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DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE A Q PROGRAM

May 18, 2012

Mr. William Rogers
Idaho Department of Environmental Quality
Air Quality Permitting
1410 North Hilton
Boise, ID 83706-1255

SUBJECT: K & T Steel Corporation – Facility ID No.: 083-00087
Application for a Modification to Air Permit No.: P-2008.0191

Dear Mr. Rogers:

Enclosed is an application for modification of Air Permit No.: P-2008.0191 that was issued on May 29, 2009 to K & T Steel Corporation – Facility ID No.: 083-00087. The Responsible Official for this permit is Mr. William W. Koch. We look forward to working with you to complete a modified/revised permit.

Please contact me at (775) 333-8455 or Sandra.Carroll@tetratech.com if you have questions or require additional information. Thank you for your attention to this application.

Sincerely,

Sandra Carroll

Sandra L. Carroll, Ph.D.
Senior Toxicologist

Tetra Tech, Inc.
3380 Americana Terrace
Suite 201
Boise, Idaho 83706

Cc: Mr. William W. Koch, K & T Steel Corporation

K & T STEEL CORP.

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DEPARTMENT OF ENVIRONMENTAL QUALITY
STATE A Q PROGRAM

Air Quality Permit to Construct Modification Application

PREPARED FOR:

Idaho Department of Environmental Quality
Air Quality Division
1410 N. Hilton
Boise, Idaho 83706

PREPARED BY:

Tetra Tech Inc.
3380 Americana Terrace
Suite 201
Boise, Idaho 83706

May 2012

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1.0 INTRODUCTION

This modeling report presents technical and regulatory compliance information in support of remodeling and a permit modification application that is being submitted to Idaho Department of Environmental Quality (IDEQ) for the K & T Steel Corp. (K & T Steel) facility in Twin Falls, Twin Falls County, Idaho. Twin Falls County is in attainment with the National Ambient Air Quality Standards (NAAQS) for all criteria pollutants. The K & T Steel facility will be a minor source of criteria pollutants and hazardous air pollutants (HAPs).

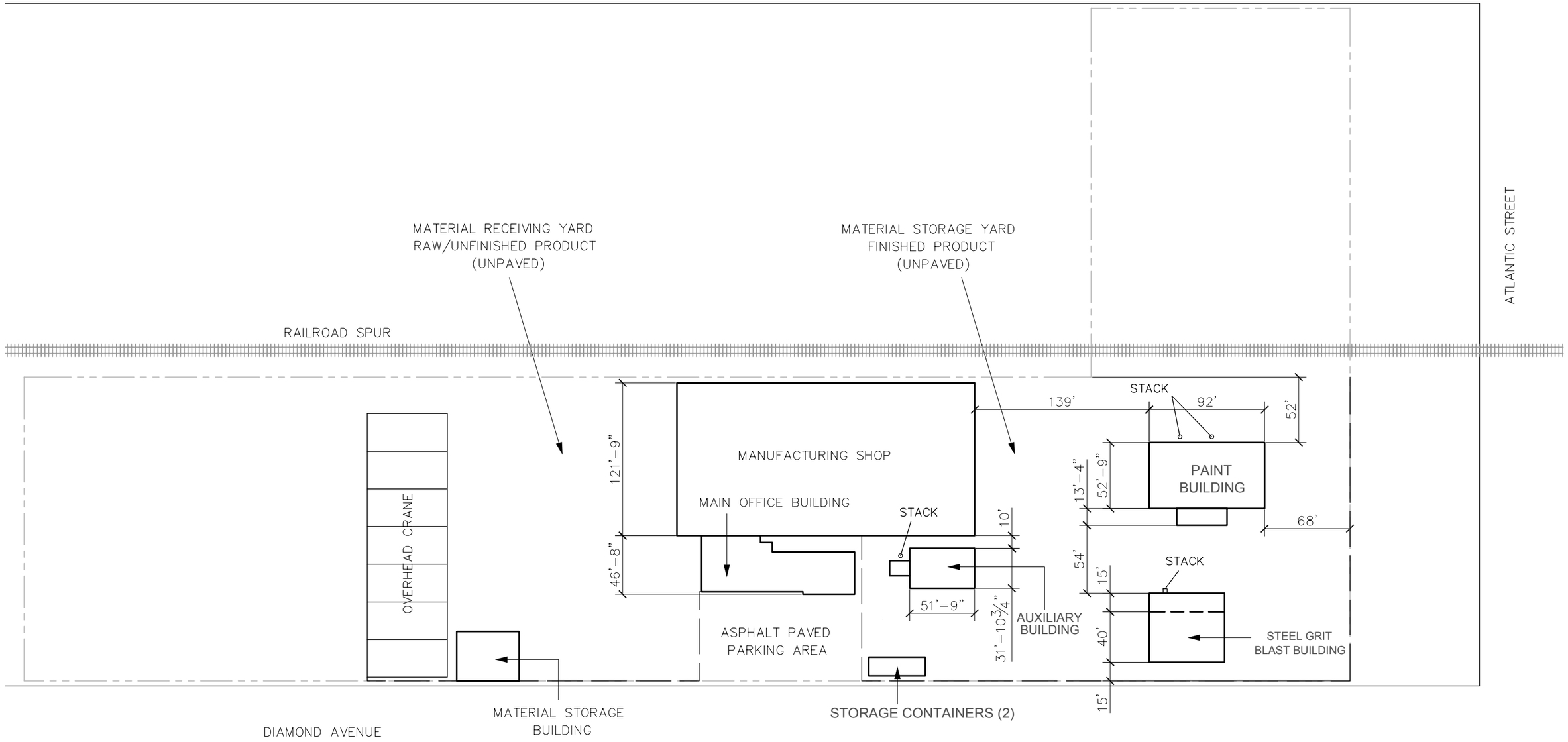
This document contains the following sections that meet the IDEQ Permit to Construct Application requirements provided in the Idaho Administrative Procedures Act (IDAPA) 58.01.01.200-228. Section 2.0 provides facility information. Section 3.0 describes the process and identifies emission units. Section 4.0 summarizes the projected and potential-to-emit (PTE) emissions from the facility, where PTE is defined in the Idaho Administrative Code as "the maximum capacity of a facility or stationary source to emit an air pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the facility or source to emit an air pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is state or federally enforceable. Secondary emissions do not count in determining the potential to emit of a facility or stationary source" (IDAPA 58.01.01).

Section 5.0 discusses the Class II area air quality impact analysis. Modeling was conducted to demonstrate compliance with the NAAQS and Idaho toxic air pollutant (TAP) standards. Section 6.0 addresses excess emissions. Section 7.0 provides information on the Compliance Certification Plan, and references are provided in Section 8.0. IDEQ PTC forms, Material Safety Data Sheets (MSDS), emission calculations, modeling files, and other supporting documentation are provided in Appendices A through F.

2.0 FACILITY INFORMATION

K & T Steel is located at 322 Diamond Avenue West in Twin Falls, Idaho. The Twin Falls facility (SIC Code 3441) fabricates rebar and structural steel, and manufactures steel tanks for above-ground storage. Normal operation at K & T Steel consists of two 10-hour shifts per day, six days per week.

The K & T Steel facility is composed of six major buildings: the Main Office Building; the Manufacturing Shop; the Auxiliary Building; the Paint Building; the Steel Grit Blast Building; and the Material Storage Building. A plot plan of the facility, the property boundaries (Figure 2-1), and a site location map (Figure 2-2) are included in the facility information. The facility is generally located at Universal Transverse Mercator (UTM) coordinates 706,500 meters (m) east and 4,713,300 m north [North American Datum (NAD) 83].



LEGEND

PROPERTY BOUNDARY LINE

FENCE LINE

N

40' 0 40' 80'

SCALE: 1" = 80'

K & T STEEL CORPORATION
TWIN FALLS, IDAHO

FIGURE 2–1

FACILITY PLOT PLAN

Revised March 20, 2012

Tetra Tech EM Inc.

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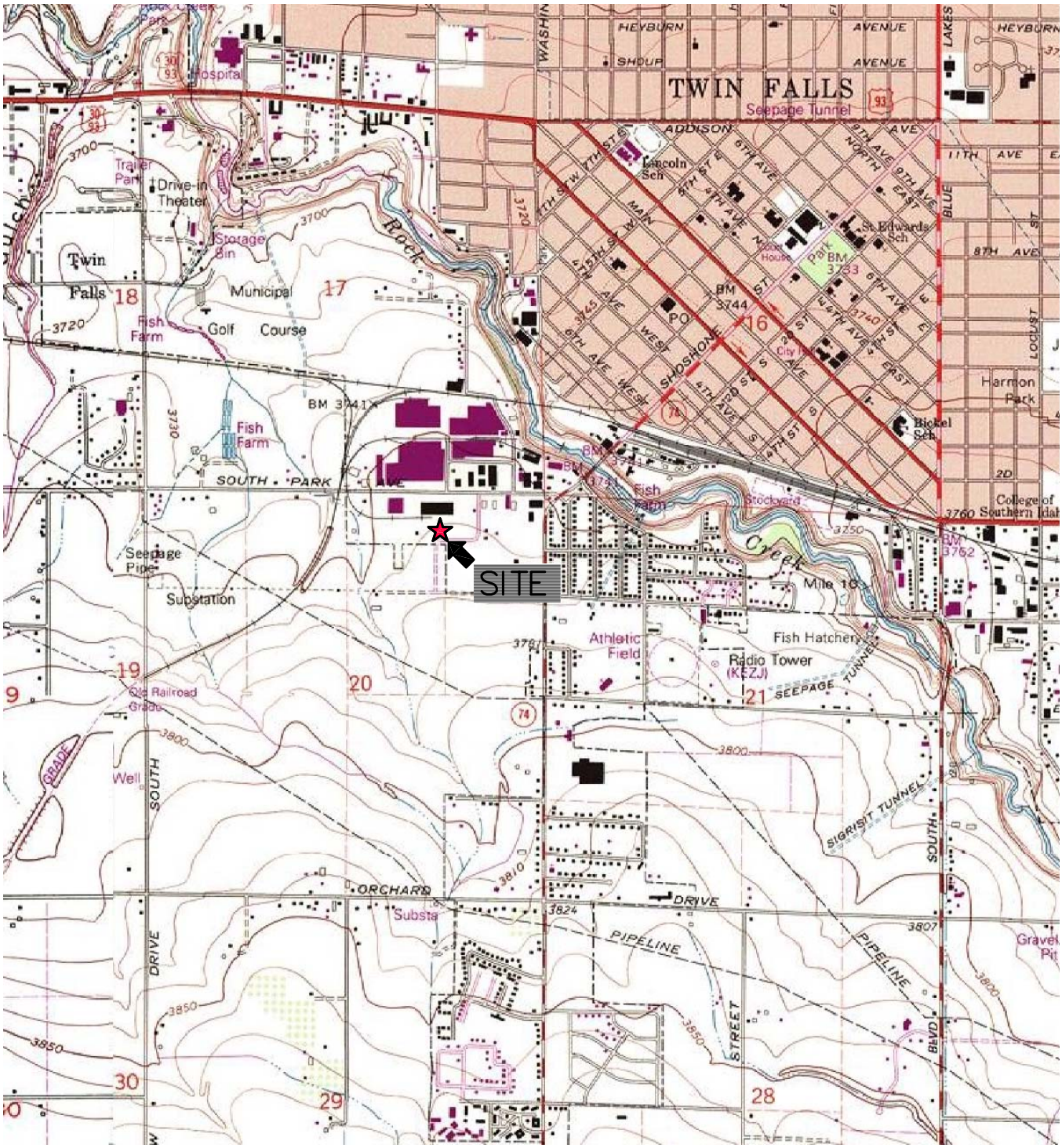

LEGEND

★ K & T STEEL FACILITY

SOURCE:
USGS 7.5 MINUTE QUADRANGLE
TWIN FALLS, IDAHO
1979 PHOTOREVISED 1992

N

2000 0 2000

SCALE: 1" = 2000'

K & T STEEL

FIGURE 2-2

FACILITY LOCATION MAP

Tetra Tech EM Inc.

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3.0 PROCESS DESCRIPTION

K & T Steel has three manufacturing operations at its facility: rebar, structural steel, and tank fabrication. The annual production capacity for the rebar process is approximately 3,000 tons per year (ton/yr). The annual production capacity for the structural steel process is approximately 3,000 ton/yr. The annual storage capacity for all fabricated tanks is approximately 1,500,000 gallons per year (gal/yr).

3.1 REBAR OPERATION

The rebar operation is carried out in the Manufacturing Shop, where rebar is mechanically cut into sections of different lengths and then bent to customers' specifications. No air emissions result from this operation.

3.2 STRUCTURAL STEEL OPERATION

The structural steel process is the major operation conducted at the facility. Structural steel operations are completely contained in the Manufacturing Shop. Some cutting and welding of steel occurs; the emissions occur within the building. Exhaust gases are not hooded or ducted through a stack to the outside air. Structural steel is painted in the Paint Building, which is discussed in Section 3.3.3.

3.3 TANK FABRICATION OPERATION

K & T Steel manufactures tanks from 500 to 30,000 gallons in capacity. Most of these tanks are between 10,000 and 20,000 gallons in capacity. The tank fabrication process begins in the Manufacturing Shop and continues in the Paint Building with some tanks (approximately 5-10%) going to the Steel Grit Blast Building prior to being painted.

The manufacturing process begins in the Manufacturing Shop where steel plates are rolled into cylindrical shapes and welded together. The tank ends or "heads" are cut and welded here also. Fittings are added to each tank, and the welds are checked by air pressure testing. Welding emissions are captured by particulate filters in the ceiling vents. Air in this building is heated by fifteen (15) natural gas-fired space heaters with heat inputs of 0.040 million British thermal units per hour (MMBtu/hr) each.

3.3.1 Steel Grit Blast Building

After fabrication, some tanks are grit-blasted with a fine steel grit material in the Steel Grit Blast Building. Some structural steel is grit-blasted also. The Steel Grit Blast Building is completely enclosed

and has an exhaust system and a wet scrubber to control particulate emissions. Manufacturer's information on this single-stage rectangular venturi scrubber was provided to IDEQ in the Air Quality Permit to Construct Application (2008) and is available on request. The maximum scrubber flow rate is 730 gallons per minute (gpm), the design scrubbing liquid flow rate is 400 gpm, and the PM control efficiency is 80%. A U-tube manometer, Dwyer Instruments, Inc. Model 1222, is mounted on the scrubber (see Photographs 1-5) to observe the static pressure of the system and optimize the scrubber performance and particulate removal efficiency. Emissions from the grit blasting operation are vented through a horizontal stack located near the top of the building. Specifications on the exhaust flow rate are estimated to be 10,000 actual cubic feet per minute (acfm), based on K & T Steel's best engineering judgment.

3.3.2 Paint Building

The final step in the manufacturing process consists of painting some structural steel (depending upon project specifications) and all tanks using primers, enamels, epoxies, or other types of coatings. A black asphalt coating is applied with a roller to a small number of tanks, and a maximum of 200 gallons of this coating is used annually. Paints, epoxies, primers, solvents, and other types of coatings are currently permitted under Air Quality Permit to Construct Number P-2008.0191. The material safety data sheets (MSDS) for these coatings are kept at the facility and are provided in Appendix B. A maximum paint spray rate is possible for only a limited period because of the time required to process the steel that is being painted. Thus, most of the processing time consists of moving the steel in and out of the Paint Building, turning the steel over to expose the uncoated areas, and waiting for the coating to dry.

Painting and coating take place in the large, enclosed Paint Building (see Photographs 6-8) that has an exhaust system with mat-type particulate filters. Exhaust gas fumes are vented via two vertical stacks, each with an estimated air flow of 10,000 acfm, based on K & T Steel's best engineering judgment. Air in the Paint Building is heated by one 1.375-MMBtu/hr natural gas-fired heater.

4.0 PROJECT AND POTENTIAL-TO-EMIT EMISSIONS

This section presents emissions data for criteria pollutants, HAPs, and TAPs. Emissions were calculated for the following processes:

- Welding (Manufacturing Shop)
- Grit Blasting (Steel Grit Blast Building)
- Painting and Coating (Paint Building)
- Space Heaters (Manufacturing Shop and Paint Building)

The K & T Steel facility is currently in full operation. K & T Steel has developed a PTE scenario and determined that the facility is a minor source of air emissions. The assumptions used for the PTE scenario are the following: the maximum projected paint usage at the K & T Steel facility is 40 gal/day and 12,675 gal/yr; the maximum daily usage rate of 40 gal/day is based on painting continuously for 6 hours; the hours of painting are limited by the process, as discussed in Section 3.3.3. Hourly emissions resulting from this paint spray rate therefore represent hourly PTE. Without any permit limitations, K & T Steel could theoretically operate at this capacity for 365 days per year (days/yr). Thus, the annual PTE estimate for criteria pollutants and HAPs is based on paint usage of 14,600 gal/yr (40 gal/day, 365 days/yr). Dividing the maximum theoretical paint usage (14,600 gal/yr) by the maximum projected annual paint usage (12,675 gal/yr) results in a scaling factor of 1.15. This scaling factor has been used to calculate annual PTE emissions. ***Please note that these numbers were used as modeling assumptions, and are not a request for operating limits.***

Tables 4-1 through 4-4 contain summary emission tables for each process at K & T Steel. Table 4-1 presents annual projected and PTE emission rates for criteria pollutants and HAPs. Criteria pollutants include particulate matter with an aerodynamic diameter less than 10 microns (PM_{10}), particulate matter with an aerodynamic diameter less than 2.5 microns ($PM_{2.5}$), sulfur dioxide (SO_2), nitrogen dioxide (NO_2) measured as nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), and lead (Pb). Table 4-2 presents annual projected and PTE emission rates for TAPs. Table 4-3 presents hourly PTE emission rates for criteria pollutants and HAPs, and Table 4-4 presents hourly PTE emission rates for TAPs. In all tables, the emission rates are apportioned by process. Emission calculations and mechanics are described in the following sections. As shown in these tables, K & T Steel PTE emissions exceed neither PTC thresholds nor Title V thresholds. Details of emissions calculations for all K & T Steel sources are provided in Appendix D.

TABLE 4-1

ANNUAL PROJECTED AND PTE FACILITY-WIDE CRITERIA POLLUTANT AND HAP EMISSIONS

Compound or Chemical	CAS	Painting	Tank Coating	Grit Blasting	Welding	Space Heaters - Manufacturing Shop	Space Heater - Paint Building	Total Projected Emissions (ton/yr)	Total PTE Emissions (ton/yr)
Criteria Pollutants									
PM	-	1.3	0	0.081	0.184	0.020	0.046	**1.7**	**1.9**
PM_{10}	-	0.9	0	0.039	0.184	0.020	0.046	**1.2**	**1.3**
$PM_{2.5}$	-	0.9	0	0.0039	0.184	0.020	0.046	**1.1**	**1.3**
SO_2	-	-	-	-	-	0.0016	0.0036	**0.0052**	**0.0060**
NO_x	-	-	-	-	-	0.25	0.566	**0.81**	**0.9**
CO	-	-	-	-	-	0.11	0.241	**0.35**	**0.40**
VOC	-	38.0	0.469	-	-	0.014	0.033	**39**	**44**
Pb	-	-	-	-	-	0.000001	0.000003	**0.000004**	**0.000005**
HAPs									
Benzene	71-43-2	-	-	-	-	0.000006	0.000013	**0.000018**	**0.000021**
Ethyl benzene	100-41-4	2.40	-	-	-	-	-	**2.40**	**2.76**
Formaldehyde	50-00-0	-	-	-	-	0.00020	0.00045	**0.00065**	**0.0007**
Hexane	110-54-3	-	-	-	-	0.005	0.011	**0.016**	**0.018**
Methyl ethyl ketone (MEK)	78-93-3	4.36	-	-	-	-	-	**4.36**	**5.02**
Methyl isobutyl ketone (Hexanone)	108-10-1	1.36	-	-	-	-	-	**1.36**	**1.56**
Naphthalene	91-20-3	-	-	-	-	0.000002	0.000004	**0.000005**	**0.000006**
Toluene	108-88-3	1.70	-	-	-	0.000009	0.000020	**1.699**	**1.96**
Xylenes	1330-20-7	9.68	-	-	-	-	-	**9.68**	**11.15**
Total HAPs	-	*19.50*	-	-	-	*0.0049*	*0.011*	***19.51***	***22.48***

Note: All emission values are in units of ton/yr.

TABLE 4-2

ANNUAL PROJECTED AND PTE FACILITY-WIDE TAP EMISSIONS

Compound or Chemical	CAS	Painting	Tank Coating	Grit Blasting	Welding	Space Heaters - Manufacturing Shop	Space Heater - Paint Building	Total Projected Emissions (ton/yr)	Total PTE Emissions (ton/yr)
Acetone	67-64-1	0.158	-	-	-	-	-	**0.16**	**0.18**
Acetic acid	64-19-7	2.945	-	-	-	-	-	**2.9**	**3.39**
Ammonia	7664-41-7	-	-	-	-	-	-	**0.00**	**0.00**
Benzene	71-43-2	-	-	-	-	0.00001	0.00001	**0.00002**	**0.00002**
Benzene dimethyl	1330-20-7	0.54	-	-	-	-	-	**0.54**	**0.62**
Butyl acetate	123-86-4	1.97	-	-	-	-	-	**1.97**	**2.27**
Butyl alcohol (Butanol)	71-36-3	1.02	-	-	-	-	-	**1.02**	**1.17**
Butyl ester	123-86-4	2,040.004	-	-	-	-	-	**2,040.00**	**2,349.83**
Calcium carbonate	471-34-1	-	0	-	-	-	-	**0.00**	**0.00**
Crystalline silica	14808-60-7	0.16	0	-	-	-	-	**0.16**	**0.18**
Cumene	98-82-8	-	-	-	-	-	-	**0.00**	**0.00**
Diglycidyl ether	2238-07-5	0.000006	-	-	-	-	-	**0.000006**	**0.000007**
Dimethyl phthalate	131-11-3	-	-	-	-	-	-	**0.00**	**0.00**
Ethyl benzene	100-41-4	2.4	-	-	-	-	-	**2.40**	**2.76**
Formaldehyde	50-00-0	-	-	-	-	0.00020	0.00045	**0.00065**	**0.0007**
Furfuryl alcohol	98-00-0	0.015	-	-	-	-	-	**0.01**	**0.02**
Heptanone	110-43-0	0.221	-	-	-	-	-	**0.221**	**0.25**
Hexamethlene-1,6-diisocyanate	822-06-0	-	-	-	-	-	-	**0.00**	**0.00**
Hexane	110-54-3	-	-	-	-	0.005	0.011	**0.016**	**0.018**
Methyl ethyl ketone (MEK)	78-93-3	4.4	-	-	-	-	-	**4.36**	**5.02**
MEK peroxide	1338-23-4	-	-	-	-	-	-	**0.00**	**0.00**
Methyl isobutyl ketone (Hexanone)	108-10-1	1.36	-	-	-	-	-	**1.36**	**1.56**
Mica group minerals	12001-26-2	0.007	-	-	-	-	-	**0.01**	**0.01**

Compound or Chemical	CAS	Painting	Tank Coating	Grit Blasting	Welding	Space Heaters - Manufacturing Shop	Space Heater - Paint Building	Total Projected Emissions (ton/yr)	Total PTE Emissions (ton/yr)
1-Methoxy-2-propyl acetate	108-65-6	1.095	-	-	-	-	-	**1.095**	**1.26**
Naphthalene	91-20-3	-	-	-	-	0.000002	0.000004	**0.000005**	**0.000006**
PAHs	-	-	-	-	-	0.00000003	0.00000006	**0.0000001**	**0.0000001**
Pentane	109-66-0	-	-	-	-	0.0068	0.016	**0.022**	**0.03**
Phenyl glycidyl ether	122-60-1	0.000017	-	-	-	-	-	**0.000017**	**0.000020**
2-Propanol	67-63-0	0.784	-	-	-	-	-	**0.78**	**0.90**
Propylene glycol methyl ether	107-98-2	0.329	-	-	-	-	-	**0.329**	**0.379**
Stoddard solvent	8052-41-3	1.381	-	-	-	-	-	**1.381**	**1.591**
Styrene	100-42-5	-	-	-	-	-	-	**0.00**	**0.00**
Toluene	108-88-3	1.699	-	-	-	0.00001	0.00002	**1.699**	**1.96**
Trimethyl benzene	25551-13-7	-	-	-	-	-	-	**0.00**	**0.00**
Vinyl toluene	25013-15-4	-	-	-	-	-	-	**0.00**	**0.00**
VM & P naphtha	64742-89-8	7.99	-	-	-	-	-	**7.99**	**9.20**
Xylenes	1330-20-7	9.7	-	-	-	-	-	**9.68**	**11.15**

Note: All emission values are in units of ton/yr.

TABLE 4-3

HOURLY PTE FACILITY-WIDE CRITERIA POLLUTANT AND HAP EMISSIONS

Compound or Chemical	CAS	Painting	Tank Coating	Grit Blasting	Welding	Space Heaters - Manufacturing Shop	Space Heater - Paint Building	Total (lb/hr)
Criteria Pollutants								
PM	-	0.69	0	0.14	0.042	0.0046	0.010	**0.9**
PM_{10}	-	0.46	0	0.065	0.042	0.0046	0.010	**0.58**
$PM_{2.5}$	-	0.46	0	0.0065	0.042	0.0046	0.010	**0.52**
SO_2	-	-	-	-	-	0.00036	0.00083	**0.0012**
NO_x	-	-	-	-	-	0.056	0.13	**0.19**
CO	-	-	-	-	-	0.024	0.055	**0.079**
VOC	-	19.8	0.64	-	-	0.0033	0.0076	**20**
Pb	-	-	-	-	-	0.0000003	0.00000069	**0.0000010**
HAPs								
Benzene	71-43-2	-	-	-	-	0.000001	0.000003	**0.000004**
Ethyl benzene	100-41-4	1.25	-	-	-	-	-	**1.25**
Formaldehyde	50-00-0	-	-	-	-	0.000045	0.00010	**0.00015**
Hexane	110-54-3	-	-	-	-	0.0011	0.0025	**0.004**
Methyl ethyl ketone (MEK)	78-93-3	2.3	-	-	-	-	-	**2.27**
Methyl isobutyl ketone (Hexanone)	108-10-1	0.71	-	-	-	-	-	**0.71**
Naphthalene	91-20-3	-	-	-	-	0.0000004	0.000001	**0.000001**
Toluene	108-88-3	0.885	-	-	-	0.000002	0.000005	**0.885**
Xylenes	1330-20-7	5.0	-	-	-	-	-	**5.04**
Total HAPs	-	*10.2*	-	-	-	*0.0011*	*0.0026*	***10.2***

Note: All emission values are in units of lb/hr.

TABLE 4-4

HOURLY PTE FACILITY-WIDE TAP EMISSIONS

Compound or Chemical	CAS	Painting	Tank Coating	Grit Blasting	Welding	Space Heaters - Manufacturing Shop	Space Heater - Paint Building	Total (lb/hr)	EL (lb/hr)
Benzene	71-43-2	-	-	-	-	0.000001	0.000003	**0.0000041**	0.0008
Benzene dimethyl	1330-20-7	0.28	-	-	-	-	-	**0.28**	29
Butyl acetate	123-86-4	1.02	-	-	-	-	-	**1.0**	47
Butyl alcohol (Butanol)	71-36-3	0.53	-	-	-	-	-	**0.53**	10
Crystalline silica	14808-60-7	0.08	0	-	-	-	-	**0.08**	**0.0067**
Diglycidyl ether	2238-07-5	0.000003	-	-	-	-	-	**0.0000030**	0.035
Ethyl benzene	100-41-4	1.25	-	-	-	-	-	**1.25**	29
Formaldehyde	50-00-0	-	-	-	-	0.000045	0.000103	**0.00015**	0.00051
Heptanone	110-43-0	0.115	-	-	-	-	-	**0.12**	15.7
Hexane	110-54-3	-	-	-	-	0.0011	0.0025	**0.0036**	12
Methyl ethyl ketone (MEK)	78-93-3	2.27	-	-	-	-	-	**2.3**	39.3
Methyl isobutyl ketone (Hexanone)	108-10-1	0.71	-	-	-	-	-	**0.71**	13.7
1-Methoxy-2-propyl acetate	108-65-6	0.570	-	-	-	-	-	**0.57**	24
Naphthalene	91-20-3	-	-	-	-	0.0000004	0.000001	**0.0000012**	3.33
PAHs	-	-	-	-	-	0.00000001	0.00000001	**0.000000019**	0.000091
Pentane	109-66-0	-	-	-	-	0.0016	0.0036	**0.0051**	118
Phenyl glycidyl ether	122-60-1	0.000009	-	-	-	-	-	**0.0000090**	0.4
Propylene glycol methyl ether	107-98-2	0.172	-	-	-	-	-	**0.17**	24
Stoddard solvent	8052-41-3	0.719	-	-	-	-	-	**0.72**	35
Toluene	108-88-3	0.885	-	-	-	0.000002	0.000005	**0.88**	25
VM & P naphtha	64742-89-8	4.16	-	-	-	-	-	**4.2**	91.3
Xylenes	1330-20-7	5.04	-	-	-	-	-	**5.0**	29

Note: All emission values are in units of lb/hr.

4.1 PAINTING EMISSIONS

Emissions from the painting process are generated in the Paint Building. K & T Steel uses a variety of painting products. PM/PM_{10}, VOCs, HAPs, and TAPs are emitted from these products, though not all painting products (such as thinners) emit $PM_{2.5}$/PM_{10}.

To calculate PM emissions, the following equation was used:

$$P = PRU * (1 - TE) * (1 - CE)$$

where:

P = PM emissions (lb/yr)

PRU = product used annually (lb/yr)

= product density (pounds per gallon, or lb/gal) times the product volume usage (gal/yr)

TE = transfer efficiency (%)

= 45%

CE = control efficiency (%)

= 99.6%

To calculate PM_{10} emissions, the following equation was used:

$$P_{PM_{10}} = P * R$$

where:

P_{PM10} = PM_{10} emissions (lb/yr)

P = PM emissions (lb/yr)

R = ratio of PM_{10} to PM in emissions (EPA 1989)

= 66.1%

To calculate $PM_{2.5}$ emissions, the following equation was used:

$$P_{PM_{2.5}} = P * R$$

where:

$P_{PM2.5}$ = $PM_{2.5}$ emissions (lb/yr)

P = PM emissions (lb/yr)

R = ratio of $PM_{2.5}$ to PM in emissions (EPA 1989)

= 66.1%

Non-volatile HAP and TAP emissions (such as crystalline silica) were calculated using the following equation:

$$E = PRU * C * (1 - TE) * (1 - CE)$$

where:

E = HAP/TAP emissions (lb/yr)

P = PM emissions (lb/yr)

C = weight percent of chemical in product (%)

TE = transfer efficiency (%)

= 45%

CE = control efficiency (%)

= 99.6%

VOC, volatile HAP, and volatile TAP emissions were calculated using the following equation:

$$E = PRU * C$$

where:

E = VOC, HAP, or TAP emissions (lb/yr)

PRU = product used annually (lb/yr)

= product density (lb/gal) times the product volume usage (gal/yr)

C = weight percent of chemical in product (%)

For certain products, VOC percentages were presented by volume rather than by weight. For these products, VOC emissions were calculated by the following alternative method:

$$E = PR * D$$

where:

E = VOC emissions (lb/yr)

PR = product used annually (gal/yr)

D = VOC density (lb/gal)

Hourly paint emissions were calculated by scaling the annual total pollutant-specific lb/yr emission rates to a maximum hourly spray rate. To calculate the maximum hourly pollutant-specific emission rate from painting, the lb/yr emission rate for a given pollutant was divided by 12,675 gal/yr to obtain an average

lb/gal value, and multiplied by the maximum hourly spray rate (40 gal/day, 6 hrs/day). ***Please note that these numbers were used as modeling assumptions, and are not a request for operating limits.***

4.2 GRIT BLASTING EMISSIONS

Grit blasting emissions are generated in the Steel Grit Blast Building. PM_{10} and $PM_{2.5}$ are the pollutants emitted in the grit blasting process. Emissions were calculated using the following equation:

$$E = G * EF * (100\% - CE) * CF$$

where:

E = PM or PM_{10} emission rate (lb/yr)

G = quantity of grit used annually (lb/yr)

EF = emission factor (lbs PM or PM_{10}/1000 lb of grit), AP 42 13.2.6-1

CE = wet scrubber control efficiency (%)

= 80% (manufacturer's guarantee)

CF = conversion factor (thousand lb grit /1000 lb grit)

Detailed emission calculations for grit blasting are provided in Appendix D of the permit application.

4.3 WELDING EMISSIONS

Welding emissions are generated in the Manufacturing Shop and are not captured with hooding or special ventilation. Welding activities result in fugitive emissions of PM_{10}. No other criteria pollutants are emitted in significant quantities from the welding process. ***Please note that five types of welding wire were used as modeling assumptions and are not a request for welding wire use limits. The only limits requested are 50,000 lb/yr welding wire consumption and 8760 hr/yr welding operation.***

To calculate welding emissions, the following equation was used:

$$P = E * EF * CF$$

where:

P = PM_{10} emissions (pounds per year, or lb/yr)

E = electrodes consumed annually (lb electrodes consumed/yr)

EF = emission factor (lb PM_{10}/thousand lb electrode consumed), from AP 42 12.19-1

CF = conversion factor (thousand lb electrode consumed/1000 lb electrode consumed)

Detailed emission calculations for welding are provided in Appendix D of the permit application.

4.4 SPACE HEATER EMISSIONS

Air in the Manufacturing Shop and the Paint Building is heated using natural gas-fired space heaters. The space heaters emit small amounts of criteria pollutants, including NO_x, SO_2, CO, PM_{10}, Pb, and VOCs.

Emissions were calculated using the following equation:

$$E = HV * EF * \frac{10^6\,Btu}{mmBtu} * \frac{scf}{1000\,Btu} * \frac{mmscf}{10^6\,scf} * H * N$$

where:

E = criteria pollutant emission rate (lb/hr)

HV = heating value (MMBtu/hr)

EF = emission factor (lb pollutant/10^6 standard cubic feet, or scf), AP 42 1.4-1

H = hours of operation per year (hrs/yr)

N = number of heaters (unitless)

4.5 MOBILE COMBUSTION ENGINE SOURCES

The facility operates mobile combustion engine sources such as forklifts. Forklifts are operated only during business hours. Emissions from these sources are not required for this application.

5.0 CLASS II AREA AIR QUALITY IMPACT ANALYSIS

This section describes the technical approach that was used for the Class II air quality impact analysis for the K & T Steel facility. The modeling addressed the impacts from all processes involved in steel fabrication at the facility. The dispersion modeling follows the guidance and protocols outlined in the State of Idaho Guideline for Performing Air Quality Impact Analyses (IDEQ 2011a) and EPA's Guideline on Air Quality Models (Revised) (EPA 2005).

The IDEQ Modeling Guideline indicates that a modeling analysis is generally required with each permit application for new construction or a modification that results in an increase in emissions of pollutants for sources permitted by IDEQ. The types of permits that require a facility to demonstrate compliance with the NAAQS are permits to construct and Tier II operating permits. A modeling analysis may also be required to demonstrate compliance with the TAP standards.

For permit modification applications, IDEQ has established Level I modeling thresholds for criteria pollutant emissions. If the facility-wide emissions for a given pollutant are less than Level I modeling thresholds, dispersion modeling for that pollutant is not required in most instances. Criteria pollutants assessed include PM_{10}, $PM_{2.5}$, NO_x, CO, SO_2, and Pb. IDEQ does not require dispersion modeling for VOC to ozone conversion as part of the permitting process. For TAPs, the facility-wide emissions are compared to screening emission levels (ELs). Modeling is required for those TAPs with emissions that are equal to or greater than the ELs. Applicable ELs are provided in IDAPA 58.01.01.585 and 586.

Modeling thresholds for criteria pollutants are shown in Table 5-1, along with a summary of the maximum projected K & T Steel emissions. Particulates as PM_{10} and $PM_{2.5}$ are the only criteria pollutants that were modeled, based on comparisons of projected emissions with modeling thresholds. K & T Steel emissions for all other criteria pollutants are predicted to be less than modeling thresholds.

The ELs for TAPs emitted at K & T Steel are shown in Table 5-2, along with a summary of projected K & T Steel hourly emissions. Emissions of one TAP – crystalline silica – exceed the ELs. This pollutant was modeled as per IDAPA 58.01.01.585 and 586.

TABLE 5-1

MODELING THRESHOLDS AND TOTAL

PROJECTED CRITERIA POLLUTANT EMISSIONS

Pollutant	Long-Term Modeling Threshold	Projected K & T Steel Emissions	Short-Term Modeling Threshold	Projected K & T Steel Emissions
CO	N/A[a]	0.35 tons/year	15 lb/hour	0.079 lb/hour
NOx	1.2 tons/year	0.81 tons/year	0.20 lb/hour	0.19 lb/hour
PM_{10}	N/A[a]	1.2 tons/year	0.22 lb/hour	0.58 lb/hour
$PM_{2.5}$	0.35 tons/year	1.1 tons/year	0.054 lb/hour	0.52 lb/hour
SO_2	1.2 ton/year	0.0052 tons/year	0.21 lb/hour	0.0012 lb/hour
Pb	14 lbs/month	0.00072 lbs/month	14 lbs/month	0.00072 lb/month

a N/A = not applicable.

TABLE 5-2

SCREENING EMISSION LEVELS AND TOTAL PROJECTED TAP EMISSIONS

Compound or Chemical	Total (lb/hour)	EL (lb/hour)
Benzene	0.0000041	0.0008
Benzene dimethyl	0.28	29
Butyl acetate	1.0	47
Butyl alcohol (Butanol)	0.53	10
Crystalline silica	0.08	0.0067
Diglycidyl ether	0.0000030	0.035
Ethyl benzene	1.25	29
Formaldehyde	0.00015	0.00051
Heptanone	0.12	15.7
Hexane	0.0036	12
Methyl ethyl ketone (MEK)	2.3	39.3
Methyl isobutyl ketone (Hexanone)	0.71	13.7
1-Methoxy-2-propyl acetate	0.57	24
Naphthalene	0.0000012	3.33
PAHs	0.000000019	0.000091
Pentane	0.0051	118
Phenyl glycidyl ether	0.0000090	0.4
Propylene glycol methyl ether	0.17	24
Stoddard solvent	0.72	35
Toluene	0.88	25
VM & P naphtha	4.2	91.3
Xylenes	5.0	29

IDEQ recommends that a preliminary analysis (PA) first be conducted when dispersion modeling is warranted. Facility-wide emissions are modeled for the PA to evaluate whether a significant impact exists. For criteria pollutants where a significant impact exists, emissions from K & T Steel were modeled to determine if a significant impact exists. Model results were compared to the Class II Significant Contribution Levels (SCLs). Table 3-2 shows the SCLs, which are used to assess whether or not a facility has a significant impact at downwind receptors. When modeling results do not exceed SCLs for a pollutant, no further analysis for that pollutant is required.

A full impact analysis (FIA) must be performed if any of the model results exceed the SCLs, which typically requires adding impacts from facility-wide emissions to neighboring source contributions and a background concentration to estimate a total concentration. If FIA was necessary, background concentrations and neighboring source contributions were obtained from IDEQ for the cumulative impact analysis. The total concentration for a pollutant must demonstrate compliance with the NAAQS. Table 5-3 shows the NAAQS increments with which K & T Steel must comply. A Prevention of Signification Deterioration (PSD) increment compliance demonstration is not required because K & T Steel is a minor source of air pollution.

TABLE 5-3

CLASS II SIGNIFICANT CONTRIBUTION LEVELS AND AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Period	Significant Contribution Level ($\mu g/m^3$)a	National AAQS ($\mu g/m^3$)a
NO_2	Annual 1-hour	1 7.5	100 188
SO_2	Annual 24-hour 3-hour 1-hour	1 5 25 7.9	80 365 c 1,300 c 196
CO	8-hour 1-hour	500 2,000	10,000c 40,000c
PM_{10}	24-hour	5	150c
$PM_{2.5}$	Annual 24-hour	0.3 1.2	15 35c
Pb	Quarterly	N/A b	1.5
Ozone	1-hour	N/A b	235

a $\mu g/m^3$ = micrograms per cubic meter
b N/A = not applicable
c Not to be exceeded more than once per calendar year

The following sections discuss the dispersion model that was used in this analysis, potential wake effects of the structures at K & T Steel, terrain, meteorological data, receptors, background concentrations and neighboring source contributions, and model parameters.

5.1 DISPERSION MODEL SELECTION

The dispersion modeling was conducted using the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee Dispersion Model (AERMOD version 11103). This model is recommended by EPA for evaluating Class II impacts within 50 kilometers (km) of the facility being assessed (EPA 2004a). Additionally, AERMOD was developed to handle complex terrain. In this analysis, AERMOD was used to predict maximum pollutant concentrations in ambient air from K & T Steel emissions. AERMOD was run using all the regulatory default options including use of stack-tip downwash, buoyancy-induced dispersion, calms processing routines, upper-bound downwash concentrations for super-squat buildings, default wind speed profile exponents, vertical potential temperature gradients, and no use of gradual plume rise. Only pollutant dispersion was modeled for this analysis; deposition was not considered.

5.2 BUILDING WAKE EFFECTS

The potential for downwash effects on stack emissions from nearby structures can be assessed in the AERMOD model. AERMOD model inputs include building dimensions to assess the potential for downwash effects. The direction-specific downwash parameters was calculated using facility plot-plan maps and BPIP-prime (BPIPPRM) software (version 04274), which is the building downwash program associated with the AERMOD model. Output from BPIPPRM was incorporated into the AERMOD modeling input files.

5.3 TERRAIN DESCRIPTION

K & T Steel is located in Twin Falls, Idaho, at an elevation of approximately 3,765 feet above mean sea level (amsl). The facility is in an industrial area with residential areas approximately one mile north and east of the facility. Undeveloped land is located to the west and south of the facility. Rural dispersion was modeled for this effort.

K & T Steel is over 40 miles from the border of the closest Class I area (Jarbidge Wilderness Area in northeastern Nevada) and over 60 miles from the closest Class I area in Idaho (Craters of the Moon Wilderness). Based on the modeling results, it is not anticipated that emissions from the K & T Steel facility will impact any Class I areas.

5.4 METEOROLOGICAL DATA

Dispersion modeling was conducted using surface meteorological data from the National Weather Service (NWS) station located at the Joslin Field-Magic Valley Regional Airport in Twin Falls, Idaho. This station is approximately five miles from K & T Steel. Data for the period 2000 to 2004 were used, as provided by IDEQ. Upper air meteorological data from the Boise, Idaho NWS station for the same period were also used. These data were selected because they are the most representative available for site conditions at the K & T Steel facility and were recommended by Kevin Schilling of IDEQ via telephone communication December 7, 2011 (IDEQ 2011b).

Meteorological data were processed into model-ready format by IDEQ and provided to Tetra Tech for the modeling effort. Figure 5-1 shows a windrose diagram of the five years of meteorological data used in the modeling analysis, as provided by IDEQ. Tetra Tech combined the 5 years of data into single meteorological files to allow AERMOD's multi-year processing routines for PM_{10} and $PM_{2.5}$ to operate properly.

5.5 RECEPTORS

The K & T Steel dispersion modeling includes a dense receptor grid to identify the maximum estimated impacts from the facility. Following IDEQ and EPA guidelines, receptor locations are identified with sufficient density and spatial coverage to isolate the area with the highest impacts. The following receptor location groups were used for the analysis:

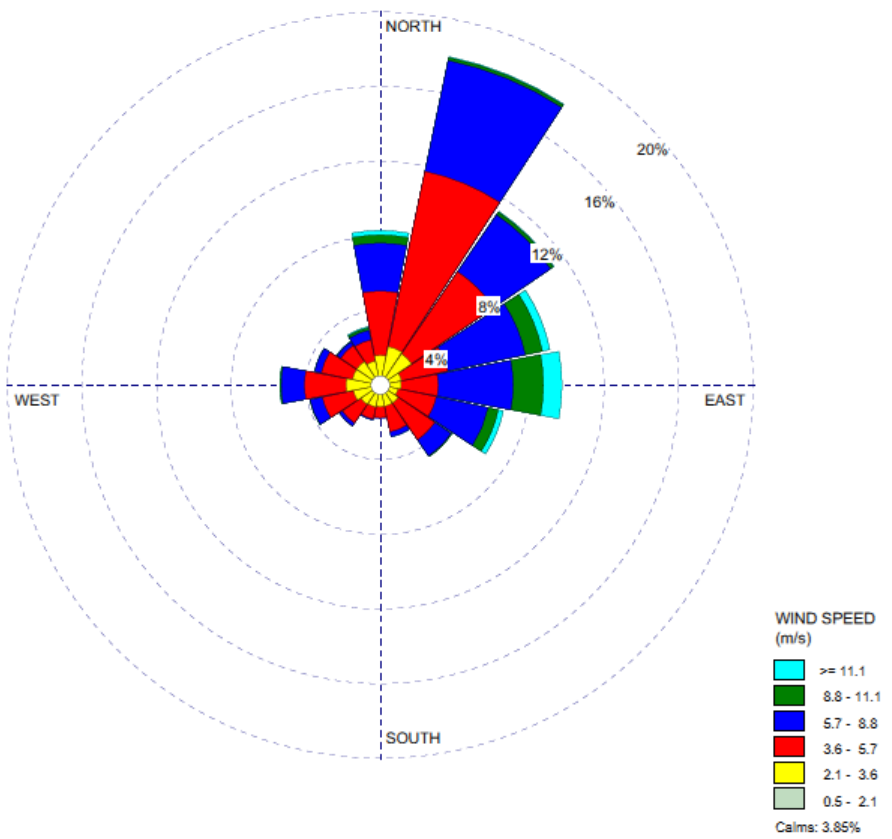
- Fence line at 10-meter intervals;
- 25-meter receptor spacing out to 100 meters in all directions from the fence line;
- 100-meter receptor spacing out to 1 km in all directions from the fence line;
- 500-meter receptor spacing between 1 km and 5 km from the fence line; and
- 1000-meter receptor spacing between 5 km and 10 km from the fence line.

FIGURE 5-1

TWIN FALLS, IDAHO METEOROLOGICAL STATION WINDROSE (2000-2004)

WIND ROSE PLOT:
Station #99999 - Twin Falls - Joslin Field NWS KTWF 2000-2004, ID

DISPLAY:
Wind Speed
Flow Vector (blowing to)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	Start Date: 1/1/2000 - 00:00 **End Date: 12/31/2004 - 17:00**	MODELER:	
	CALM WINDS: **3.85%**	TOTAL COUNT: **41212 hrs.**	
	AVG. WIND SPEED: **4.83 m/s**	DATE: **6/9/2011**	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

The fence line is considered to include the sections of the property with restricted public access, via fencing and warning signs. Receptor locations within the fence line were not included in the modeling. A total of 1,614 receptors were used. Receptor locations are presented in UTM coordinates (NAD 83). Figure 5-2 shows the receptor grid relative to the K & T Steel facility. Terrain elevations were assigned to all receptors using U.S. Geological Survey (USGS) 7.5-minute series digital elevation model (DEM) data in the AERMAP program (version 11103). DEM data are from in the NAD 27 coordinate system.

5.6 BACKGROUND CONCENTRATIONS AND NEIGHBORING SOURCE CONTRIBUTIONS

Ambient background concentrations represent the contribution of pollutant sources that are not included in the modeling analysis, including naturally occurring sources. Background concentrations for PM_{10} were obtained from IDEQ for the time period 2000 to 2002. PM_{10} background concentrations of 52 $\mu g/m^3$ and $PM_{2.5}$ background concentrations of 21.3 $\mu g/m^3$ (24-hour) and 7.2 $\mu g/m^3$ (annual) were used for remodeling. Background concentrations were not available for crystalline silica emissions.

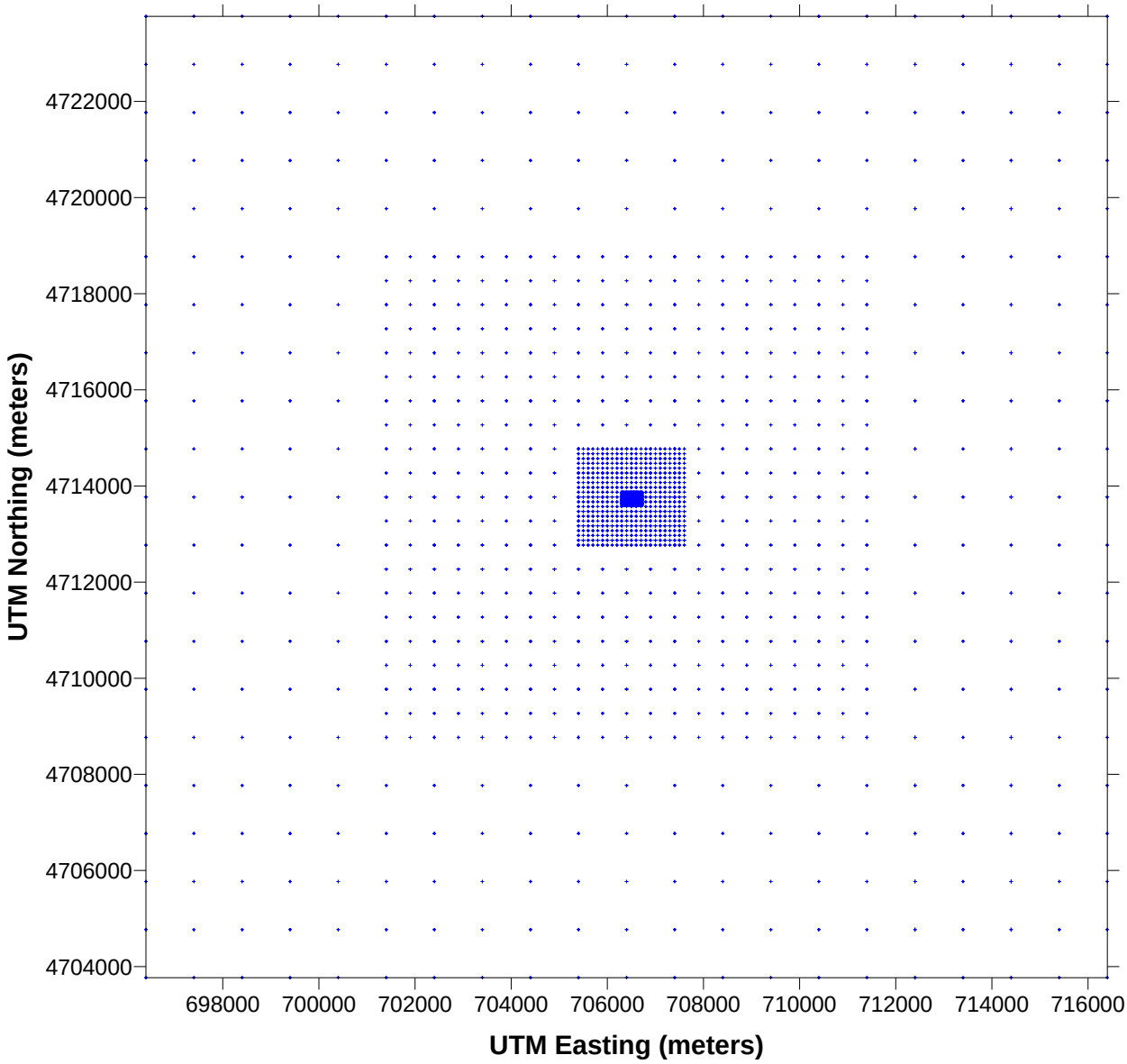
Neighboring source contributions were requested from IDEQ. IDEQ recommended using a generic method to add impacts from neighboring facilities to modeled concentrations, with the following requirements for neighboring source contributions (IDEQ 2011c):

- For 24-hour PM_{10} modeled concentrations, use 20 $\mu g/m^3$
- For 24-hour $PM_{2.5}$ modeled concentrations, use 1.2 $\mu g/m^3$
- For Annual $PM_{2.5}$ modeled concentrations, use 0.3 $\mu g/m^3$
- Neighboring source contributions were not provided for crystalline silica emissions.

Tetra Tech incorporated the background and neighboring source concentrations as required by IDEQ.

FIGURE 5-2

K & T STEEL RECEPTOR GRID



5.7 MODEL PARAMETERS

Modeled emissions sources at the K & T Steel facility include both point sources and volume sources. Model parameters are shown in Tables 5-4 and 5-5 and discussed below. Source locations are presented in UTM coordinates (NAD 83). Certain operations and activities performed on-site produce air emissions that are considered insignificant with respect to Idaho Tier I air quality permit regulations, according to the IDAPA 58.01.01.317. However, it does not appear that these activities are considered insignificant under Idaho modeling guidelines. Therefore all emission units at the K & T Steel facility were included in the dispersion modeling effort.

Exhaust gas fumes from painting are vented out of the Paint Building via two (2) vertical stacks equipped with particulate filters. The filters have a particulate capture efficiency of 99.6%, based on the manufacturer's specifications. Because the filters do not capture any VOCs, it is assumed that all VOCs emitted during the painting process escape the Paint Building through these stacks. Emissions of TAPs that are not VOCs are assumed to be captured along with particulate matter, and have the same control efficiencies applied. Each stack has an estimated air flow of 10,000 ACFM, based on K & T Steel's best engineering judgment. Stack heights and diameters are provided by K & T Steel. The exhaust temperature from the stacks is the same as the temperature inside the buildings, which is kept at 68 degrees Fahrenheit (°F).

Grit and space heater emissions from the Steel Grit Blast Building operation are vented through a horizontal stack located near the top of the building. Because the vent is horizontally oriented, it was treated as a point source with a nominal exit velocity (0.001 meters per second) in the model. The release height is assumed to be the height of the building. The exhaust temperature from the stack is the same as the temperature inside the buildings, which is kept at 68 °F.

Welding and space heater emissions from the Manufacturing Shop are emitted as a source of fugitive emissions that are not captured with hooding or special ventilation. Therefore, this source was modeled as a volume source. The release height is assumed to be the height of the building. Sigma y and sigma z values are calculated based on AERMOD guidance, as shown in Table 5-4.

TABLE 5-4

CRITERIA POLLUTANT SOURCE EMISSION RATES AND STACK PARAMETERS

Source	Source Type	Release Height (m)	Stack Temperature (Kelvin)	Flow Rate (ACFM)	Stack Exit Velocity (m/s)	Stack Diameter (m)	Sigma y (m)[1]	Sigma z (m)[2]	PM_{10} Emission Rate (g/s)	$PM_{2.5}$ Emission Rate (g/s)	
									24-Hour	24-Hour	Annual
Paint Building - Stack 1[3]	Point	11.33	293	10,000	12.13	0.762	N/A	N/A	3.65E-02	3.65E-02	1.64E-02
Paint Building - Stack 2[3]	Point	11.33	293	10,000	12.13	0.762	N/A	N/A	3.65E-02	3.65E-02	1.64E-02
Grit Blast Building	Point	3.76	293	Nominal	0.001	0.462	N/A	N/A	8.19E-03	8.19E-04	1.12E-04
Manufacturing Shop[4]	Volume[5]	3.05	293	Fugitive	N/A	N/A	1.16	1.42	5.87E-03	5.87E-03	5.87E-03

1 The sigma y values for the volume sources were calculated by dividing the length of side by 4.3, per AERMOD guidance. The length of side was estimated as 5 m for the Manufacturing Shop.

2 The sigma z values for the Manufacturing Shop were calculated as the initial release heights of the sources divided by 2.15 (for a fugitive source on or adjacent to a building).

3 Paint Building emissions are comprised of paint and space heater emissions. The 24-hour paint emission rate was calculated by dividing the maximum pounds per day emission rate by 24 hours, and converting to a g/s value. This value was added to the space heater emission rate, which assumes emissions occur 24 hours per day.

4 Manufacturing Shop emissions are comprised of welding and space heater emissions. The 24-hour welding emission rate was calculated by dividing the maximum pounds per day emission rate by 24 hours, and converting to a g/s value. This value was added to the space heater emission rate, which assumes emissions occur 24 hours per day.

5 Fugitive emission sources were modeled as volume sources.

TABLE 5-5

TAP SOURCE EMISSION RATES AND STACK PARAMETERS

Source	Source Type	Release Height (m)	Stack Temperature (Kelvin)	Flow Rate (ACFM)	Stack Exit Velocity (m/s)	Stack Diameter (m)	Crystalline Silica Emission Rate (g/s)[1]
Paint Building - Stack 1	Point	11.33	293	10,000	12.13	0.762	6.51E-03
Paint Building - Stack 2	Point	11.33	293	10,000	12.13	0.762	6.51E-03

1 Crystalline silica is emitted during the painting process. The crystalline silica emission rate was calculated by dividing the maximum pounds per day emission rate by 24 hours, and converting to a g/s value.

5.8 MODEL RESULTS

Annual and 24-hour emissions of $PM_{2.5}$ and 24-hour emissions of PM_{10}, were modeled using AERMOD as discussed in section 5.0. As shown in Table 5-6, modeled concentrations of annual emissions of $PM_{2.5}$ and 24-hour emissions of $PM_{2.5}$ and PM_{10} exceeded their respective SCLs. Therefore, a cumulative impact analysis was conducted for $PM_{2.5}$ and PM_{10}. Figure 5-3 shows the results of significant impact modeling for 24-hour PM_{10}. Figures 5-4 and 5-5 show the results of significant impact modeling for 24-hour and annual $PM_{2.5}$, respectively.

Cumulative modeling for both averaging periods demonstrates that K & T Steel will comply with the NAAQS levels. Table 5-7 summarizes the NAAQS model results. The cumulative 24-hour PM_{10} impact, with background and neighboring source values added, is 87.2 μg/m^3. The highest cumulative 24-hour $PM_{2.5}$ impact, with background and neighboring source values added, is 34.2 μg/m^3. The highest cumulative annual $PM_{2.5}$ impact, with background and neighboring source values added, is 11.4 μg/m^3. These values are below the respective NAAQS values of 150 μg/m^3, 35 μg/m3, and 15 μg/m^3. Figure 5-6 presents NAAQS impact contours for PM_{10}. Figures 5-7 and 5-8 present NAAQS impact contours for $PM_{2.5}$.

AERMOD modeling was also completed for 24-hour crystalline silica emissions. The maximum 24-hour impact from crystalline silica emissions at K & T Steel, 2.1 μg/m^3, is less than the AAC established in IDAPA 58.01.01 (5.0 μg/m^3). Table 5-6 summarizes the modeling results for crystalline silica.

All electronic modeling files used in this analysis are included in Appendix A of the modeling report.

TABLE 5-6

K & T STEEL SCL MODEL RESULTS

Pollutant	Averaging Period	UTM-X Location (meters)	UTM-Y Location (meters)	Year	Maximum Modeled Concentration ($\mu g/m^3$)[a]	SCL ($\mu g/m^3$)[a]
PM_{10}	24-hour	706,603	4,713,766.7	N/A[b]	21.5	5
$PM_{2.5}$	Annual	706,553	4,713,766.7	N/A[b]	3.9	0.3
	24-hour	706,553	4,713,766.7	N/A[b]	11.7	1.2
Crystalline Silica	24-hour	706,635	4,713,738.7	2004	2.1	N/A

a $\mu g/m^3$ = micrograms per cubic meter
b N/A = not applicable

TABLE 5-7

K & T STEEL NAAQS MODEL RESULTS

Pollutant	Averaging Period	Year	Maximum Modeled Concentration ($\mu g/m^3$)[a]	Background Concentration ($\mu g/m^3$)[a]	Neighboring Source Contribution ($\mu g/m^3$)[a]	Total Concentration ($\mu g/m^3$)[a]	National AAQS ($\mu g/m^3$)[a]	24-Hour AAC ($\mu g/m^3$)[a]
PM_{10}	24-hour	N/A[b]	15.2[c]	52	20	87.2	150[d]	N/A[b]
$PM_{2.5}$	Annual	N/A[b]	3.9[e]	7.2	0.3	11.4	15[f]	N/A[b]
	24-hour	N/A[b]	11.7[g]	21.3	1.2	34.2	35[h]	N/A[b]
Crystalline Silica	24-hour	2004	2.1	N/A[b]	N/A[b]	2.1	N/A[b]	5.0[i]

a $\mu g/m^3$ = micrograms per cubic meter
b N/A = not applicable
c Modeled concentration shown is highest sixth high value for the five-year meteorological data set.
d Not to be exceeded more than once per calendar year
e Five-year average of the annual mean concentration
f Three-year average of the annual mean concentrations
g Five-year average of the high first high 24-hour average concentration
h Three-year average of the 98th percentile of 24-hour average concentrations
i The 24-hour AAC for crystalline silica is 0.005 mg/m^3.

FIGURE 5-3

24-HOUR PM_{10} SIGNIFICANT CONTRIBUTION LEVEL CONCENTRATIONS

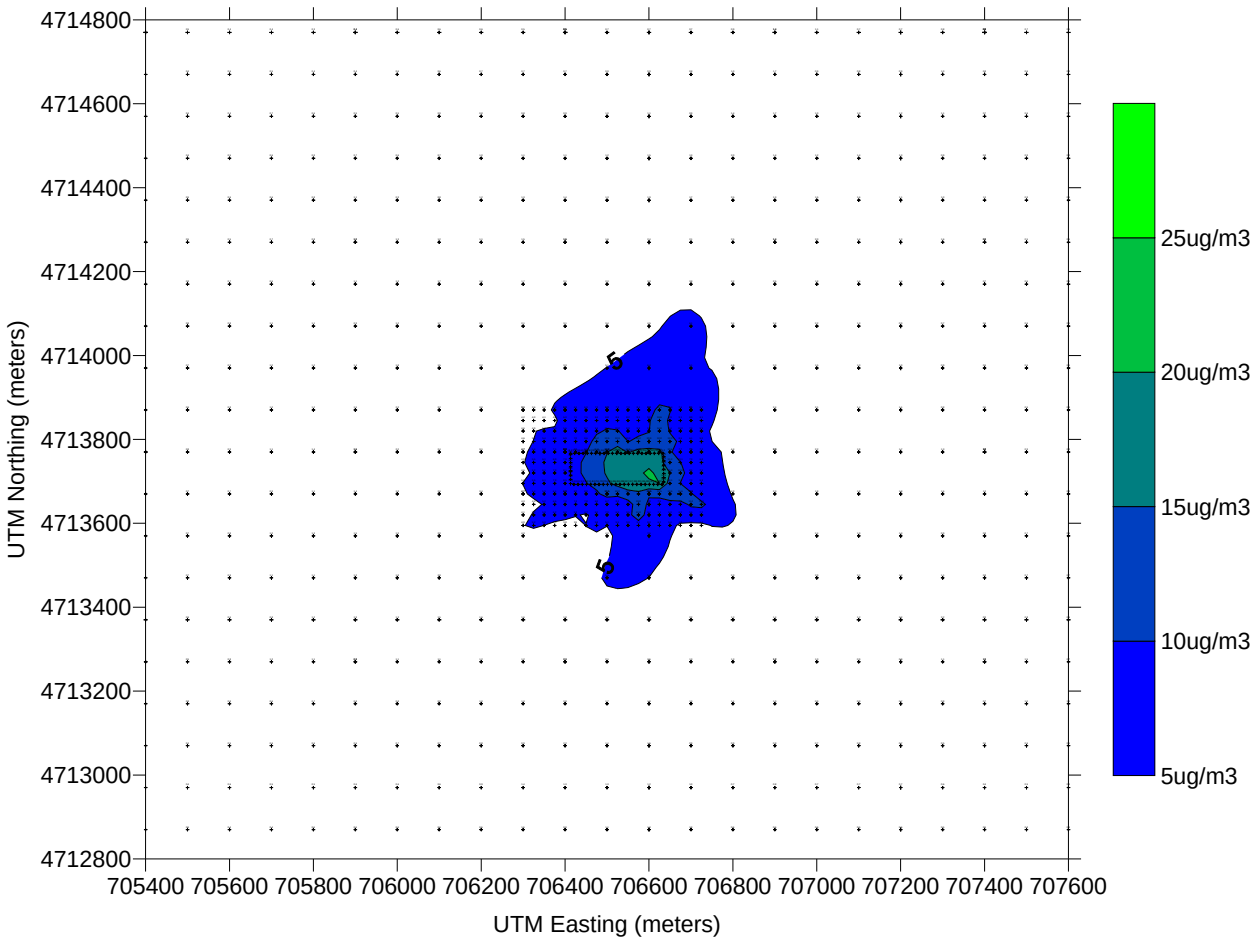


FIGURE 5-4

24-HOUR PM $_{2.5}$ SIGNIFICANT CONTRIBUTION LEVEL CONCENTRATIONS

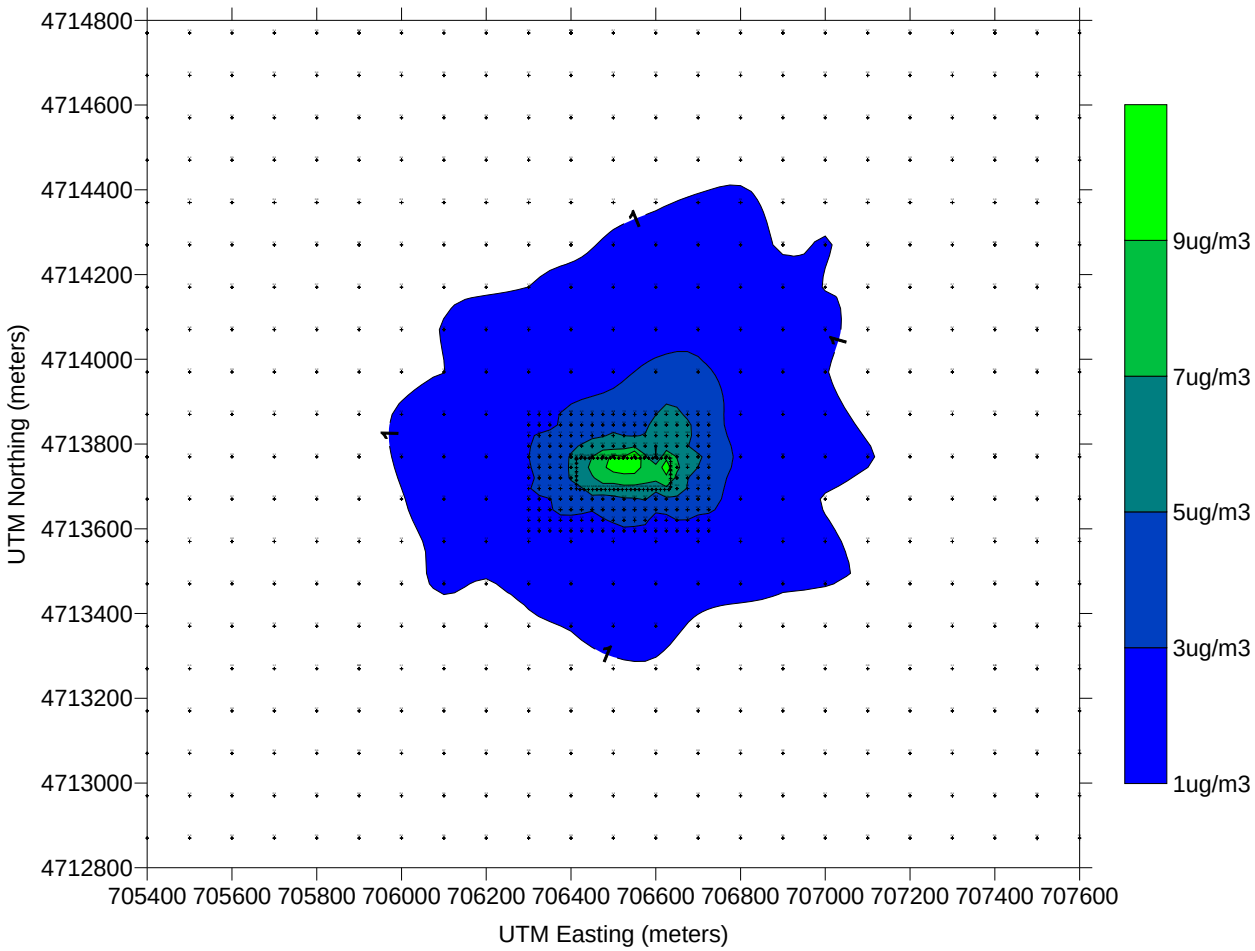


FIGURE 5-5

ANNUAL $PM_{2.5}$ SIGNIFICANT CONTRIBUTION LEVEL CONCENTRATIONS

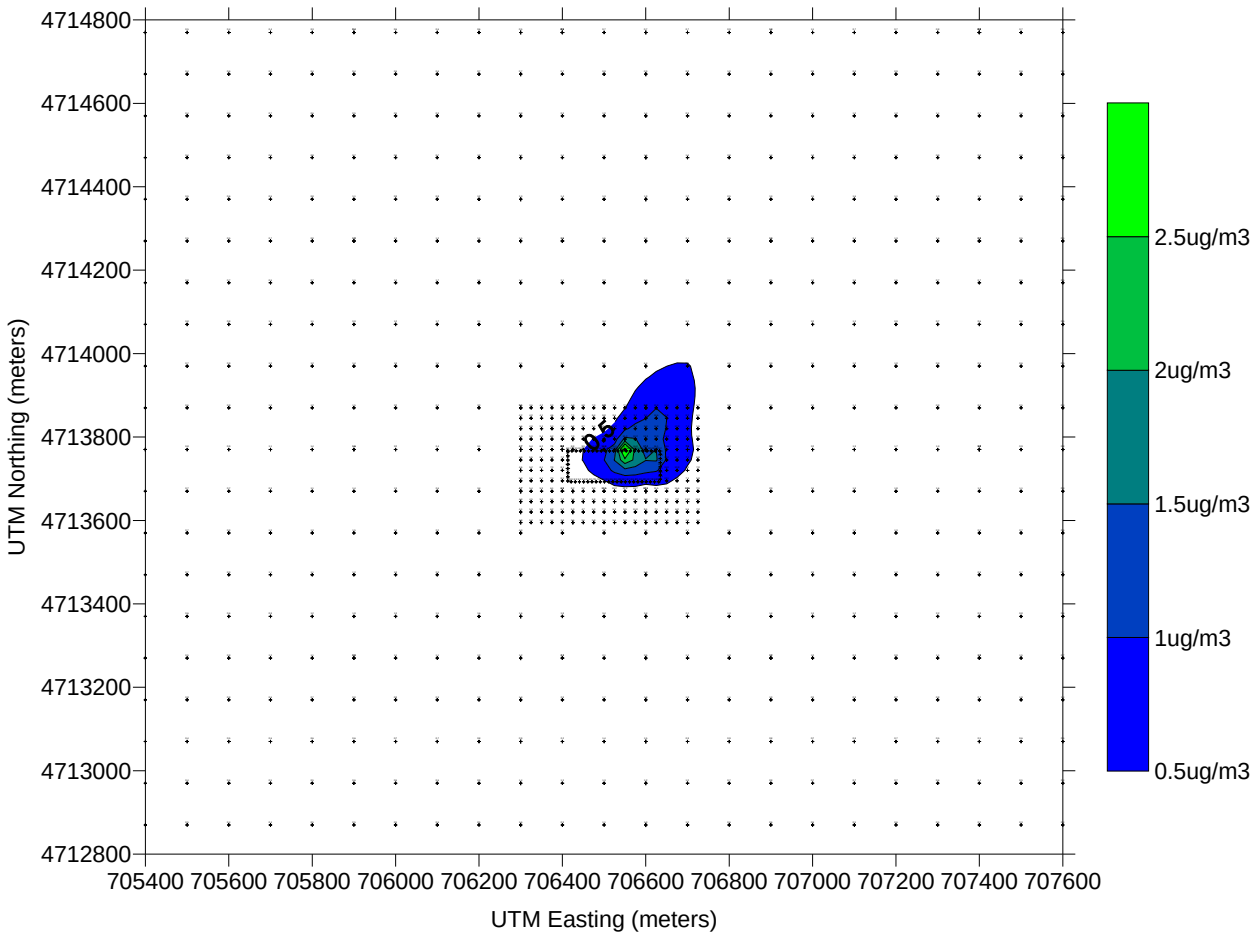


FIGURE 5-6

24-HOUR PM_{10} NAAQS CONCENTRATIONS

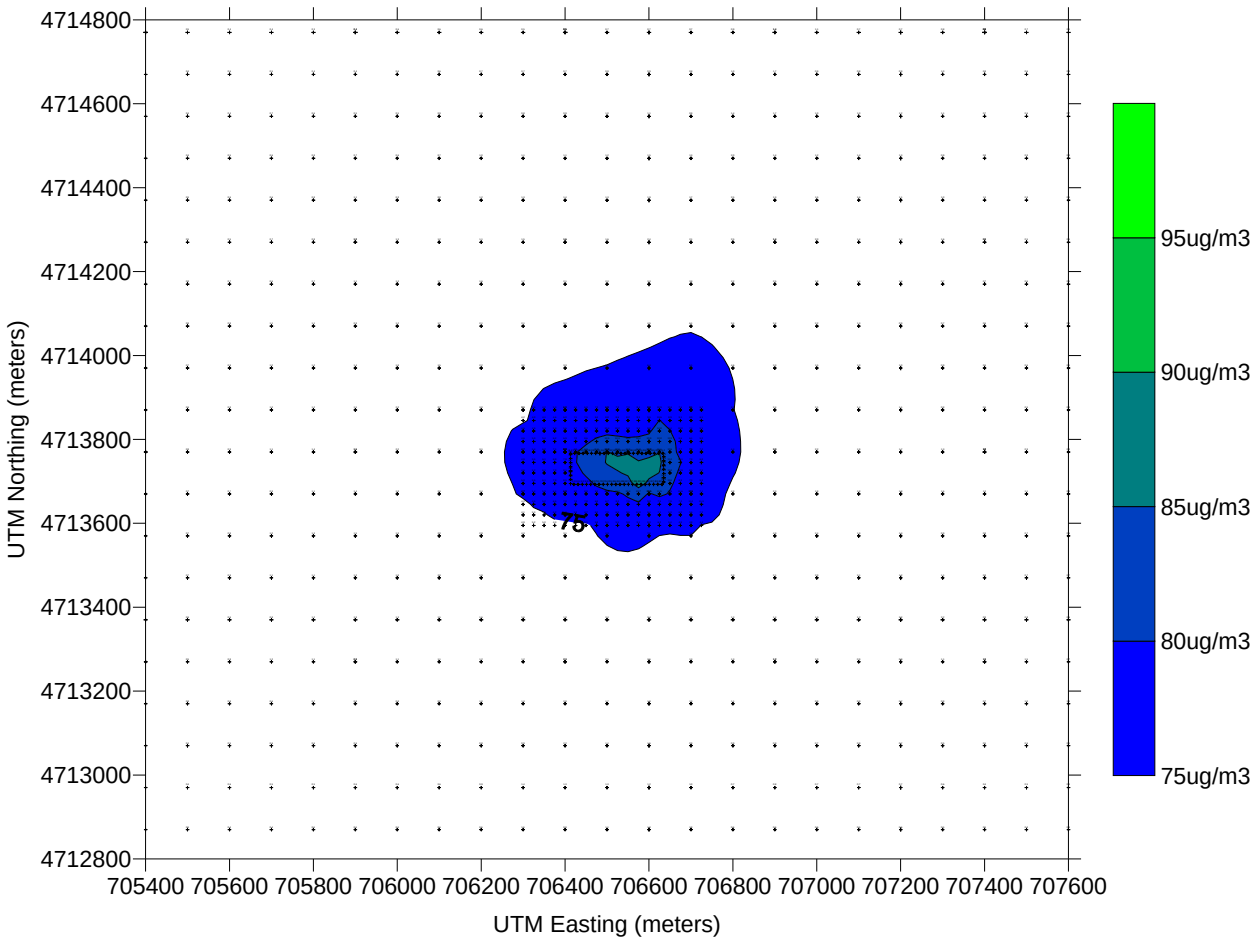


FIGURE 5-7

24-HOUR $PM_{2.5}$ NAAQS CONCENTRATIONS

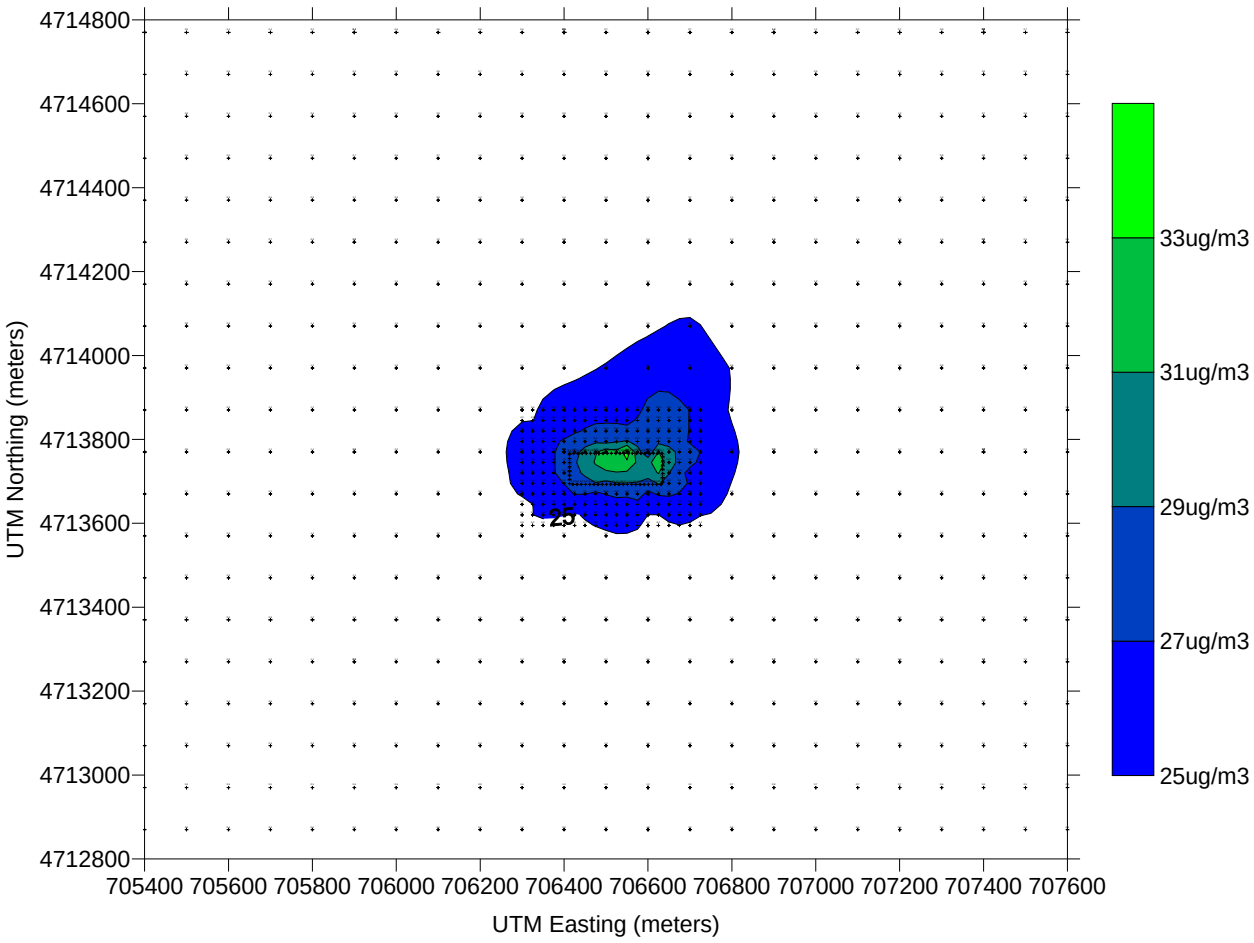
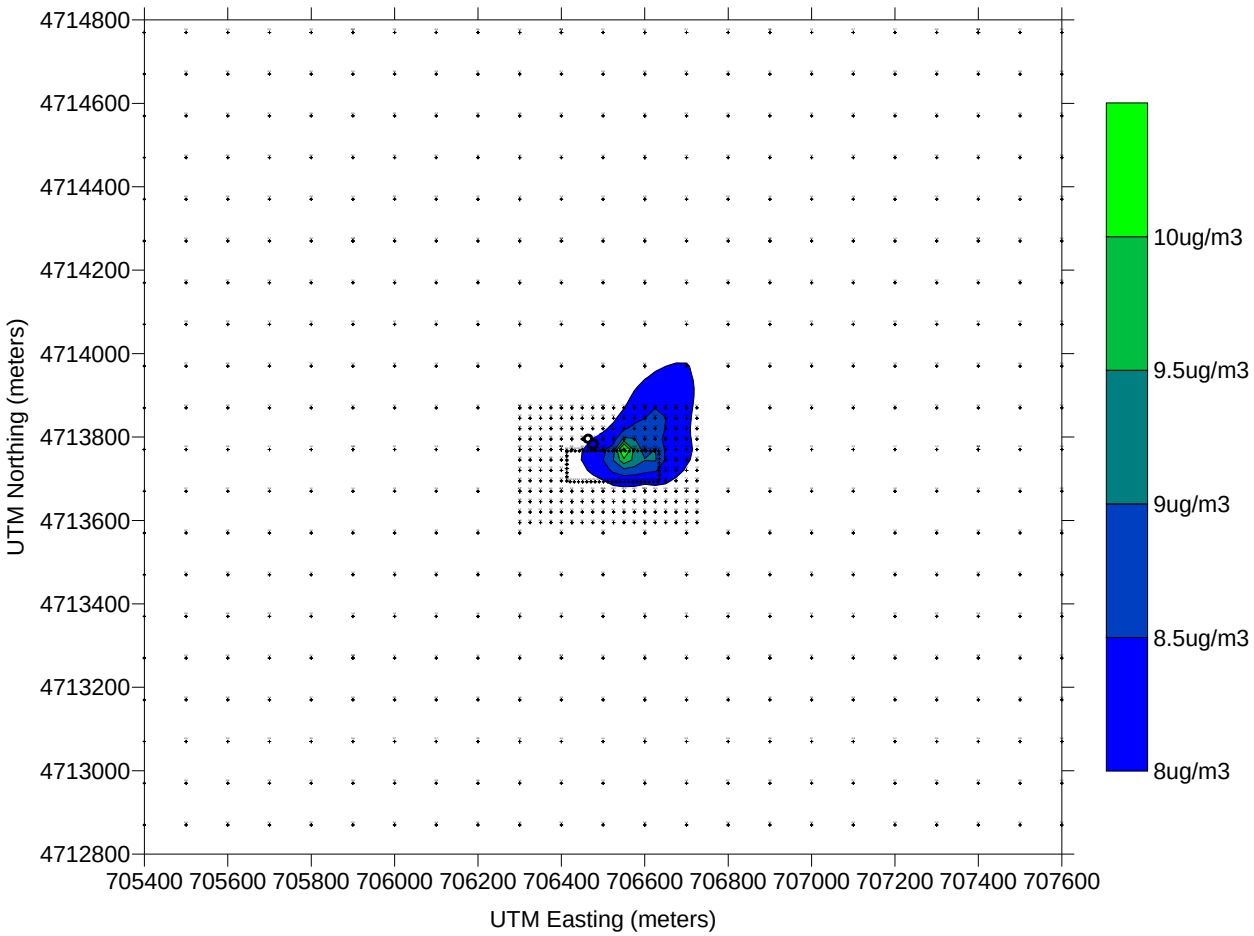


FIGURE 5-8

ANNUAL $PM_{2.5}$ NAAQS CONCENTRATIONS



6.0 EXCESS EMISSIONS DOCUMENTATION

This section is not applicable to K & T Steel, because no excess emissions will be caused by startup, shutdown, or scheduled maintenance. Appendix D provides potential-to-emit emission calculations for criteria pollutants, HAPs, and TAPs.

7.0 COMPLIANCE CERTIFICATION PLAN

To maintain compliance with the provisions of the PTC, K & T Steel proposes to maintain a facility-wide record keeping program. Table 7-1 presents the parameters proposed for the record keeping program.

The key components of the record keeping program will be logbooks at the Paint Building, which contains the most significant HAP/VOC emission sources. Records will include purchasing and usage records for paint, solvents, and other coatings used.

K & T Steel requests that IDEQ establish criteria pollutant and TAP permit limits based on facility-wide emission rates for each pollutant. In the event that K & T Steel's operations require the use of a new paint or solvent, IDEQ will be provided a copy of the MSDS to verify that pollutant emission limits will not be exceeded.

Operators will record usage of chemicals for all fabricated material that is coated. The information will be compiled at the frequencies indicated in Table 7-1. The spreadsheet will calculate emissions for all chemicals using the same calculation methodology as presented in this permit application. Monthly records of HAP/VOC emissions will be kept with the operating permit documentation.

TABLE 7-1
RECORD KEEPING AND MONITORING PARAMETERS

Parameter	Frequency
Paint and solvent usage (type and quantity)	Updated Weekly
Purchasing documentation for paints and solvents	Updated Monthly
Spreadsheet of HAP/VOC emissions	Updated Monthly

8.0 REFERENCES

Idaho Department of Environmental Quality (IDEQ). 2002. *State of Idaho Air Quality Modeling Guideline*. Stationary Source Program, Air Quality Division. December 31.

IDEQ. 2011a. *State of Idaho Guideline for Performing Air Quality Impact Analyses*. Stationary Source Program, Air Quality Division. July.

IDEQ. 2011b. Telephone Conversation Regarding Meteorological Data for Use in Modeling the K & T Steel Facility. Between Kevin Schilling, IDEQ and Tetra Tech. December 7.

IDEQ. 2011c. Letter RE: Modeling Protocol for the K & T Steel Corp. proposed Modification of their Facility in Twin Falls. From Kevin Schilling, IDEQ to Rob Tisdale and Sandra Carroll, Tetra Tech. December 27.

IDEQ. 2007a. Telephone Conversation Regarding Meteorological Data for Use in Modeling the K & T Steel Facility. Between Darrin Mehr, IDEQ and Melissa Weakley, Tetra Tech. October 22.

IDEQ. 2007b. First Electronic Mail Regarding Meteorological Data Processing. From Kevin Schilling, IDEQ to Melissa Weakley, Tetra Tech. November 7.

IDEQ. 2007c. Second Electronic Mail Regarding Meteorological Data Processing. From Kevin Schilling, IDEQ to Melissa Weakley, Tetra Tech. November 9.

IDEQ. 2007d. Third Electronic Mail Regarding Meteorological Data Processing. From Kevin Schilling, IDEQ to Melissa Weakley, Tetra Tech. November 9.

IDEQ. 2007e. Comments on the Modeling Protocol for the K & T Steel Corp. Facility in Twin Falls, Idaho. Kevin Schilling. November 9.

IDEQ. 2008. Telephone Conversation Regarding the K & T Steel Corp. Facility in Twin Falls, Idaho. Between Kevin Schilling and Cheryl Robinson, IDEQ and Melissa Weakley and Sandra Carroll, Tetra Tech. July 24.

Tetra Tech, Inc. (Tetra Tech). 2007. Dispersion Modeling Protocol for the Pending Permit to Construct Application. Prepared for K & T Steel Corporation. November 1.

Tetra Tech, Inc. (Tetra Tech). 2012. Air Quality Modeling Report. Prepared for K & T Steel Corporation. January 4, 2012.

U.S. Environmental Protection Agency (EPA). 1989. "Surface Coating of Automobiles and Light Trucks", *PM_{10} Emission Factor Listing Developed by Technology Transfer and AIRS Source Classification Codes with Documentation*. EPA-450/4-89-022. November.

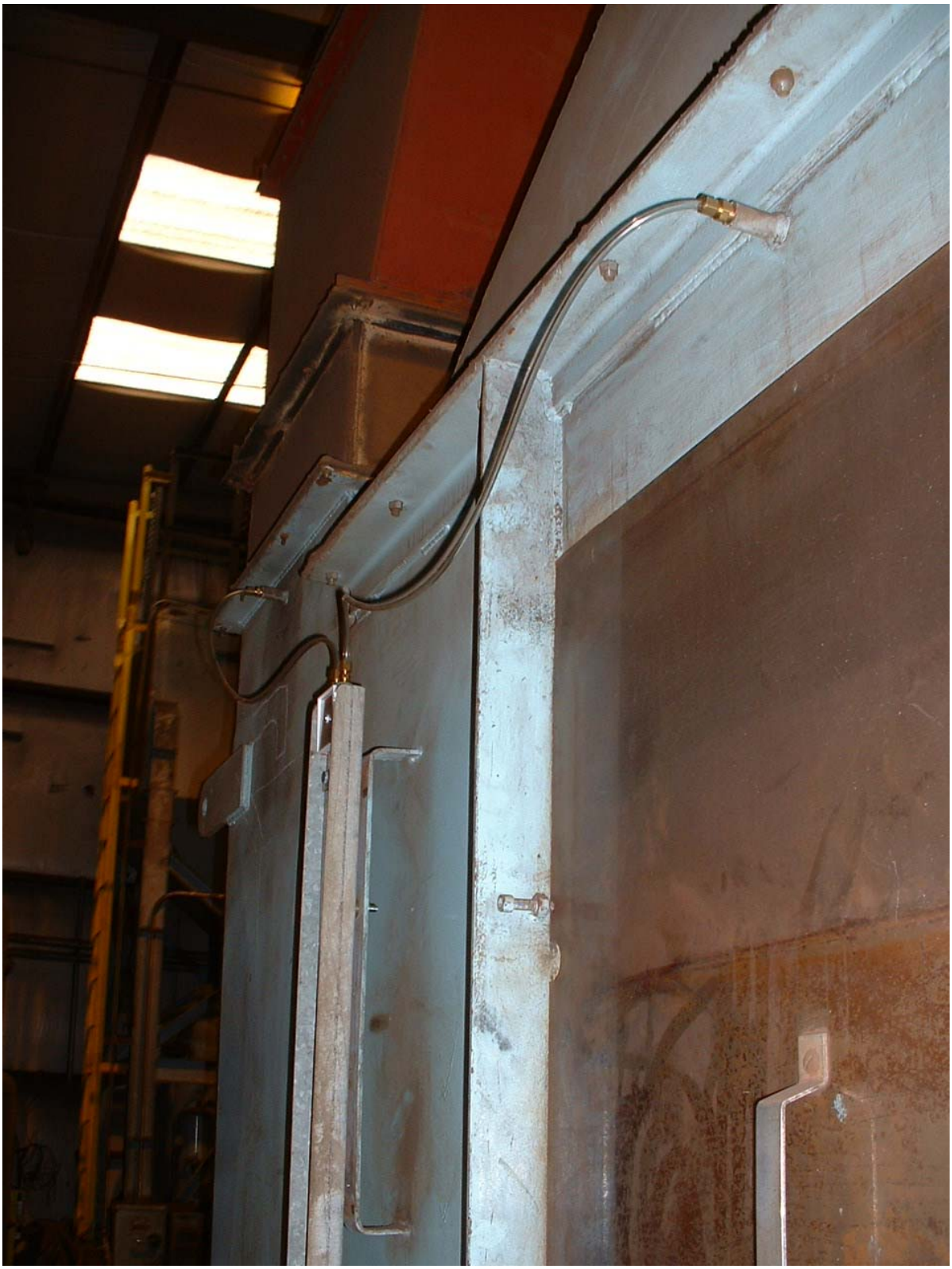
EPA. 2004a. User's Guide for the AMS/EPA Regulatory Model - AERMOD. EPA-454/B-03-002. Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division. Research Triangle Park, North Carolina. September.

EPA. 2004b. *User's Guide for the AERMOD Meteorological Processor (AERMET)*. EPA-454/B-03-001. Office of Air Quality Planning and Standards, Emissions Monitoring and Analysis Division. Research Triangle Park, North Carolina. November.

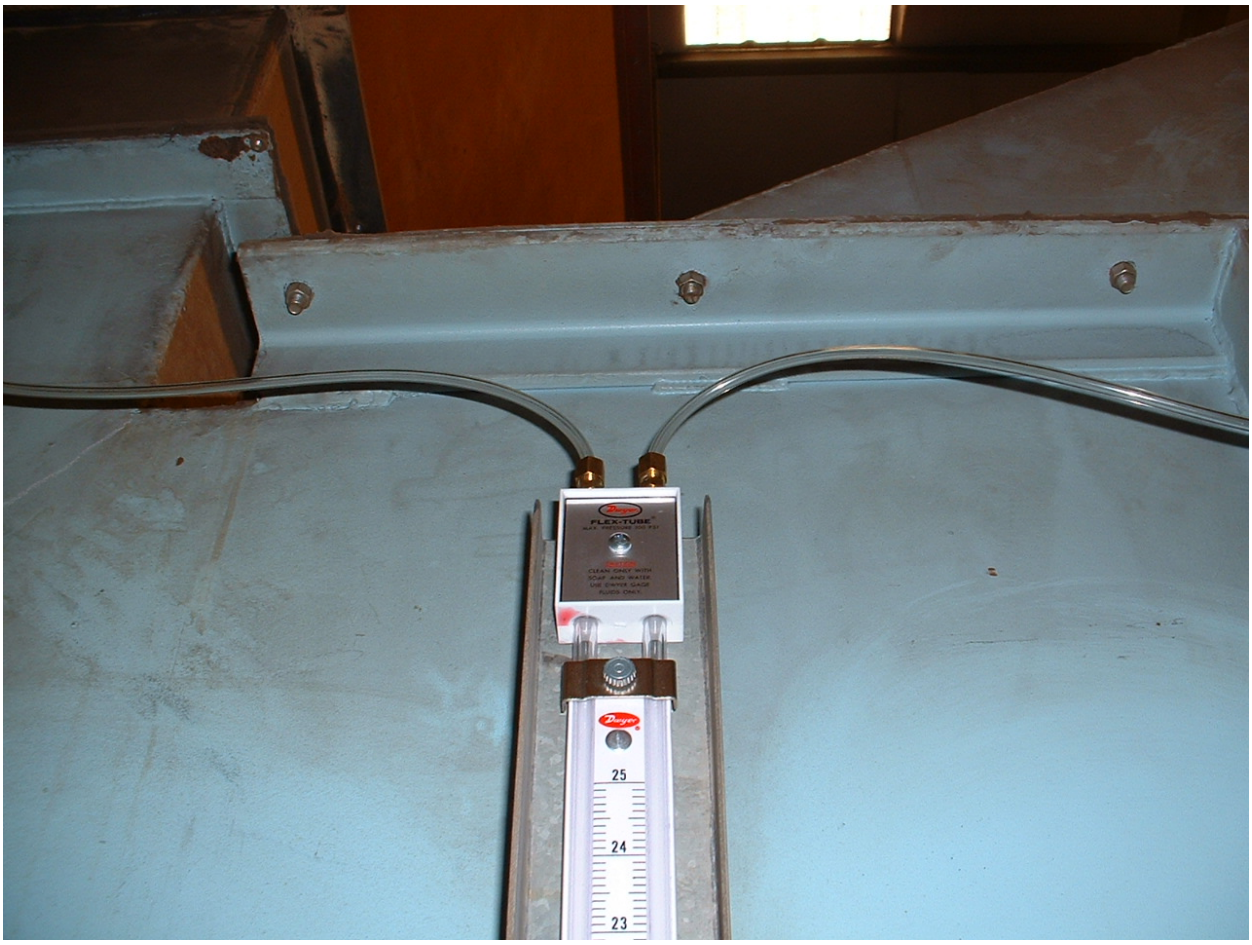
EPA. 2005. *Guideline on Air Quality Models (Revised)*. Title 40 Code of Federal Regulations, Part 51, Appendix W. Office of Air Quality Planning and Standards. Research Triangle Park, North Carolina.

PHOTOGRAPHS

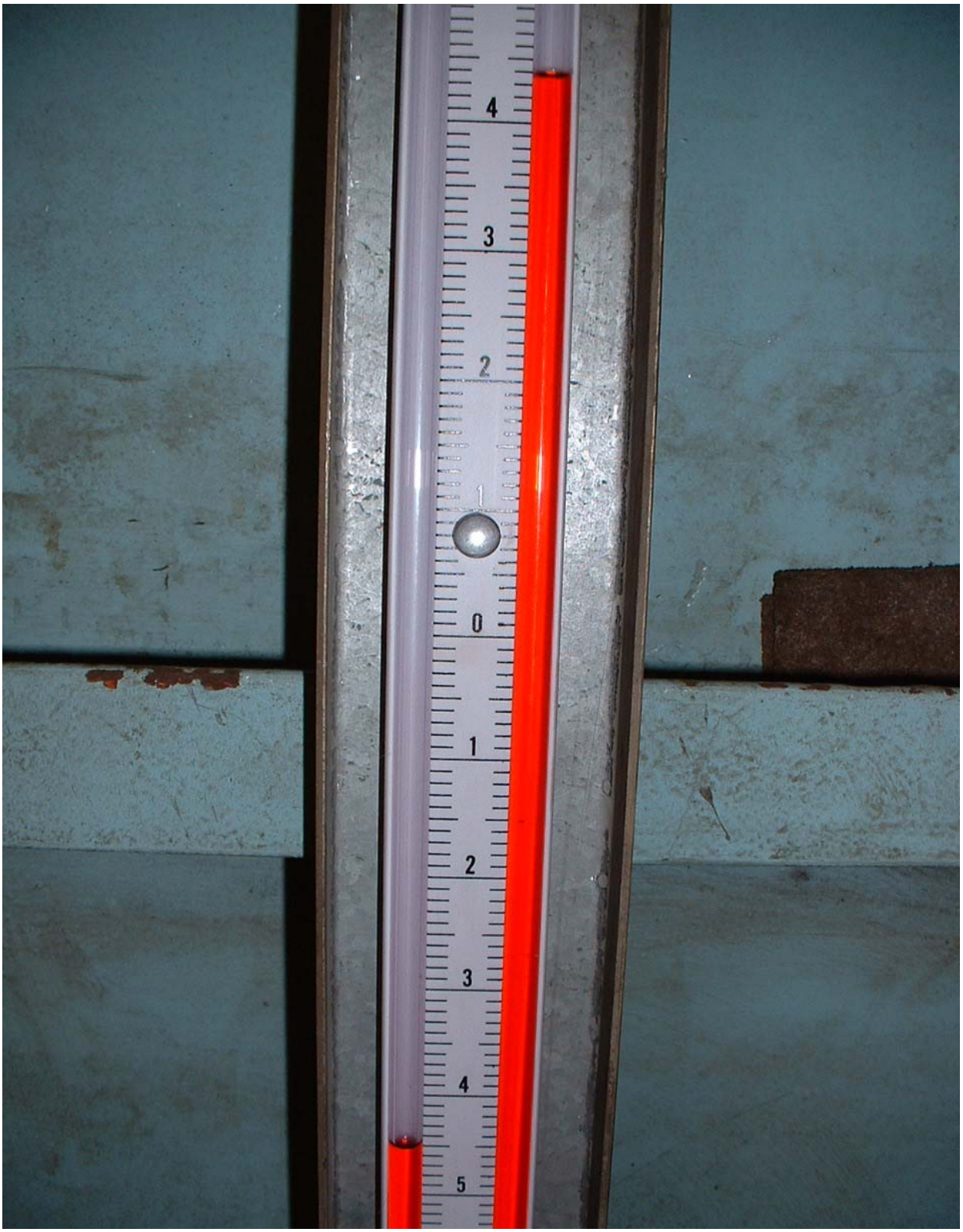
PHOTOGRAPH 1 – MANOMETER ON SCRUBBER IN STEEL GRIT BLAST BUILDING



PHOTOGRAPH 2 – MANOMETER ON SCRUBBER IN STEEL GRIT BLAST BUILDING TOP VIEW



PHOTOGRAPH 3 – MANOMETER ON GRIT BLAST SCRUBBER TOP VIEW CLOSE-UP



PHOTOGRAPH 4 – MANOMETER READING FOR GRIT BLAST SCRUBBER

PHOTOGRAPH 5 – MANOMETER ON GRIT BLAS SCRUBBER BOTTOM VIEW CLOSE-UP

PHOTOGRAPH 6 – MANOMETER IN PAINT BUILDING

PHOTOGRAPH 7 – PAINT BUILDING FILTERS

PHOTOGRAPH 8 – STACKS ABOVE PAINT BUILDING ROOFLINE

APPENDIX A

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY FORMS

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Cover Sheet for Air Permit Application – Permit to Construct **Form CSPTC**

Please see instructions on page 2 before filling out the form.

COMPANY NAME, FACILITY NAME, AND FACILITY ID NUMBER

1. Company Name	K & T Steel Corporation		
2. Facility Name	K & T Steel Corporation	3. Facility ID No.	083-00087
4. Brief Project Description - One sentence or less	Proposed modification to Air Quality Permit P-2008.0191 for K & T Steel facility		

PERMIT APPLICATION TYPE

5. ☐ New Source ☐ New Source at Existing Facility ☐ PTC for a Tier I Source Processed Pursuant to IDAPA 58.01.01.209.05.c
☐ Unpermitted Existing Source ☐ Facility Emissions Cap ☒ Modify Existing Source: Permit No.: P-2008.0191 Date Issued: 5-29-2009
☐ Required by Enforcement Action: Case No.:____

6. ☒ Minor PTC ☐ Major PTC

FORMS INCLUDED

Included	N/A	Forms		DEQ Verify
☒	☐	Form CSPTC – Cover Sheet		☐
☒	☐	Form GI – Facility Information		☐
☒	☐	Form EU0 – Emissions Units General		☐
☐	☒	Form EU1– Industrial Engine Information	Please specify number of EU1s attached: _____	☐
☐	☒	Form EU2– Nonmetallic Mineral Processing Plants	Please specify number of EU2s attached: _____	☐
☒	☐	Form EU3– Spray Paint Booth Information	Please specify number of EU3s attached: 2	☐
☐	☒	Form EU4– Cooling Tower Information	Please specify number of EU3s attached: _____	☐
☐	☒	Form EU5 – Boiler Information	Please specify number of EU4s attached: _____	☐
☐	☒	Form CBP– Concrete Batch Plant	Please specify number of CBPs attached: _____	☐
☐	☒	Form HMAP – Hot Mix Asphalt Plant	Please specify number of HMAPs attached: _____	☐
☐	☒	PERF – Portable Equipment Relocation Form		☐
☐	☒	Form AO – Afterburner/Oxidizer		☐
☐	☒	Form CA – Carbon Adsorber		☐
☐	☒	Form CYS – Cyclone Separator		☐
☐	☒	Form ESP – Electrostatic Precipitator		☐
☐	☒	Form BCE– Baghouses Control Equipment		☐
☐	☒	Form SCE– Scrubbers Control Equipment		☐
☒	☐	Form VSCE – Venturi Scrubber Control Equipment		☐
☐	☒	Form CAM – Compliance Assurance Monitoring		☐
☒	☐	Forms EI-– Emissions Inventory		☐
☒	☐	PP – Plot Plan		☐
☒	☐	Forms MI1 – MI4 – Modeling	(Excel workbook, all 4 worksheets)	☐
☐	☒	Form FRA – Federal Regulation Applicability		☐

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

General Information FOI
Re

Please see instructions on page 2 before filling out the form.

All information is required. If information is missing, the application will not be processed.

IDENTIFICATION

1. Company Name	2. Facility Name:
K & T Steel Corporation	Same

3. Brief Project Description:	Proposed Minor Modification to an Existing Minor Source Air Quality Permit for K & T Steel Corp.

FACILITY INFORMATION

4. Primary Facility Permit Contact Person/Title	William W. Koch		President	
5. Telephone Number and Email Address	208.733.2554		bkoch@ktsteelcorp.com	
6. Alternate Facility Contact Person/Title	Keith DePew		Environmental Compliance	
7. Telephone Number and Email Address	208.733.2554		keith@ktsteelcorp.com	
8. Address to Which the Permit Should be Sent	P. O. Box 291			
9. City/County/State/Zip Code	Twin Falls	Twin Falls County	ID	83303
10. Equipment Location Address (if different than the mailing address above)	322 Diamond Avenue West			
11. City/County/State/Zip Code	Twin Falls	Twin Falls	ID	83301
12. Is the Equipment Portable?	☐ Yes ☒ No			
13. SIC Code(s) and NAICS Code	Primary SIC: 3441	Secondary SIC: N/A	NAICS: 332312	
14. Brief Business Description and Principal Product	Fabrication of rebar, structural steel and tanks; associated coating of steel as necess			
15. Indentify any adjacent or contiguous facility that this company owns and/or operates	None			
16. Specify the reason for the application	☐ Permit to Construct (PTC) For Tier I permitted facilities only: If you are applying for a PTC then you must also specify how the PTC will be incorporated into the Tier I permit. ☐ Incorporate the PTC at the time of the Tier I renewal ☐ Co-process the Tier I modification and PTC ☐ Administratively amend the Tier I permit to incorporate the PTC upon your request (IDAPA 58.01.01.209.05.a, b, or c) ☐ Tier I Permit ☒ Tier II Permit ☐ Tier II/Permit to Construct			

CERTIFICATION

In accordance with IDAPA 58.01.01.123 (Rules for the Control of Air Pollution in Idaho), I certify based on information and belief form reasonable inquiry, the statements and information in the document(s) are true, accurate, and complete.

17. Responsible Official's Name/Title	William W. Koch	President
18. Responsible Official Address	322 Diamond Ave. West, Twin Falls, ID 83301	
19.Responsible Official Telephone Number	208.733.2554	

20. Responsible Official Email Address	bkoch@ktsteelcorp.com		
21. Responsible Official's Signature	William W. Koch	Date:	5/4/12
22. ☒ Check here to indicate that you would like to review the draft permit prior to final issuance.			

Department of Environmental Quality
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline - 1-877-5PERMIT

Department of Environmental Quality - Air Quality Division
Minor Source Permit to Construct Application Completeness Checklist

This checklist is designed to aid the applicant in submitting a complete permit to construct application.

I. Actions Recommended Before Submitting Application

☒ Refer to the Rule. Read the Permit to Construct requirements contained in IDAPA 58.01.01.200-228, Rules for the Control of Air Pollution in Idaho. The Rules are available on DEQ's website (go to http://adm.idaho.gov/adminrules/rules/idapa58/0101.pdf).

☒ Refer to DEQ's Permit to Construct Guidance Document. DEQ has developed a guidance document to aid applicants in submitting a complete permit to construction application. The guidance document is located on DEQ's website (go to http://www.deq.idaho.gov/air/permits_forms/permitting/ptc_prepermit_guidance.pdf).

☒ Consult with DEQ Representatives. It is recommended that the applicant schedule a pre-application meeting with DEQ to discuss application requirements before submitting the permit to construct application. The meeting can be in person or on the phone. Contact DEQ's Air Quality Hotline at **877-5PERMIT** to schedule the pre-application meeting.

☒ Submit Ambient Air Quality Modeling Protocol. It is strongly recommended that an ambient air quality modeling protocol be submitted to DEQ at least two (2) weeks before the permit to construct application is submitted. Contact DEQ's Air Quality Hotline at **877-5PERMIT** for information about the protocol.

II. Application Content

Application content should be prepared using the checklist below. The checklist is based on the requirements contained in IDAPA 58.01.01.202.

☒ Apply for a Permit to Construct. Submit a Permit to Construct application using forms available on DEQ's website at http://www.deq.idaho.gov/air/permits_forms/forms/ptc_general_application.pdf.

☒ Permit to Construct Application Fee. The permit to construct application fee of $1000 must be submitted at the time the original permit to construct application is submitted. Refer to IDAPA 58.01.01.224. If the permit to construct application is withdrawn or denied and a new application is submitted, a new $1,000 application fee is required to be submitted. The application fee is not transferable or refundable. The application fee can be paid by check, credit card or Electronic Funds Transfer (EFT). If you choose to pay by credit card or EFT, please refer to the following Access Idaho link:
https://www.accessidaho.org/secure/deq/payport/item.html?id=511
If you choose to pay by check, enclose the check with your permit to construct application.

☒ Process Description(s). The process or processes for which construction is requested must be described in sufficient detail and clarity such that a member of the general public not familiar with air quality can clearly understand the proposed project. A process flow diagram is required for each process.

☒ Equipment List. All equipment that will be used for which construction is requested must be described in detail. Such description includes, but is not limited to, manufacturer, model number or other descriptor, serial number, maximum process rate, proposed process rate, maximum heat input capacity, stack height, stack diameter, stack gas flowrate, stack gas temperature, etc. All equipment that will be used for which construction is requested must be clearly labeled on the process flow diagram.

☒ Potential to Emit. Submit the uncontrolled potential to emit (pre-control equipment emissions estimates) and the controlled potential to emit (post-control equipment emissions estimates) for all equipment for which construction is requested. Any limit on the equipment for which is construction is requested may become a

limit on that equipment in the permit to construct.

☒ Potential to Emit and Modeled Ambient Concentration for All Regulated Air Pollutants. All proposed emission limits and modeled ambient concentrations for all regulated air pollutants must demonstrate compliance with all applicable air quality rules and regulations. Regulated air pollutants include criteria air pollutants, toxic air pollutants listed pursuant to IDAPA 58.01.01.585 and 586, and hazardous air pollutants listed pursuant to Section 112 of the 1990 Clean Air Act Amendments (go to http://www.epa.gov/ttn/atw/188polls.html). Describe in detail how the proposed emissions limits and modeled ambient concentrations demonstrate compliance with each applicable air quality rule and regulation. It is requested that emissions calculations, assumptions, and documentation be submitted with sufficient detail so DEQ can verify the validity of the emissions estimates.

☒ Scaled Plot Plan. It is required a scaled plot plan be included in the permit to construct application and it must clearly label the location of each proposed process and the equipment that will be used in the process.

☒ List all Applicable Requirements. All applicable requirements must be cited by the rule or regulation section/subpart that applies for each emissions unit.

☒ Certification of Permit to Construct Application. The permit to construct application must be signed by the Responsible Official and must contain a certification signed by the Responsible Official. The certification must state that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete. Refer to IDAPA 58.01.01.123.

☒ Submit the Permit to Construct Application. Submit the permit to construct application and application fee to the following address:

Air Quality Program Office – Application Processing
Department of Environmental Quality
1410 N. Hilton
Boise, ID 83706-1255

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
K & T Steel Corporation	K & T Steel Corporation	083-00087

4. Brief Project Description:	Proposed Minor Modification to an Existing Minor Source Air Quality Permit for K & T Steel Corp.

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	PAINT BUILDING
6.	EU ID Number:	001/002
7.	EU Type:	☐ New Source ☐ Unpermitted Existing Source ☒ Modification to a Permitted Source -- Previous Permit #:P-2008.0191 Date Issued: 5/29/09
8.	Manufacturer:	GRACO
9.	Model:	G40 WITH REVERSE-A-CLEAN (RAC) SPRAY TIP
10..	Maximum Capacity:	8.3 GAL/HR (50 GAL/DAY)
11.	Date of Construction:	SEPTEMBER 2000
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☐ No ☒ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:	PAINT ARRESTANCE FILTER HIGHLOFT POLYESTER		
15. Date of Installation:	9-2000	16. Date of Modification (if any):	2-15-2012
17. Manufacturer and Model Number:	AIR HANDLER Paint Filter Roll Synthetic ECXL 2EKK8		
18. ID(s) of Emission Unit Controlled:	001\002		
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☒ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☒ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency	99.61%	99.61%				

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency. See Appendix C

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	
23.	Maximum Operation:	8760 HOURS PER YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☒ Yes ☐ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☒ Material Usage Limit(s):	13,000 GALLONS PER YEAR
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	PROCESS LIMITATIONS (MATERIAL USAGE LIMITS WERE INCLUDED IN AIR DISPERSION MODELING)

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
K & T Steel Corporation	K & T Steel Corporation	083-00087

4. Brief Project Description:	Proposed Minor Modification to an Existing Minor Source Air Quality Permit for K & T Steel Corp.

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	PAINT BUILDING
6.	EU ID Number:	001/002
7.	EU Type:	☐ New Source ☐ Unpermitted Existing Source ☒ Modification to a Permitted Source -- Previous Permit #:P-2008.0191 Date Issued: 5/29/09
8.	Manufacturer:	WAGNER AIRLESS SPRAY GUN
9.	Model:	G-10
10..	Maximum Capacity:	8.3 GAL/HR (50 GAL/DAY)
11.	Date of Construction:	SEPTEMBER 2000
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☐ No ☒ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:	PAINT ARRESTANCE FILTER HIGHLOFT POLYESTER		
15. Date of Installation:	9/2000	16. Date of Modification (if any):	2-15-2012
17. Manufacturer and Model Number:	AIR HANDLER Paint Filter Roll Synthetic ECXL 2EKK8		
18. ID(s) of Emission Unit Controlled:	001/002		
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☒ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☒ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency	99.6%	99.6%				

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency. See Appendix C

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	
23.	Maximum Operation:	8760 HOURS PER YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☒ Yes ☐ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☒ Material Usage Limit(s):	13,000 GALLONS PER YEAR
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	PROCESS LIMITATIONS (MATERIAL USAGE LIMITS WERE INCLUDED IN AIR DISPERSION MODELING)

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Unit - General **Form EU0**
Revision 4
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
K & T Steel Corporation	K & T Steel Corporation	083-00087

4. Brief Project Description:	Proposed Minor Modification to an Existing Minor Source Air Quality Permit for K & T Steel Corp.

EMISSIONS UNIT (PROCESS) IDENTIFICATION & DESCRIPTION

5.	Emissions Unit (EU) Name:	STEEL GRIT BLAST BUILDING
6.	EU ID Number:	003
7.	EU Type:	☐ New Source ☐ Unpermitted Existing Source ☒ Modification to a Permitted Source -- Previous Permit #:P-2008.0191 Date Issued: 5/29/09
8.	Manufacturer:	SUPER TITAN BLASTING NOZZLE
9.	Model:	PART # VNPL-7
10..	Maximum Capacity:	32,500 LB/YEAR
11.	Date of Construction:	APRIL 2002
12.	Date of Modification (if any):	N/A
13.	Is this a Controlled Emission Unit?	☐ No ☒ Yes If Yes, complete the following section. If No, go to line 22.

EMISSIONS CONTROL EQUIPMENT

14. Control Equipment Name and ID:	Venturi Scrubber		
15. Date of Installation:	April 2002	16. Date of Modification (if any):	N/A
17. Manufacturer and Model Number:	DeVansco CAB		
18. ID(s) of Emission Unit Controlled:	003		
19. Is operating schedule different than emission units(s) involved?	☐ Yes ☒ No		
20. Does the manufacturer guarantee the control efficiency of the control equipment?	☒ Yes ☐ No (If Yes, attach and label manufacturer guarantee)		

	Pollutant Controlled					
	PM	PM10	SO_2	NOx	VOC	CO
Control Efficiency	80%	80%				

21. If manufacturer's data is not available, attach a separate sheet of paper to provide the control equipment design specifications and performance data to support the above mentioned control efficiency. See Appendix C

EMISSION UNIT OPERATING SCHEDULE (hours/day, hours/year, or other)

22.	Actual Operation:	
23.	Maximum Operation:	8760 HOURS PER YEAR

REQUESTED LIMITS

24.	Are you requesting any permit limits?	☒ Yes ☐ No (If Yes, indicate all that apply below)
	☐ Operation Hour Limit(s):	
	☐ Production Limit(s):	
	☒ Material Usage Limit(s):	32,500 LB/YEAR
	☐ Limits Based on Stack Testing:	Please attach all relevant stack testing summary reports
	☐ Other:	
25.	Rationale for Requesting the Limit(s):	PROCESS LIMITATIONS (MATERIAL USAGE LIMITS WERE INCLUDED IN AIR DISPERSION MODELING)

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Emissions Units - Spray Paint Booth Information **Form EU3**
Revision 5
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	2. Facility Name:	3. Facility ID No:
K & T Steel Corporation	K & T Steel Corporation	083-00087

4. Brief Project Description: Proposed Minor Modification to an Existing Minor Source Air Quality Permit for K & T Steel Corp.

BOOTH INFORMATION

5. Booth Type: ☐ New Booth ☐ Unpermitted Existing Booth
☒ Modification to a Permitted Booth, Permit #: P-2008.0191, Date Issued: 5-29-2009

6. Construction Date:

SPRAY GUN DESCRIPTION AND SPECIFICATIONS

Gun No.	7. Manufacturer	8. Model	9. Type	10. Transfer Eff. %	11. Rated Capacity (gal/hr)
1	Wagner	G-10	Airless Spray Gun	45	12.5
2	Graco	G40 w/ Reverse-A-Clean (RAC) spray tip	HVLP	80-90	14.4 @ 2,000 psi; operating @ 10 psi
3					
4					

Number of guns to be used simultaneously: 2

SPRAY MATERIAL DESCRIPTION AND SPECIFICATIONS

12. Type of Spray Material Used	13. Type of Material Coated	14. Max. Usage (gal/day)	15. Solid TAP/HAP Content (lb/gal)	16. VOC TAP/HAP Content (lb/gal)	17. MSD (Y/N)
Primers & topcoat paints	Structural steel & steel tanks		See Emissions Inventory (Appendix D)	See Emissions Inventory (Appendix D)	Yes (Appendix B)

REQUEST FOR PERMIT LIMITATIONS

18. Are you requesting any permit limits? ☐ No ☒ Yes. If Yes, check all that apply below and fill in requested limit(s)

☐ Operation Hour Limits: ☐ Production Limits:

☒ Material Usage Limits: 13,000 gal/yr ☐ Other:

19. Rationale for Requesting the Limit(s):

EMISSION CONTROL DEVICE (FILTER[b]) DESCRIPTION AND SPECIFICATIONS

Stack Served	20. Filter Manufacturer	21. Model	22. PM Control Efficiency(%)[a]	23. Dimension (Total Area, Thickness and Number of Filters)
Stack 1	Air Handler Paint Filter Roll Synthetic	ECXL 2EKK8	99 (See Appendix C)	48" width x 90 " length x 1" thickness roll
Stack 2	Air Handler Paint Filter Roll Synthetic	ECXL 2EKK8	99 (See Appendix C)	48" width x 90 " length x 1" thickness roll
Stack 3				
Stack 4				

Notes: a. Provide either stack test data or vendor's documentation to support the control efficiency specified above.
b. Fill out and submit appropriate control equipment form(s) if this booth has a control device(s) other than a filter system.

BOOTH OPERATING SCHEDULE (indicate hours/day, hours/year, or other)

24. Actual Operation:	25. Maximum Operation: 8760 hours / year

DEQ AIR QUALITY PROGRAM
1410 N. Hilton, Boise, ID 83706
For assistance, call the
Air Permit Hotline – 1-877-5PERMIT

Venturi Scrubber Control Equipment - **Form VSCE**
Revision 2
08/28/08

Please see instructions on page 2 before filling out the form.

IDENTIFICATION

1. Company Name:	K & T Steel Corporation	2. Facility Name:	K & T Steel Corporation	3. Facility ID No.:	083-00087
4. Brief Project Description:	Proposed Minor Modification to an Existing Minor Source Air Quality Permit for K & T Steel Corp.				

EMISSION UNIT ID				SCRUBBER						
5.	6.	7.	8.	9.	10.	11.	12.	13	14.	15.
Emission Unit	EU ID No.	CE ID No.	Stack ID No.	Manufacturer Name	Model No.	Efficiency (PM_{10}@70%, SO_2@50%, etc.)	Basis for Efficiency (i.e., guarantee, source test, etc.)	Design Scrubbing Liquid Flow (gpm)	Design Pressure Drop (in H_2O)	Design pH (for acid gas control)
Grit Blasting	003		N/A	DeVansco	Custom	PM @ 80%	Manufacturer Performance Test	400 gpm	5-15	N/A

Describe the maintenance required to assure the scrubber operates as designed (i.e. frequency of inspection, nozzle inspection, nozzle cleaning, etc.). (Provide an attachment if necessary.) K&T Steel Corp. follows the manufacturers' specifications for maintenance of the Venturi Scrubber.

APPENDIX B

MATERIAL SAFETY DATA SHEETS

Submitted Electronically on CD-ROM

APPENDIX C

MANUFACTURERS' DATA

Submitted Electronically on CD-ROM

APPENDIX D

EMISSION CALCULATIONS

Source	Source Type	RH (m)	Temp (K)	Flow Rate (ACFM)	Velocity (m/s)	Diameter (m)	Sigma y (m)	Sigma z (m)	24h PM10 ER (g/s)	Ann PM10 ER (g/s)	24h PM2.5 ER (g/s)	Ann PM2.5 ER (g/s)	24h CS ER (g/s)
Paint Building - Stack 1	Point	11.33	293	10000	12.13	0.762	N/A	N/A	0.02934	0.01323	0.02934	0.01323	0.00521
Paint Building - Stack 2	Point	11.33	293	10000	12.13	0.762	N/A	N/A	0.02934	0.01323	0.02934	0.01323	0.00521
Sand Blast	Point	3.76	293	N/A	0.001	0.462	N/A	N/A	0.008190	0.001122	0.000819	0.000112	N/A
Manufacturing Shop	Volume	3.05	293	N/A	N/A	N/A	1.16	1.42	0.005872	0.005872	0.005872	0.005872	N/A

Not modeled

Appendix D-1
Acronyms and Abbreviations

CAS	Chemical Abstracts Service
days/yr	days per year
gal/yr	gallons per year
HAP	Hazardous Air Pollutant
lb/day	pounds per day
lb/gal	pounds per gallon
lb/hr	pounds per hour
lb/yr	pounds per year
ton/yr	tons per year
TAP	Toxic Air Pollutant
$PM_{2.5}$	Particulate Matter with Aerodynamic Diameter Less Than 2.5 Microns
PM_{10}	Particulate Matter with Aerodynamic Diameter Less Than 10 Microns
PM	Particulate Matter
VOC	Volatile Organic Compound

Appendix D-2
Criteria Pollutants and HAPs Emission Summary
Painting Process
(Emission values are in lb/yr unless noted otherwise)

Compound or Chemical	CAS	HAP	Total (lb/yr)	Total (lb/hr)[1]	Total (ton/yr)
Criteria Pollutants					
PM	-	-	**2,649**	**0.69**	**1.32**
PM_{10}	-	-	**1,748**	**0.46**	**0.87**
$PM_{2.5}$	-	-	**1,748**	**0.46**	**0.87**
VOC	-	-	**76,099**	**19.8**	**38.0**
HAPs					
Benzene	71-43-2	x	**-**	**-**	**-**
Cumene	98-82-8	x	**-**	**-**	**-**
Dimethyl phthalate	131-11-3	x	**-**	**-**	**-**
Ethyl benzene	100-41-4	x	**4,799**	**1.25**	**2.4**
Hexamethlene-1,6-diisocyanate	822-06-0	x	**-**	**-**	**-**
Methyl ethyl ketone (MEK)	78-93-3	x	**8,722**	**2.3**	**4.4**
Methyl isobutyl ketone (Hexanone)	108-10-1	x	**2,714**	**0.71**	**1.4**
Styrene	100-42-5	x	**-**	**-**	**-**
Toluene	108-88-3	x	**3,397**	**0.88**	**1.7**
Xylenes	1330-20-7	x	**19,364**	**5.0**	**9.7**
Total HAPs	-	-	*38,997*	*10.2*	*19.5*

1 Total lb/hr values are calculated based on paint spraying occuring a maximum of 6 hrs/day.

Appendix D-3
TAPs Emission Summary
Painting Process
(Emission values are in lb/yr unless noted otherwise)

Compound or Chemical	CAS	Total (lb/yr)	Total (lb/hr)[1]	Total (ton/yr)
Acetone	67-64-1	**316**	**0.082**	**0.16**
Acetic acid	64-19-7	**5,890**	**1.5**	**2.9**
Ammonia	7664-41-7	**-**	**-**	**-**
Benzene	71-43-2	**-**	**-**	**-**
Benzene dimethyl	1330-20-7	**1,082**	**0.28**	**0.54**
Butyl acetate	123-86-4	**3,934**	**1.0**	**2.0**
Butyl alcohol (Butanol)	71-36-3	**2,040**	**0.53**	**1.0**
Butyl ester	123-86-4	**-**	**-**	**-**
Calcium carbonate	471-34-1	**-**	**-**	**-**
Crystalline silica	14808-60-7	**317**	**0.083**	**0.16**
Cumene	98-82-8	**-**	**-**	**-**
Diglycidyl ether	2238-07-5	**0.012**	**0.0000030**	**0.0000058**
Dimethyl phthalate	131-11-3	**-**	**-**	**-**
Ethyl benzene	100-41-4	**4,799**	**1.2**	**2.4**
Furfuryl alcohol	98-00-0	**29**	**0.0076**	**0.015**
Heptanone	110-43-0	**442**	**0.12**	**0.22**
Hexamethlene-1,6-diisocyanate	822-06-0	**-**	**-**	**-**
Methyl ethyl ketone (MEK)	78-93-3	**8,722**	**2.3**	**4.4**
MEK peroxide	1338-23-4	**-**	**-**	**-**
Methyl isobutyl ketone (Hexone)	108-10-1	**2,714**	**0.71**	**1.4**
Mica group minerals	12001-26-2	**13**	**0.0035**	**0.0067**
1-Methoxy-2-propyl acetate	108-65-6	**2,191**	**0.57**	**1.1**
Phenyl glycidyl ether	122-60-1	**0.035**	**0.0000090**	**0.000017**
2-Propanol	67-63-0	**1,568**	**0.41**	**0.78**
Propylene glycol methyl ether	107-98-2	**659**	**0.17**	**0.33**
Stoddard solvent	8052-41-3	**2,762**	**0.72**	**1.4**
Styrene	100-42-5	**-**	**-**	**-**
Toluene	108-88-3	**3,397**	**0.88**	**1.7**
Trimethyl benzene	25551-13-7	**-**	**-**	**-**
Vinyl toluene	25013-15-4	**-**	**-**	**-**
VM & P naphtha	64742-89-8	**15,971**	**4.2**	**8.0**
Xylenes	1330-20-7	**19,364**	**5.0**	**9.7**

1 Total lb/hr values are calculated based on paint spraying occuring a maximum of 6 hrs/day.

Appendix D-4
Asphalt Coating
Tank Coating Process
Emission Rates

Product - HE107 - Asphalt Emulsion
Manufacturer - Henry Company

Product density	8.8404	lb/gal
Maximum annual product use by volume	200	gal/yr
Maximum annual product use by weight	1,768	lb/yr
Hours of coating per day	4	hrs/day
Transfer efficiency of coating process	100	%

Compound or Chemical	CAS	HAP	TAP	Percent of chemical in product	Chemical emitted (lb/yr)	Chemical emitted (lb/hr)[1]	Chemical emitted (ton/yr)
PM	-	-	-	-	0.0	0.0	0.0
PM_{10}	-	-	-	-	0.0	0.0	0.0
$PM_{2.5}$	-	-	-	-	0.0	0.0	0.0
VOC	-	-	-	53.0%	**937**	**0.642**	**0.469**
Acetone	67-64-1	-	x	-	-	-	-
Acetic acid	64-19-7	-	x	-	-	-	-
Ammonia	7664-41-7	-	x	-	-	-	-
Benzene	71-43-2	x	x	-	-	-	-
Benzene dimethyl	1330-20-7	-	x	-	-	-	-
Butyl acetate	123-86-4	-	x	-	-	-	-
Butyl alcohol (Butanol)	71-36-3	-	x	-	-	-	-
Crystalline silica[2]	14808-60-7	-	x	1.0%	**0.0**	**0.0**	**0.0**
Cumene	98-82-8	x	x	-	-	-	-
Diglycidyl ether	2238-07-5	-	x	-	-	-	-
Dimethyl phthalate	131-11-3	x	x	-	-	-	-
Ethyl benzene	100-41-4	x	x	-	-	-	-
Furfuryl alcohol	98-00-0	-	x	-	-	-	-
Heptanone	110-43-0	-	x	-	-	-	-
Hexamethlene-1,6-diisocyanate	822-06-0	x	x	-	-	-	-
Methyl ethyl ketone (MEK)	78-93-3	x	x	-	-	-	-
MEK peroxide	1338-23-4	-	x	-	-	-	-
Methyl isobutyl ketone (Hexone)	108-10-1	x	x	-	-	-	-
Mica group minerals	12001-26-2	-	x	-	-	-	-
1-Methoxy-2-propyl acetate	108-65-6	-	x	-	-	-	-
Phenyl glycidyl ether	122-60-1	-	x	-	-	-	-
2-Propanol	67-63-0	-	x	-	-	-	-
Propylene glycol methyl ether	107-98-2	-	x	-	-	-	-
Stoddard solvent	8052-41-3	-	x	-	-	-	-
Styrene	100-42-5	x	x	-	-	-	-
Toluene	108-88-3	x	x	-	-	-	-
Trimethyl benzene	25551-13-7	-	x	-	-	-	-
Vinyl toluene	25013-15-4	-	x	-	-	-	-
VM & P naphtha	64742-89-8	-	x	-	-	-	-
Xylenes	1330-20-7	x	x	-	-	-	-

1 Total lb/hr values are calculated based on coating occuring a maximum of 4 hrs/day.

2 There are no particulates emitted from this process. The coating is applied with rollers, resulting in VOC emissions but no PM emissions.

Appendix D-5
Grit Blasting Process
Emission Rates

Maximum quantity of grit used annually	30,000	lb/yr	
Maximum quantity of grit used per hour	25	lb/hr	
Emission factor	27	lb of particulates/1000 lb of grit [AP 42, 13.2.6-1]	
	13	lb of PM_{10}/1000 lb of grit [AP 42, 13.2.6-1]	
	1.3	lb of $PM_{2.5}$/1000 lb of grit [AP 42, 13.2.6-1]	
Wet Scrubber Control Efficiency	80%		
PM emissions	162	lb/yr	PM
	0.135	lb/hr	PM
	0.081	ton/yr	PM
PM_{10} emissions	78	lb/yr	PM_{10}
	0.065	lb/hr	PM_{10}
	0.039	ton/yr	PM_{10}
$PM_{2.5}$ emissions	7.8	lb/yr	PM_{10}
	0.0065	lb/hr	PM_{10}
	0.0039	ton/yr	PM_{10}

Appendix D-6
Welding Emissions
Emission Rates for PM_{10}

Type of Welding[1]	Type of Electrode	Emission Factor[2] (lb/1,000 lb electrode consumed)	Percentage Total Electrodes Used (%)	Electrodes Consumed lb/yr	$PM/PM_{10}/PM_{2.5}$ Emission Rate		
					lb/yr	lb/hr[3]	ton/yr
SMAW	E308	10.8	0.04%	22	0.24	2.8E-05	1.2E-04
SMAW	E6011	38.4	0.9%	449	17.2	2.0E-03	8.6E-03
SMAW	E7018	18.4	4.9%	2,456	45.2	5.2E-03	2.3E-02
SMAW	E7024	9.2	30.4%	15,209	139.9	1.6E-02	7.0E-02
GMAW	E70S	5.2	63.7%	31,863	165.7	1.9E-02	8.3E-02
	Total	**--**	**100.0%**	**50,000**	**368.3**	**4.2E-02**	**1.8E-01**

1 GMAW = Gas metal arc welding; SMAW = Shielded metal arc weldin
2 Emission factors from AP-42, Table 12.19-1 "PM-10 Emissions Factors for Welding Operations"
3 Based on 8760 hours of operation per year (two 12-hour shifts, 7 days per week)

Appendix D-7
Space Heaters in Manufacturing Shop
Emission Rates

Engine Unit:	**Space Heaters**	
Number of Units:	**15**	
Heat Input:	**40,000**	**Btu/hr**
Heating Value:	**1,000**	**Btu/ft^3**
Heating Rate:	**40**	**ft^3/hr**
Heating Rate:	**0.00004**	**10^6 ft^3/hr**
Fuel Type:	**Natural Gas**	
Hours of Operation:	**8,760**	

Pollutants	CAS	HAP	TAP	Emission Factor (lb/10^6 ft^3)	Emission Factor Source	Emission Rate Per Unit (lb/hr)	Emission Rate Per Unit (ton/yr)	**Total Emissions (lb/hr)**	**Total Emissions (ton/yr)**
Criteria Pollutants									
$PM/PM_{10}/PM_{2.5}$	-	-	-	7.6	AP 42 1.4-2	3.04E-04	1.33E-03	**4.56E-03**	**2.00E-02**
SO_2	-	-	-	0.6	AP 42 1.4-2	2.40E-05	1.05E-04	**3.60E-04**	**1.58E-03**
NO_x	-	-	-	94	AP 42 1.4-1	3.76E-03	1.65E-02	**5.64E-02**	**2.47E-01**
CO	-	-	-	40	AP 42 1.4-1	1.60E-03	7.01E-03	**2.40E-02**	**1.05E-01**
VOC	-	-	-	5.5	AP 42 1.4-2	2.20E-04	9.64E-04	**3.30E-03**	**1.45E-02**
Pb	-	-	-	0.0005	AP 42 1.4-2	2.00E-08	8.76E-08	**3.00E-07**	**1.31E-06**
Other Pollutants									
Benzene	71-43-2	x	x	2.10E-03	AP 42 1.4-3	8.40E-08	3.68E-07	**1.26E-06**	**5.52E-06**
Formaldehyde	50-00-0	x	x	7.50E-02	AP 42 1.4-3	3.00E-06	1.31E-05	**4.50E-05**	**1.97E-04**
Hexane	110-54-3	x	x	1.80E+00	AP 42 1.4-3	7.20E-05	3.15E-04	**1.08E-03**	**4.73E-03**
Naphthalene	91-20-3	x	x	6.10E-04	AP 42 1.4-3	2.44E-08	1.07E-07	**3.66E-07**	**1.60E-06**
PAHs	-	-	x	9.60E-06	AP 42 1.4-3	3.84E-10	1.68E-09	**5.76E-09**	**2.52E-08**
Pentane	109-66-0	-	x	2.60E+00	AP 42 1.4-3	1.04E-04	4.56E-04	**1.56E-03**	**6.83E-03**
Toluene	108-88-3	x	x	3.40E-03	AP 42 1.4-3	1.36E-07	5.96E-07	**2.04E-06**	**8.94E-06**
TOTAL HAPs	-	-	-	-	-	***7.52E-05***	***3.30E-04***	***1.13E-03***	***4.94E-03***

Appendix D-8
Space Heaters in Paint Building
Emission Rates

Engine Unit:	**Space Heaters**	
Number of Units:	**1**	
Heat Input:	**1,375,000**	**Btu/hr**
Heating Value:	**1,000**	**Btu/ft^3**
Heating Rate:	**1,375**	**ft^3/hr**
Heating Rate:	**0.00138**	**10^6 ft^3/hr**
Fuel Type:	**Natural Gas**	
Hours of Operation:	**8,760**	

Pollutants	CAS	HAP	TAP	Emission Factor (lb/10^6 ft^3)	Emission Factor Source	Emission Rate Per Unit (lb/hr)	Emission Rate Per Unit (ton/yr)	**Total Emissions (lb/hr)**	**Total Emissions (ton/yr)**
Criteria Pollutants									
$PM/PM_{10}/PM_{2.5}$	-	-	-	7.6	AP 42 1.4-2	1.05E-02	4.58E-02	**1.05E-02**	**4.58E-02**
SO_2	-	-	-	0.6	AP 42 1.4-2	8.25E-04	3.61E-03	**8.25E-04**	**3.61E-03**
NO_x	-	-	-	94	AP 42 1.4-1	1.29E-01	5.66E-01	**1.29E-01**	**5.66E-01**
CO	-	-	-	40	AP 42 1.4-1	5.50E-02	2.41E-01	**5.50E-02**	**2.41E-01**
VOC	-	-	-	5.5	AP 42 1.4-2	7.56E-03	3.31E-02	**7.56E-03**	**3.31E-02**
Pb	-	-	-	0.0005	AP 42 1.4-2	6.88E-07	3.01E-06	**6.88E-07**	**3.01E-06**
Other Pollutants									
Benzene	71-43-2	x	x	2.10E-03	AP 42 1.4-3	2.89E-06	1.26E-05	**2.89E-06**	**1.26E-05**
Formaldehyde	50-00-0	x	x	7.50E-02	AP 42 1.4-3	1.03E-04	4.52E-04	**1.03E-04**	**4.52E-04**
Hexane	110-54-3	x	x	1.80E+00	AP 42 1.4-3	2.48E-03	1.08E-02	**2.48E-03**	**1.08E-02**
Naphthalene	91-20-3	x	x	6.10E-04	AP 42 1.4-3	8.39E-07	3.67E-06	**8.39E-07**	**3.67E-06**
PAHs	-	-	x	9.60E-06	AP 42 1.4-3	1.32E-08	5.78E-08	**1.32E-08**	**5.78E-08**
Pentane	109-66-0	-	x	2.60E+00	AP 42 1.4-3	3.58E-03	1.57E-02	**3.58E-03**	**1.57E-02**
Toluene	108-88-3	x	x	3.40E-03	AP 42 1.4-3	4.68E-06	2.05E-05	**4.68E-06**	**2.05E-05**
TOTAL HAPs	-	-	-	-	-	***2.59E-03***	***1.13E-02***	***2.59E-03***	***1.13E-02***

12.19 Electric Arc Welding

NOTE: Because of the many Source Classification Codes (SCCs) associated with electric arc welding, the text of this Section will give only the first 3 of the 4 SCC number fields. The last field of each applicable SCC will be found in Tables 12.19-1 and 12.19-2 below.

12.19.1 Process Description[1-2]

Welding is the process by which 2 metal parts are joined by melting the parts at the points of contact and simultaneously forming a connection with molten metal from these same parts or from a consumable electrode. In welding, the most frequently used methods for generating heat employ either an electric arc or a gas-oxygen flame.

There are more than 80 different types of welding operations in commercial use. These operations include not only arc and oxyfuel welding, but also brazing, soldering, thermal cutting, and gauging operations. Figure 12.19-1 is a diagram of the major types of welding and related processes, showing their relationship to one another.

Of the various processes illustrated in Figure 12.19-1, electric arc welding is by far the most often found. It is also the process that has the greatest emission potential. Although the national distribution of arc welding processes by frequency of use is not now known, the percentage of electrodes consumed in 1991, by process type, was as follows:

Shielded metal arc welding (SMAW) - 45 percent
Gas metal arc welding (GMAW) - 34 percent
Flux cored arc welding (FCAW) - 17 percent
Submerged arc welding (SAW) - 4 percent

12.19.1.1 Shielded Metal Arc Welding (SMAW)[3] -

SMAW uses heat produced by an electric arc to melt a covered electrode and the welding joint at the base metal. During operation, the rod core both conducts electric current to produce the arc and provides filler metal for the joint. The core of the covered electrode consists of either a solid metal rod of drawn or cast material or a solid metal rod fabricated by encasing metal powders in a metallic sheath. The electrode covering provides stability to the arc and protects the molten metal by creating shielding gases by vaporization of the cover.

12.19.1.2 Gas Metal Arc Welding (GMAW)[3] -

GMAW is a consumable electrode welding process that produces an arc between the pool of weld and a continuously supplied filler metal. An externally supplied gas is used to shield the arc.

12.19.1.3 Flux Cored Arc Welding (FCAW)[3] -

FCAW is a consumable electrode welding process that uses the heat generated by an arc between the continuous filler metal electrode and the weld pool to bond the metals. Shielding gas is provided from flux contained in the tubular electrode. This flux cored electrode consists of a metal sheath surrounding a core of various powdered materials. During the welding process, the electrode core material produces a slag cover on the face of the weld bead. The welding pool can be protected from the atmosphere either by self-shielded vaporization of the flux core or with a separately supplied shielding gas.

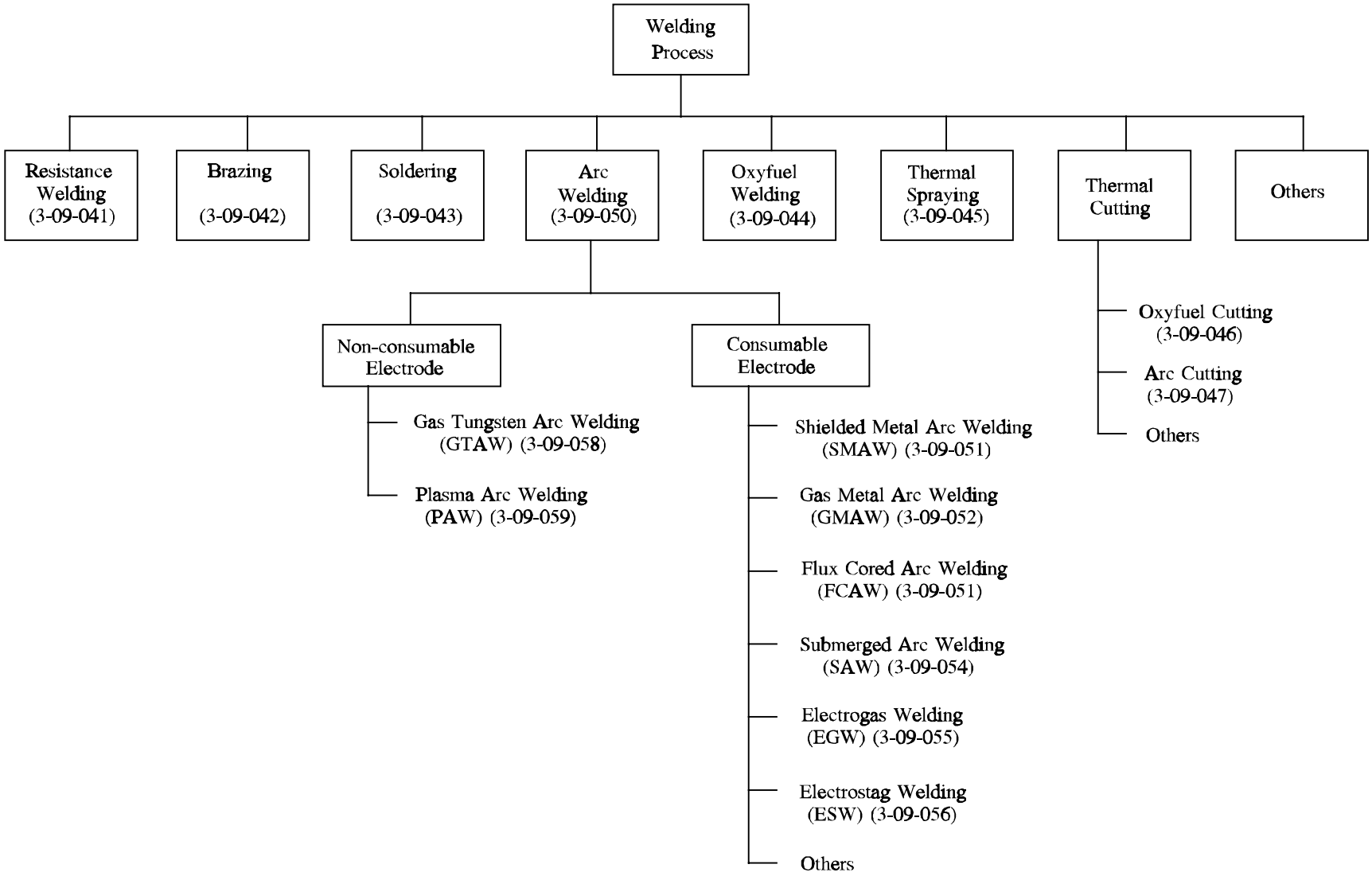


Figure 12.19-1. Welding and allied processes. (Source Classification Codes in parentheses.)

12.19.1.4 Submerged Arc Welding (SAW)[4] -

SAW produces an arc between a bare metal electrode and the work contained in a blanket of granular fusible flux. The flux submerges the arc and welding pool. The electrode generally serves as the filler material. The quality of the weld depends on the handling and care of the flux. The SAW process is limited to the downward and horizontal positions, but it has an extremely low fume formation rate.

12.19.2 Emissions And Controls[4-8]

12.19.2.1 Emissions -

Particulate matter and particulate-phase hazardous air pollutants are the major concerns in the welding processes. Only electric arc welding generates these pollutants in substantial quantities. The lower operating temperatures of the other welding processes cause fewer fumes to be released. Most of the particulate matter produced by welding is submicron in size and, as such, is considered to be all PM-10 (i. e., particles ≤ 10 micrometers in aerodynamic diameter).

The elemental composition of the fume varies with the electrode type and with the workpiece composition. Hazardous metals designated in the 1990 Clean Air Act Amendments that have been recorded in welding fume include manganese (Mg), nickel (Ni), chromium (Cr), cobalt (Co), and lead (Pb).

Gas phase pollutants are also generated during welding operations, but little information is available on these pollutants. Known gaseous pollutants (including "greenhouse" gases) include carbon dioxide (CO_2), carbon monoxide (CO), nitrogen oxides (NO_x), and ozone (O_3).

Table 12.19-1 presents PM-10 emission factors from SMAW, GMAW, FCAW, and SAW processes, for commonly used electrode types. Table 12.19-2 presents similar factors for hazardous metal emissions. Actual emissions will depend not only on the process and the electrode type, but also on the base metal material, voltage, current, arc length, shielding gas, travel speed, and welding electrode angle.

12.19.2.2 Controls -

The best way to control welding fumes is to choose the proper process and operating variables for the given task. Also, capture and collection systems may be used to contain the fume at the source and to remove the fume with a collector. Capture systems may be welding booths, hoods, torch fume extractors, flexible ducts, and portable ducts. Collection systems may be high efficiency filters, electrostatic precipitators, particulate scrubbers, and activated carbon filters.

Table 12.19-1 (Metric And English Units). PM-10 EMISSION FACTORS FOR WELDING OPERATIONS[a]

Welding Process	Electrode Type (With Last 2 Digits Of SCC)		Total Fume Emission Factor (g/kg [lb/10^3 lb] Of Electrode Consumed)[b]	EMISSION FACTOR RATING
SMAW[c] (SCC 3-09-051)	14Mn-4Cr	(-04)	81.6	C
	E11018	(-08)[h]	16.4	C
	E308	(-12)[j]	10.8	C
	E310	(-16)[k]	15.1	C
	E316	(-20)[m]	10.0	C
	E410	(-24)[n]	13.2	D
	E6010	(-28)	25.6	B
	E6011	(-32)	38.4	C
	E6012	(-36)	8.0	D
	E6013	(-40)	19.7	B
	E7018	(-44)	18.4	C
	E7024	(-48)	9.2	C
	E7028	(-52)	18.0	C
	E8018	(-56)[p]	17.1	C
	E9015	(-60)[q]	17.0	D
	E9018	(-64)[r]	16.9	C
	ECoCr	(-68)[s]	27.9	C
	ENi-Cl	(-72)	18.2	C
	ENiCrMo	(-76)[t]	11.7	C
	ENi-Cu	(-80)[u]	10.1	C
GMAW[d,e] (SCC 3-09-052)	E308L	(-12)[v]	5.4	C
	E70S	(-54)[w]	5.2	A
	ER1260	(-10)	20.5	D
	ER5154	(-26)	24.1	D
	ER316	(-20)[x]	3.2	C
	ERNiCrMo	(-76)[y]	3.9	C
	ERNiCu	(-80)[z]	2.0	C

Table 12.19-1 (cont.).

Welding Process	Electrode Type (With Last 2 Digits Of SCC)		Total Fume Emission Factor (g/kg [lb/10^3 lb] Of Electrode Consumed)[b]	EMISSION FACTOR RATING
FCAW[f,g] (SCC 3-09-053)	E110	(-06)[aa]	20.8	D
	E11018	(-08)	57.0	D
	E308LT	(-12)[bb]	9.1	C
	E316LT	(-20)[cc]	8.5	B
	E70T	(-54)[dd]	15.1	B
	E71T	(-55)[ee]	12.2	B
SAW[g] (SCC 3-09-054)	EM12K	(-10)[ff]	0.05	C

[a] References 7-18. SMAW = shielded metal arc welding; GMAW = gas metal arc welding; FCAW = flux cored arc welding; SAW = submerged arc welding. SCC = Source Classification Code.
[b] Mass of pollutant emitted per unit mass of electrode consumed. All welding fume is considered to be PM-10 (particles ≤ 10 µm in aerodynamic diameter).
[c] Current = 102 to 229 A; voltage = 21 to 34 V.
[d] Current = 160 to 275 A; voltage = 20 to 32 V.
[e] Current = 275 to 460 A; voltage = 19 to 32 V.
[f] Current = 450 to 550 A; voltage = 31 to 32 V.
[g] Type of shielding gas employed will influence emission factor.
[h] Includes E11018-M
[j] Includes E308-16 and E308L-15
[k] Includes E310-16
[m] Includes E316-15, E316-16, and E316L-16
[n] Includes E410-16
[p] Includes E8018C3
[q] Includes E9015B3
[r] Includes E9018B3 and E9018G
[s] Includes ECoCr-A
[t] Includes ENiCrMo-4
[u] Includes ENi-Cu-2
[v] Includes E308LSi
[w] Includes E70S-3, E70S-5, and E70S-6
[x] Includes ER316I-Si and ER316L-Si
[y] Includes ENiCrMo-3 and ENi-CrMo-4
[z] Includes ERNiCu-7
[aa] Includes E110TS-K3
[bb] Includes E308LT-3
[cc] Includes E316LT-3
[dd] Includes E70T-1, E70T-2, E70T-4, E70T-5, E70T-7, and E70T-G
[ee] Includes E71T-1 and E71T-11
[ff] Includes EM12K1 and F72-EM12K2

Table 12.19-2. HAZARDOUS AIR POLLUTANT (HAP) EMISSION FACTORS FOR WELDING OPERATIONS[a]

Welding Process	Electrode Type (With Last 2 Digits Of SCC)		HAP Emission Factor (10^{-1} g/kg [$10^{-1}/10^{3}$ lb] Of Electrode Consumed)[b]						EMISSION FACTOR RATING
			Cr	Cr(VI)	Co	Mn	Ni	Pb	
SMAW[c] (SCC 3-09-051)	14Mn-4Cr	(-04)	13.9	ND	ND	232	17.1	ND	C
	E11018	(-08)[h]	ND	ND	ND	13.8	ND	ND	C
	E308	(-12)[j]	3.93	3.59	0.01	2.52	0.43	ND	D
	E310	(-16)[k]	25.3	18.8	ND	22.0	1.96	0.24	C
	E316	(-20)[m]	5.22	3.32	ND	5.44	0.55	ND	D
	E410	(-24)[n]	ND	ND	ND	6.85	0.14	ND	C
	E6010	(-28)	0.03	0.01	ND	9.91	0.04	ND	B
	E6011	(-32)	0.05	ND	0.01	9.98	0.05	ND	C
	E6012	(-36)	ND	ND	ND	ND	ND	ND	ND
	E6013	(-40)	0.04	ND	< 0.01	9.45	0.02	ND	B
	E7018	(-44)	0.06	ND	< 0.01	10.3	0.02	ND	C
	E7024	(-48)	0.01	ND	ND	6.29	ND	ND	C
	E7028	(-52)	0.13	ND	ND	8.4612	ND	1.62	C
	E8018	(-56)[p]	0.17	ND	ND	0.3	0.51	ND	C
	E9016	(-60)	ND	ND	ND	ND	ND	ND	ND
	E9018	(-64)[q]	2.12	ND	ND	7.83	0.13	ND	C
	ECoCr	(-68)	ND	ND	ND	ND	ND	ND	ND
	ENi-Cl	(-72)	ND	ND	ND	0.39	8.90	ND	C
	ENiCrMo	(-76)[r]	4.20	ND	ND	0.43	2.47	ND	C
	ENi-Cu-2	(-80)[s]	ND	ND	ND	2.12	4.23	ND	C
GMAW[d,e] (SCC 3-09-052)	E308	(-12)[t]	5.24	ND	< 0.01	3.46	1.84	ND	C
	E70S	(-54)[u]	0.01	ND	< 0.01	3.18	0.01	ND	A
	ER1260	(-10)	0.04	ND	ND	ND	ND	ND	D
	ER5154	(-26)	0.10	ND	ND	0.34	ND	ND	D
	ER316	(-20)[v]	5.28	0.10	ND	2.45	2.26	ND	D
	ERNiCrMo	(-76)[w]	3.53	ND	ND	0.70	12.5	ND	B
	ERNiCu	(-80)[x]	< 0.01	ND	ND	0.22	4.51	ND	C

Table 12.19-2 (cont.).

Welding Process	Electrode Type (With Last 2 Digits Of SCC)		HAP Emission Factor (10^{-1} g/kg [10^{-1} lb/10^3 lb] Of Electrode Consumed)[b]						EMISSION FACTOR RATING
			Cr	Cr(VI)	Co	Mn	Ni	Pb	
FCAW[f,g] (SCC 3-09-053)	E110	(-06)[y]	0.02	ND	ND	20.2	1.12	ND	D
	E11018	(-08)[z]	9.69	ND	ND	7.04	1.02	ND	C
	E308	(-12)	ND	ND	ND	ND	ND	ND	ND
	E316	(-20)[aa]	9.70	1.40	ND	5.90	0.93	ND	B
	E70T	(-54)[bb]	0.04	ND	ND	8.91	0.05	ND	B
	E71T	(-55)[cc]	0.02	ND	< 0.01	6.62	0.04	ND	B
SAW[h] (SCC 3-09-054)	EM12K	(-10)	ND	ND	ND	ND	ND	ND	ND

[a] References 7-18. SMAW = shielded metal arc welding; GMAW = gas metal arc welding; FCAW = flux cored arc welding; SAW = submerged arc welding. SCC = Source Classification Code. ND = no data.
[b] Mass of pollutant emitted per unit mass of electrode consumed. Cr = chromium. Cr(VI) = chromium +6 valence state. Co = cobalt. Mn = manganese. Ni = nickel. Pb = lead. All HAP emissions are in the PM-10 size range (particles ≤ 10 µm in aerodynamic diameter).
[c] Current = 102 to 225 A; voltage = 21 to 34 V.
[d] Current = 275 to 460 A; voltage = 19 to 32 V.
[e] Type of shielding gas employed will influence emission factors.
[f] Current = 160 to 275 A; voltage = 22 to 34 V.
[g] Current = 450 to 550 A; voltage = 31 to 32 V.
[h] Includes E11018-M
[j] Includes E308-16 and E308L-15
[k] Includes E310-15
[m] Includes E316-15, E316-16, and E316L-16
[n] Includes E410-16
[p] Includes 8018C3
[q] Includes 9018B3
[r] Includes ENiCrMo-3 and ENiCrMo-4
[s] Includes ENi-Cu-2
[t] Includes E308LSi
[u] Includes E70S-3, E70S-5, and E70S-6
[v] Includes ER316I-Si
[w] Includes ERNiCrMo-3 and ERNiCrMo-4
[x] Includes ERNiCu-7
[y] Includes E110TS-K3
[z] Includes E11018-M
[aa] Includes E316LT-3
[bb] Includes E70T-1, E70T-2, E70T-4, E70T-5, E70T-7, and E70T-G
[cc] Includes E71T-1 and E71T-11

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APPENDIX E

ELECTRONIC MODELING FILES