATE (OVEN)	02.05.14	KO
1D	FIELD DEVICE DEPICTION CORRECTION	02.20.14	KO



DRAWING FILE	SHEET REFERENCE NUMBER	REVISION
05-42787-A	05	1D

Calhoun & Poxon Co., Inc.
Electrical Equipment

Los Angeles, CA 90032
5330 Alhambra Ave.
Ph. (323) 225 2328
Fx. (323) 221 4930

SALES ORDER NUMBER	DESIGNED	
42787	KO	07.17.13
	DRAWN KO	08.14.13
SALES ORDER DATE 08.14.13	CHECKED AN	08.14.13
CUSTOMER PO 14019	APPROVED AR	PENDING
CUSTOMER PO DATE 08.13.13	SALES ENG. AN	05.09.13

WIRTH GAS EQUIPMENT

AMERICAN CREMATORY

MONTES

FLAME SAFEGUARDS

Mark	Description	Date	DWN.
1	RELEASED FOR FABRICATION	08.14.13	KO
1A	CR9/CR2 CONTACT CORRECTIONS	09.13.13	KO
1B	ELEVATION UPDATE	09.18.13	KO
1C	ELEVATION UPDATE (OVEN)	02.05.14	KO
1D	FIELD DEVICE DEPICTION CORRECTION	02.20.14	KO

41 Corporate Park, Suite 300
Irvine, CA 92606

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Prepared for:

Mr. Joshua England
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27135 Madison Avenue
Temecula, CA 92590

CREEKSIDE CREMATORY
SCREENING AIR TOXIC HEALTH RISK ASSESSMENT
CITY OF MURRIETA, CALIFORNIA

August 26, 2013

JN:08829-03a
HQ

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1.0 INTRODUCTION

Creekside Crematory is proposing to construct and operate two human cremation units within an existing industrial complex located in the City of Murrieta, California. The cremation units will utilize natural gas to produce heat and flame in a manner which consumes soft tissue and retains dry bone fragments. Inherently, exhaust gases and related toxic air contaminants (TAC) are emitted from the combustion process. As such, the proposed equipment is subject to permitting requirements of the South Coast Air Quality Management District (SCAQMD).

In June 1990, the SCAQMD adopted Rule 1401 which specified limits for maximum individual cancer risk and excess cancer cases for new, relocated, or modified equipment which emit carcinogenic air contaminants. The rule was subsequently amended in July 1998 to include noncarcinogenic compounds.

Rule 1401 specifies limits for maximum individual cancer risk (MICR), noncancer acute and chronic hazard indices (HI) and cancer burden from new permit units, relocations, or modifications to existing permit units which emit identified TACs. As a result, a risk assessment is required to determine facility compliance with the following requirements:

- The cumulative increase in maximum individual cancer risk (MICR) does not exceed one in one million (1.0E-06) if Best Available Control Technology for Toxics (T-BACT) is not used or, one in one hundred thousand (1.0 E-05) if T-BACT is used;
- For target organ systems, neither the cumulative increase in either the total chronic hazard index (HIC) nor the total acute hazard index (HIA) due to total emissions from the affected permit unit exceed 1.0 for any target organ system, or an alternate hazard index level deemed to be safe; and,
- The cumulative cancer burden (increase in cancer cases within the population) does not exceed 0.5.

The risk assessment and dispersion modeling methodologies used in the preparation of this report were composed of all relevant and appropriate procedures presented by the U.S. Environmental Protection Agency and SCAQMD. The methodologies and assumptions offered under this regulatory guidance were used to ensure that the assessment accurately quantified community-based impacts associated with the generation of contaminant emissions.

This report summarizes the protocol used to evaluate the health risks associated with the operation of the proposed cremation units and presents the results of the air toxic health risk assessment.

The SCAQMD typically issues a comment letter on the Notice of Preparation of a CEQA Document. Per the SCAQMD's typical comment letter, since the proposed Project is expected to TACs, preparation of a HRA is necessary. This document serves to meet the

SCAQMD's request for preparation of a HRA. Cancer risk is expressed in terms of expected incremental incidence per million population. The SCAQMD has established an incidence rate of 10 persons per million as the maximum acceptable incremental cancer risk due to DPM exposure. This threshold serves to determine whether or not a given project has a potentially significant project-specific and cumulative impact.

The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (August 2003). In this report the AQMD clearly states (Page D-3):

> *"…the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR. The only case where the significance thresholds for project specific and cumulative impacts differ is the Hazard Index (HI) significance threshold for toxic air contaminant (TAC) emissions. The project specific (project increment) significance threshold is HI > 1.0 while the cumulative (facility-wide) is HI > 3.0. It should be noted that the HI is only one of three TAC emission significance thresholds considered (when applicable) in a CEQA analysis. The other two are the maximum individual cancer risk (MICR) and the cancer burden, both of which use the same significance thresholds (MICR of 10 in 1 million and cancer burden of 0.5) for project specific and cumulative impacts.*
>
> *Projects that exceed the project-specific significance thresholds are considered by the SCAQMD to be cumulatively considerable. This is the reason project-specific and cumulative significance thresholds are the same. Conversely, projects that do not exceed the project-specific thresholds are generally not considered to be cumulatively significant."*

2.0 SITE DESCRIPTION

The proposed project is located at 41725 Elm Street, Suite 204 and is situated within an existing industrial complex. The 2,310 square foot facility is designed to accommodate one cremation unit suitable for processing a maximum of 26,000 pounds of human remains in any one month. The facility may operate annually up to 12 hours per day, 7 days per week.

The site is located between a private access road serving local businesses to the northwest, Jefferson Avenue to the northeast, Adams Avenue to the southwest and Elm Street to the southeast. The site is zoned general industrial (GI) and adjoined by commercial uses which include business park (BP) and multiple use (MU2) designations. Appendix A presents a land use map which identifies the various land use designations in proximity of the proposed project. Figure 1 presents an aerial photograph of the site and surrounding community.

Figure 1
Site Location/Vicinity Aerial Photograph

3.0 SOURCE CHACTERIZATION

The facility owner is proposing to construct and operate an American Crematory A-200HT cremation unit manufactured by American Crematory Equipment Co. The units are designed to complete a typical cremation case in 1 to 2 hours. The time does not include preheating the secondary chamber or the cool down period before removal of the remains (1/2 hour). The units have nominal burn rates of 150 pounds per hour for both remains and their associated containers. The cremation units are manual feed multiple chamber design and fired by natural gas.

Based upon the above operational characteristics, the facility owner/operator proposes to process a maximum of 26,000 pounds of human remains in any one month. Assuming a maximum of 26,000 pounds of human remains per month and maximum operating schedule of 12 hous per day 7 days per week at 4.3 weeks per month, facility mass emissions are anticipated to be approximately 71.98 pounds per hour for modeling purposes.

To assess the impact of TAC emissions, the facility wide emission estimate was applied to a contaminant profile utilized by the SCAQMD for crematory operations to produce discrete emission estimates. A list of emitted compounds and corresponding emission factors utilized in the assessment is presented in Table 1.

Table 1
TAC Crematory Emission Factor Profile

Compound	Emission Factor (lb/ton)
Arsenic and arsenic compounds (inorganic)	4.00E-04
Beryllium (and beryllium compounds)	1.84E-05
Cadmium and cadmium compounds	1.46E-03
Chromium, hexavalent	1.91E-04
Polychlorinated Dibenzofurans (PCDF) (as 2,3,7,8-Eqiv) and total	1.43E-07
Polychlorinated Dibenzo-p-Dioxins (PCDD) (as 2,3,7,8-Eqiv) and total	7.74E-08
Formaldehyde	2.89E-09
Hydrogen chloride (hydrochloric acid)	1.97E-00
Lead and lead compounds (inorganic, including elemental lead)	9.39E-03
Nickel & nickel compounds (except nickel oxide)	5.09E-04
Mercury and mercury compounds (inorganic)	5.32E-03
Polycyclic Aromatic Hydrocarbons (PAH)	9.63E-04

Source: South Coast Air Quality Management District – Rule 1401 Risk Assessment Calculator, Version 7.0 12/07/12.

4.0 EXPOSURE QUANTIFICATION

In order to assess the impact of emitted compounds on individuals who work and/or live throughout the adjoining community, air quality modeling utilizing the SCREEN3 model was performed. The model is recommended by the SCAQMD when conducting risk assessments utilizing the Tier 3 screening dispersion model protocol.

SCREEN3 is a single source Gaussian plume model which provides maximum ground level concentrations for point, area, flare, and volume sources, as well as concentrations in the cavity zone, and concentrations due to inversion break-up and shoreline fumigation. SCREEN3 is a screening version of the Industrial Source Complex-Short Term (ISCST3) model.

SCREEN3 can perform single source, short-term calculations including estimating maximum ground level concentrations and the distance to the maximum, incorporating the effects of building downwash on the maximum concentrations for both the near wake and far wake regions as well as estimating concentrations in the cavity recirculation zone. Although SCREEN3 cannot explicitly determine maximum impacts from multiple sources, guidance is provided to accept multiple nearby stacks by merging emissions into a single "representative" source location.

In addition, the model examines a full range of meteorological conditions, including all stability classes and wind speeds to find the maximum downwind concentration. The use of a full set of meteorological conditions is required as maximum concentrations are given as a function of distance and A, C, E or F stability classes may not be controlling for sources with building downwash. SCREEN3 explicitly calculates the effects of multiple reflections of the plume off an elevated inversion and off the ground when calculating concentrations under limited mixing conditions. The model also addresses the dispersion effects from plume rise associated with buoyancy induced dispersion.

As noted above, regulatory guidance allows for consideration of multiple stacks when release parameters are similar and located within relative proximity. For the proposed cremation units, they are of the same make and design and will be adjoining within the same facility. As such, the risk assessment assumed all facility emissions were associated with a single source location.

Model input values were based upon available technical documentation provided by the equipment manufacturer and Creekside Crematory representatives. Stack exhaust gas temperature and volumetric flow rate were obtained from Creekside Crematory's permit application on file with SCAQMD.

The effect of plume behavior associated with building downwash was considered in the modeling exercise utilizing the Schulman-Scire regulatory option. The downwash screening procedure assumes that the building is approximated by a simple rectangular box. Wake effects are included in the calculations using either the automated distance array or discrete distance options. Table 2 outlines the relevant input values utilized in the modeling exercise.

Table 2
SCREEN3 Model Input Parameters

Input Parameter	Value
Terrain	Simple
Source Type	Point
Emission Rate	9.07748
Stack Height (m)	7.0104
Stack Inside Diameter (m)	0.5080
Stack Exit Velocity (m/s)	5.475
Stack Gas Temperature (K)	755.222
Ambient Air Temperature (K)	293.0
Receptor Height (m)	0
Urban/Rural Option	Urban
Building Height (m)	6.096
Minimum Horizontal Dimension (m)	28
Maximum Horizontal Dimension (m)	104

Discrete distances were programmed into the model to identify the maximum exposed residential and worker receptors based upon the nearest off site location identified through a review of land use designations and aerial imagery. As such, a distance of 400 meters was assigned for the residential receptor located northeast of the proposed facility. For the worker receptor, existing businesses currently border the emission source. As a result, the receptor distance is limited by the dispersion model's ability to perform concentration estimates within a defined distance. For sources located on short or "squat" buildings affected by downwash, SCREEN3 requires a minimum distance based upon a value 3 times the building height. As a result, a minimum receptor distance of 23 meters was utilized.

The SCREEN3 model output file is presented in Appendix B. Predicted mass ground level concentrations are expressed in micrograms per cubic meter (μg/m3).

5.0 RISK CHARACTERIZATION

Carcinogenic compounds are not considered to have threshold levels (i.e., dose levels below which there are no risks). Any exposure, therefore, will have some associated risk. As a result, the SCAQMD has established a threshold of one in one hundred thousand (1.0E-05) for sources utilizing best available control technology for toxics (T-BACT). The proposed cremation units are both natural gas fired and maintain temperatures ≥ 1500 ^{o}F within the secondary chamber. As such, the units are assumed to be T-BACT compliant.

For noncarcinogenic effects, the established threshold for a cumulative increase in either the chronic hazard index (HIC) or the acute hazard index (HIA) shall not exceed 1.0 for any target organ system.

The cancer burden is the estimated increase in the occurrence of cancer cases in a population as a result of exposures to TAC emissions. The cancer burden for a population unit (city, census tract, sub-area or grid) is the product of the number of persons in the population and the estimated individual risk from TAC exposures. The SCAQMD has established a cancer burden threshold of 0.5 to address the incremental increase in cancer cases throughout a given population.

To quantify TAC exposures, the assessment utilized a spreadsheet program developed by the SCAQMD to produce carcinogenic risk, noncarcinogenic health effects and cancer burden estimates pursuant to *Rule 1401 Risk Assessment Procedures for Rules 1401 and 212, Version 7.0*. The program contains a Tier 3 procedure module that enables the user to provide concentration estimates generated by the SCREEN3 dispersion model to produce cancer risk and hazard estimates for cremation units fired by natural gas. Appendix C, presents the available worksheets generated from the Tier 3 Screening Risk Assessment Report.

6.0 CUMULATIVE IMPACTS

The SCAQMD uses the same significance thresholds for project-specific and cumulative impacts for air quality impacts analyzed in an Environmental Assessment or EIR. Pursuant to SCAQMD standards, less-than-significant Project-level air quality impacts are by definition not cumulatively considerable.[1] Accordingly less-than-significant TAC impacts resulting from the Project would not be cumulatively considerable. Please refer also to *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (SCAQMD) August 2003.

The SCAQMD has conducted an in-depth analysis of the toxic air contaminants and their resulting health risks for all of Southern California. This study, the *Multiple Air Toxics Exposure Study in the South Coast Air Basin, MATES III,"* estimates the average excess cancer risk level from exposure to TACs is approximately 1,200 in one million basin-wide. DPM is included in this cancer risk along with all other TAC sources. DPM accounts for 83.6% of the total risk shown in MATES-III.

The MATES-III basin-wide estimates were based on monitoring data collected at ten fixed sites within the South Coast Air Basin. None of the fixed monitoring sites are within the local area of the Project site. However, MATES-III has extrapolated the excess cancer risk levels throughout the Basin by grid-specific modeling. MATES-III grid-specific modeling predicts an excess cancer risk of 169-416 in one million for the general vicinity of the Project site (SCAQMD 2008, MATES III Carcinogenic Interactive Map).

Additionally, there is an existing crematory located operating at 41725 Elm Street Suite 304 by Carriage Funeral Services of CA, Inc. (existing crematory) Cancer risk attributed to this cumulative project has been included in the cumulative analysis (and is based on previous CEQA entitlements[2]).

The total cumulative TAC risk is indicated at 2-7, and is derived by adding the Project-source risk, plus the existing crematory and the MATES-III study background risk. In this latter regard, the analysis conservatively assumes the upper limit background risk identified in MATES III of 416 per million for the Project site. A summary of cumulative impacts for Residential and Workers is as follows:

<u>Residential Exposure Scenario:</u>
The greatest cumulative With Project cancer risk is 429.49 in one million. The Project's maximum incremental contribution to the cumulative health risk in the Project area is 3.75 in one million which is not above the 10 in one million threshold set by SCAQMD, and is therefore less-than-significant. Accordingly, pursuant to SCAQMD cumulative impact criteria, the Project's Residential Exposure TAC impacts would not be cumulatively considerable.

<u>Worker Exposure Scenario:</u>

[1] The AQMD has published a report on how to address cumulative impacts from air pollution: *White Paper on Potential Control Strategies to Address Cumulative Impacts from Air Pollution* (August 2003). In this report the AQMD clearly states (Page D-3): *"…the AQMD uses the same significance thresholds for project specific and cumulative impacts for all environmental topics analyzed in an Environmental Assessment or EIR.*

[2] Conditional Use Permit (CUP) 010-2922 & *Evans-Brown & Hemet Valley Crematory Screening Air Toxic Health Risk Assessment* (Urban Crossroads, Inc. August 9, 2010).

The greatest cumulative With Project cancer risk after is 428.92 in one million. The Project's maximum incremental contribution to the cumulative health risk in the Project area is 3.18 in one million which is not above the 10 in one million threshold set by SCAQMD, and is therefore less-than-significant. Accordingly, pursuant to SCAQMD cumulative impact criteria, the Project's Worker Exposure TAC impacts would not be cumulatively considerable.

Table 3

Cumulative Cancer Risk[3]

	Cancer Risk as Maximum Sensitive Receptor (risk in one million)			
	Background (MATES III)	Existing Crematory at 41725 Elm St., Suite 304	Project Site	Total Cumulative Risk
Maximum Impact to All Receptors Without Project	416	9.74		425.74
Maximum Residential Impact With Project	416	2.71	3.75	429.49
Maximum Worker Impact With Project	416	9.74	3.18	428.92
	Source: **MATES III Carcinogenic Risk Interactive Map (**http://www2.aqmd.gov/webappl/matesiii/) (SCAQMD 2008).			

7.0 SUMMARY OF FINDINGS

For carcinogenic exposures, the summation of risk totaled 3.75E-06 (3.75 in one million) for the maximum exposed residential receptor and 3.18E-06 (3.18 in one million) for the maximum exposed worker. For noncarcinogenic effects, the chronic and acute hazard indices for each toxicological endpoint totaled less than one for both residential and worker receptors. For the cancer burden estimate, an increase in cancer cases was estimated to be 1.88E-1.

In acknowledgment of the regulatory guidelines relating to carcinogenic and noncarcinogenic exposures, TAC emissions generated from the proposed cremation units are within acceptable limits and not anticipated to pose an actual or potential endangerment to persons who live and/or work within the local community.

[3] Although cumulative impacts typically represent a General Plan Buildout Scenario, there is no such data available for what General Plan Buildout DPM emissions impacts would be. The background risk, however, would likely overstate, rather than understate future DPM impacts and is assumed to be inclusive of future growth. It should be noted that due to improved DPM emissions control technologies and increasingly stringent DPM emissions regulations, the cancer risk incidence in the seven (7) years between the Mates II and Mates III studies declined by approximately 15% even as population and business growth occurred throughout the region. Similar future declines in area-wide DPM source emissions are anticipated pursuant to enactment of further emissions regulations.

REFERENCES

1. City of Murrieta, 2010. Information Systems/GIS. Website: http://www.murieta.org/services/is/disclaimer.asp.

2. Google Earth, 2013. Website: http://earth.google.com/intl/en/userguide/v5.

3. Qureshi, Haseeb, 2013. E-Mail correspondence from Josh England, Creekside Crematory providing proposed facility operating parameters and permit documentation.

4. South Coast Air Quality Management District, 2012. *Risk Assessment Procedures for Rules 1401 and 212, Version 7.0.*

5. South Coast Air Quality Management District, 2012. Rule 1401 Risk Assessment Calculator.

6. South Coast Air Quality Management District, 2013. MATES III Carcinogenic Interactive Map. http://www.aqmd.gov/prdas/matesIII/matesIII.html

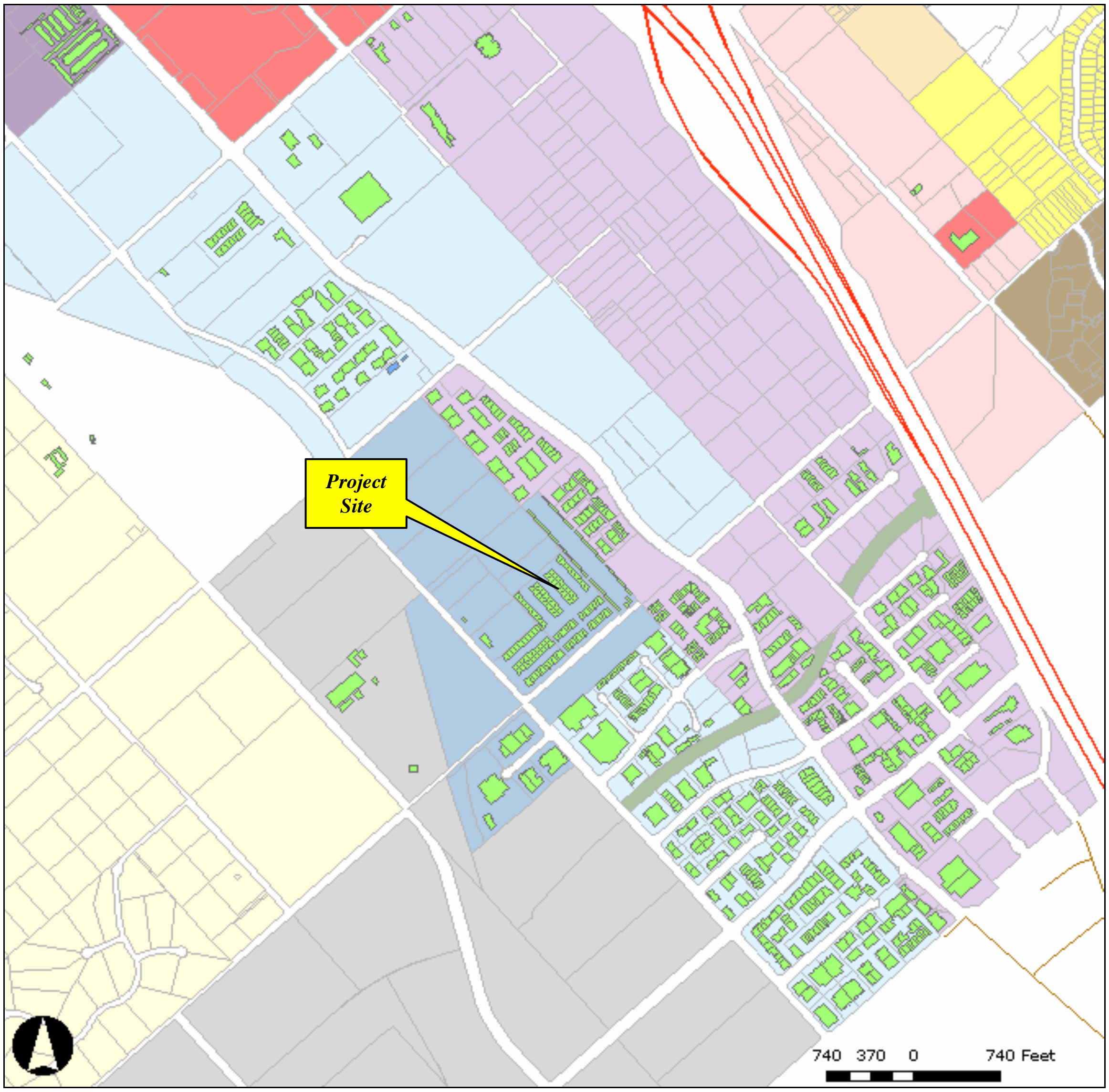
7. United States Environmental Protection Agency, Office of Air Quality Planning and Standards, 1995. *User's Guide for the Industrial Source Complex (ISC3) Dispersion Models, Volumes I and II*. EPA-454/B-95-003a and b.

8. United States Environmental Protection Agency, Office of Air Quality Planning and Standards, 1995. *SCREEN3 Model User's Guide*. EPA-454/B-95-004.

9. Urban Crossroads Inc., 2013. *Evans-Brown & Hemet Valley Crematory Screening Air Toxic Health Risk Assessment*.

APPENDIX A
Adjoining Land Use Designations

Adjoining Land Use Designations



Commercial/Industrial

Civic Buildings

City Zoning

- Business Park
- Civic/Institutional
- Community Commercial
- Estate Residential 1
- Estate Residential 2

City Zoning (continued)

- Estate Residential 3
- General Industrial
- Multi-Family 1, Residential
- Multi-Family 2, Residential
- Multiple Use, Area 1
- Multiple Use, Area 2
- Multiple Use, Area 3
- Neighborhood Commercial
- Open Space

City Zoning (continued)

- Parks & Recreation
- Private Recreation
- Professional Commercial
- Recreational/Resort Commercial
- Regional Commercial
- Rural Residential
- Single-Family 1, Residential

City Zoning (continued)

- Single-Family 2, Residential
- Special Industrial
- Specific Plan

APPENDIX B

SCREEN3 Model Output File

```
08/21/13

09:42:08
  ***  SCREEN3 MODEL RUN  ***
  *** VERSION DATED 96043 ***

 C:\Lakes\Screen View\8829_Screen3\Mortuary.scr

 SIMPLE TERRAIN INPUTS:
    SOURCE TYPE            =        POINT
    EMISSION RATE (G/S)    =      9.07748
    STACK HEIGHT (M)       =       7.0104
    STK INSIDE DIAM (M)    =       0.5080
    STK EXIT VELOCITY (M/S)=       5.4750
    STK GAS EXIT TEMP (K)  =     755.2220
    AMBIENT AIR TEMP (K)   =     293.0000
    RECEPTOR HEIGHT (M)    =       0.0000
    URBAN/RURAL OPTION     =        URBAN
    BUILDING HEIGHT (M)    =       6.0960
    MIN HORIZ BLDG DIM (M) =      28.0000
    MAX HORIZ BLDG DIM (M) =     104.0000

 THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
 THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.


 BUOY. FLUX =    2.120 M**4/S**3;  MOM. FLUX =    0.750 M**4/S**2.

 *** FULL METEOROLOGY ***

 *********************************
 *** SCREEN DISCRETE DISTANCES ***
 *********************************

 *** TERRAIN HEIGHT OF    0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES
***

   DIST     CONC             U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)   (UG/M**3)   STAB  (M/S)  (M/S)    (M)   HT (M)   Y (M)   Z (M)
DWASH
 -------  ----------  ----  -----  -----  ------  ------  ------  ------  ---
--
     60.   6119.        5     4.5    4.5 10000.0    8.39    6.52    5.95
SS
    400.   1211.        6     1.0    1.0 10000.0   32.72   40.85   25.30
SS
   1520.   289.8        6     1.0    1.0 10000.0   32.72  131.85   67.14
SS

  DWASH=   MEANS NO CALC MADE (CONC = 0.0)
  DWASH=NO MEANS NO BUILDING DOWNWASH USED
  DWASH=HS MEANS HUBER-SNYDER DOWNWASH USED
  DWASH=SS MEANS SCHULMAN-SCIRE DOWNWASH USED
  DWASH=NA MEANS DOWNWASH NOT APPLICABLE, X<3*LB

 ****************************************
```

```
     *** REGULATORY (Default) ***
    PERFORMING CAVITY CALCULATIONS
  WITH ORIGINAL SCREEN CAVITY MODEL
          (BRODE, 1988)
****************************************


 *** CAVITY CALCULATION - 1 ***       *** CAVITY CALCULATION - 2 ***
  CONC (UG/M**3)       =    1319.       CONC (UG/M**3)       =    4778.
  CRIT WS @10M (M/S) =    14.47       CRIT WS @10M (M/S) =    14.84
  CRIT WS @ HS (M/S) =    14.47       CRIT WS @ HS (M/S) =    14.84
  DILUTION WS (M/S)  =     7.24       DILUTION WS (M/S)  =     7.42
  CAVITY HT (M)      =     6.12       CAVITY HT (M)      =     6.10
  CAVITY LENGTH (M)  =    34.57       CAVITY LENGTH (M)  =    22.81
  ALONGWIND DIM (M)  =    28.00       ALONGWIND DIM (M)  =   104.00

****************************************
      END OF CAVITY CALCULATIONS
****************************************


     ***************************************
     *** SUMMARY OF SCREEN MODEL RESULTS ***
     ***************************************

 CALCULATION         MAX CONC    DIST TO   TERRAIN
  PROCEDURE         (UG/M**3)    MAX (M)    HT (M)
--------------    -----------   -------   -------
SIMPLE TERRAIN      6119.           60.        0.

BLDG. CAVITY-1      1319.           35.       --  (DIST = CAVITY LENGTH)

BLDG. CAVITY-2      4778.           23.       --  (DIST = CAVITY LENGTH)


***************************************************
** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
***************************************************
```

APPENDIX C
Tier 3 Screening Risk Assessment Report

TIER 3 SCREENING RISK ASSESSMENT REPORT

A/N:
Fac:

Application deemed complete date: 04/24/13

2. Tier 2 Data

MET Factor	1.00
4 hr	0.81
6 or 7 hrs	0.83

Dispersion Factors tables

2	For Chronic X/Q
6	For Acute X/Q

Dilution Factors (ug/m3)/(tons/yr)

Receptor	X/Q	X/Qmax
Residential	0.307289748	16.82411369
Commercial	1.212411573	66.37953362

Adjustment and Intake Factors

	AFann	DBR	EVF
Residential	1	302	0.96
Worker	2	149	0.38

3. Rule 1401 Compound Data

Compound	R1 - uncontrolled (lbs/hr)	R2 - controlled (lbs/hr)	CP	MP MICR Resident	MP MICR Worker	MP Chronic Resident	MP Chronic Worker	REL Chronic	REL Acute
Arsenic and arsenic compounds (inorganic)	1.44E-05	1.44E-05	1.20E+01	4.7831	4.5723	40.0600	37.8500	0.015	0.2
Beryllium (and beryllium compounds)	6.62E-07	6.62E-07	8.40E+00	1	1	1	1	0.007	
Cadmium and cadmium compounds	5.25E-05	5.25E-05	1.50E+01	1	1	1.4979079	1.1213	0.02	
Chromium, hexavalent	6.87E-06	6.87E-06	5.10E+02	1	1	1	1	0.2	
Polychlorinated Dibenzofurans (PCDF) (as 2,3,7,8-Eqiv	5.15E-09	5.15E-09	1.30E+05	9.7500	3.3600	11.53	6.9	0.00004	
Polychlorinated Dibenzo-p-Dioxins (PCDD) (as 2,3,7,8-	2.79E-09	2.79E-09	1.30E+05	9.7500	3.3600	11.53	6.9	0.00004	
Formaldehyde	1.04E-10	1.04E-10	2.10E-02	1	1	1	1	9	55
Hydrogen chloride (hydrochloric acid)	7.09E-02	7.09E-02		1	1	1	1	9	2100
Lead and lead compounds (inorganic, including element	3.38E-04	3.38E-04	4.20E-02	4.1924	2.9381	1	1		
Nickel & nickel compounds (except nickel oxide):	1.83E-05	1.83E-05	9.10E-01	1	1	1	1	0.014	0.2
Mercury and mercury compounds (inorganic)	1.91E-04	1.91E-04		1	1	6.6600	4.2400	0.03	0.6
PolyCyclic Aromatic Hydrocarbon (PAHs)	3.47E-05	3.47E-05	3.90E+00	29.76	14.6211	1	1		

4. Emission Calculations

Compound	uncontrolled R1 (lb/hr)	controlled R2 (lb/hr)	R2 (lb/yr)	R2 (ton/yr)
Arsenic and arsenic compounds (inorganic)	1.44E-05	1.44E-05	0.06288173	3.14409E-05
Beryllium (and beryllium compounds)	6.62E-07	6.62E-07	0.00289256	1.44628E-06
Cadmium and cadmium compounds	5.25E-05	5.25E-05	0.22951831	0.000114759
Chromium, hexavalent	6.87E-06	6.87E-06	0.03002603	1.5013E-05
Polychlorinated Dibenzofurans (PCDF) (as 2,3,7,8-Eqiv	5.15E-09	5.15E-09	2.248E-05	1.12401E-08
Polychlorinated Dibenzo-p-Dioxins (PCDD) (as 2,3,7,8-	2.79E-09	2.79E-09	1.2168E-05	6.08381E-09
Formaldehyde	1.04E-10	1.04E-10	4.5432E-07	2.2716E-10
Hydrogen chloride (hydrochloric acid)	7.09E-02	7.09E-02	309.69251	0.154846255
Lead and lead compounds (inorganic, including element	3.38E-04	3.38E-04	1.47614856	0.000738074
Nickel & nickel compounds (except nickel oxide):	1.83E-05	1.83E-05	0.080017	4.00085E-05
Mercury and mercury compounds (inorganic)	1.91E-04	1.91E-04	0.83632698	0.000418163
PolyCyclic Aromatic Hydrocarbon (PAHs)	3.47E-05	3.47E-05	0.15138776	7.56939E-05
Total	7.16E-02	7.16E-02	3.13E+02	1.56E-01

A/N: | Application deemed complete date: 04/24/13

TIER 3 RESULTS

5a. MICR

MICR = CP (mg/(kg-day))^-1 * Q (ton/yr) * (X/Q) * AFann * MET * DBR * EVF * 1E-6* MP

Compound	Residential	Commercial
Arsenic and arsenic compounds (inorganic)	1.61E-07	2.37E-07
Beryllium (and beryllium compounds)	1.08E-09	1.67E-09
Cadmium and cadmium compounds	1.53E-07	2.36E-07
Chromium, hexavalent	6.82E-07	1.05E-06
Polychlorinated Dibenzofurans (PCDF) (as 2,3,7,8-Eqiv	1.27E-06	6.74E-07
Polychlorinated Dibenzo-p-Dioxins (PCDD) (as 2,3,7,8-	6.87E-07	3.65E-07
Formaldehyde	4.25E-16	6.55E-16
Hydrogen chloride (hydrochloric acid)		
Lead and lead compounds (inorganic, including element	1.16E-08	1.25E-08
Nickel & nickel compounds (except nickel oxide):	3.24E-09	5.00E-09
Mercury and mercury compounds (inorganic)		
PolyCyclic Aromatic Hydrocarbon (PAHs)	7.83E-07	5.93E-07
Total	**3.75E-06**	**3.18E-06**
	PASS	**PASS**

5b. Cancer Burden	**YES**
X/Q for one-in-a-million:	0.0819204986
Distance (meter)	1511.72
Area (km2):	7.18E+00
Population:	50,231
Cancer Burden:	**1.88E-01**

6. Hazard Index

HIA = [Q(lb/hr) * (X/Q)max] * AF / Acute REL

HIC = [Q(ton/yr) * (X/Q) * MET * MP] / Chronic REL

Target Organs	Acute	Chronic	Acute Pass/Fail	Chronic Pass/Fail
Alimentary system (liver) - AL		3.62E-03	Pass	Pass
Bones and teeth - BN			Pass	Pass
Cardiovascular system - CV	4.78E-03	9.62E-02	Pass	Pass
Developmental - DEV	2.60E-02	1.71E-01	Pass	Pass
Endocrine system - END		3.62E-03	Pass	Pass
Eye	2.24E-03		Pass	Pass
Hematopoietic system - HEM		7.09E-03	Pass	Pass
Immune system - IMM	6.08E-03	2.50E-04	Pass	Pass
Kidney - KID		7.95E-02	Pass	Pass
Nervous system - NS	2.60E-02	1.68E-01	Pass	Pass
Reproductive system - REP		3.62E-03	Pass	Pass
Respiratory system - RES	8.32E-03	1.32E-01	Pass	Pass
Skin		9.62E-02	Pass	Pass

A/N: Application deemed complete date: 04/24/13

6a. Hazard Index Acute

HIA = [Q(lb/hr) * (X/Q)max] *AF/ Acute REL

	HIA - Residential									
Compound	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Arsenic and arsenic compounds (inorganic)		1.21E-03	1.21E-03				1.21E-03			
Beryllium (and beryllium compounds)										
Cadmium and cadmium compounds										
Chromium, hexavalent										
Polychlorinated Dibenzofurans (PCDF) (as 2,3,7,8-Eqiv										
Polychlorinated Dibenzo-p-Dioxins (PCDD) (as 2,3,7,8-										
Formaldehyde				3.18E-11						
Hydrogen chloride (hydrochloric acid)				5.68E-04					5.68E-04	
Lead and lead compounds (inorganic, including element										
Nickel & nickel compounds (except nickel oxide):						1.54E-03			1.54E-03	
Mercury and mercury compounds (inorganic)			5.37E-03				5.37E-03			
PolyCyclic Aromatic Hydrocarbon (PAHs)										
Total		1.21E-03	6.58E-03	5.68E-04		1.54E-03	6.58E-03		2.11E-03	

	HIA - Commercial								
Compound	AL	CV	DEV	EYE	HEM	IMM	NS	REP	RESP	SKIN
Arsenic and arsenic compounds (inorganic)		4.78E-03	4.78E-03				4.78E-03			
Beryllium (and beryllium compounds)										
Cadmium and cadmium compounds										
Chromium, hexavalent										
Polychlorinated Dibenzofurans (PCDF) (as 2,3,7,8-Eqiv										
Polychlorinated Dibenzo-p-Dioxins (PCDD) (as 2,3,7,8-										
Formaldehyde				1.26E-10						
Hydrogen chloride (hydrochloric acid)				2.24E-03					2.24E-03	
Lead and lead compounds (inorganic, including element										
Nickel & nickel compounds (except nickel oxide):						6.08E-03			6.08E-03	
Mercury and mercury compounds (inorganic)			2.12E-02				2.12E-02			
PolyCyclic Aromatic Hydrocarbon (PAHs)										
Total		4.78E-03	2.60E-02	2.24E-03		6.08E-03	2.60E-02		8.32E-03	

6b. Hazard Index Chronic

HIC = [Q(ton/yr) * (X/Q) * MET * MP] / Chronic REL

	HIC - Residential											
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Arsenic and arsenic compounds (inorganic)			2.58E-02	2.58E-02						2.58E-02		2.58E-02	#######
Beryllium (and beryllium compounds)								6.35E-05				6.35E-05	
Cadmium and cadmium compounds									2.64E-03			2.64E-03	
Chromium, hexavalent												2.31E-05	
Polychlorinated Dibenzofurans (PCDF) (as 2,3,7,8-Eqiv	9.96E-04			9.96E-04	9.96E-04		9.96E-04				9.96E-04	9.96E-04	
Polychlorinated Dibenzo-p-Dioxins (PCDD) (as 2,3,7,8-	5.39E-04			5.39E-04	5.39E-04		5.39E-04				5.39E-04	5.39E-04	
Formaldehyde												7.76E-12	
Hydrogen chloride (hydrochloric acid)												5.29E-03	
Lead and lead compounds (inorganic, including element													
Nickel & nickel compounds (except nickel oxide):							8.78E-04					8.78E-04	
Mercury and mercury compounds (inorganic)				2.85E-02					2.85E-02	2.85E-02			
PolyCyclic Aromatic Hydrocarbon (PAHs)													
Total	1.53E-03		2.58E-02	5.59E-02	1.53E-03		2.41E-03	6.35E-05	3.12E-02	5.43E-02	1.53E-03	3.62E-02	#######

A/N: | Application deemed complete date: 04/24/13

6b. Hazard Index Chronic (cont.)

	HIC - Commercial												
Compound	AL	BN	CV	DEV	END	EYE	HEM	IMM	KID	NS	REP	RESP	SKIN
Arsenic and arsenic compounds (inorganic)			9.62E-02	9.62E-02						9.62E-02		9.62E-02	#######
Beryllium (and beryllium compounds)								2.50E-04				2.50E-04	
Cadmium and cadmium compounds									7.80E-03			7.80E-03	
Chromium, hexavalent												9.10E-05	
Polychlorinated Dibenzofurans (PCDF) (as 2,3,7,8-Eqiv	2.35E-03			2.35E-03	2.35E-03		2.35E-03				2.35E-03	2.35E-03	
Polychlorinated Dibenzo-p-Dioxins (PCDD) (as 2,3,7,8-	1.27E-03			1.27E-03	1.27E-03		1.27E-03				1.27E-03	1.27E-03	
Formaldehyde												3.06E-11	
Hydrogen chloride (hydrochloric acid)												2.09E-02	
Lead and lead compounds (inorganic, including element													
Nickel & nickel compounds (except nickel oxide):							3.46E-03					3.46E-03	
Mercury and mercury compounds (inorganic)				7.17E-02					7.17E-02	7.17E-02			
PolyCyclic Aromatic Hydrocarbon (PAHs)													
Total	3.62E-03		9.62E-02	1.71E-01	3.62E-03		7.09E-03	2.50E-04	7.95E-02	1.68E-01	3.62E-03	1.32E-01	#######