Air Quality Permitting
Statement of Basis

August 25, 2003

Permit to Construct No. P-030408

The Sprinkler Shop, Inc., Paul

AIRS Facility No. 067-00020

Prepared by:

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Division of Technical Services

FINAL PERMIT

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Attachment A: Technical Analysis Memorandum, Emission Inventory, by Dan Pitman, Senior Engineer, dated June 26, 2003

Attachment B: Modeling Memorandum, by Dan Pitman, Senior Engineer, dated July 2, 2003

Acronyms, Units, and Chemical Nomenclatures

AACC	acceptable ambient concentration for carcinogens (in units of micrograms per cubic meter, annual average)
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
HAPs	hazardous air pollutants
IDAPA	A numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act.
lb/day	pound per day
lb/hr	pound per hour
lb/yr	pound per year
MACT	Maximum Achievable Control Technology
MMBtu	million British thermal units
NESHAP	Nation Emission Standards for Hazardous Air Pollutants
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
NSPS	New Source Performance Standards
PM	particulate matter
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
PSD	Prevention of Significant Deterioration
PTC	permit to construct
PTE	potential to emit
SIP	State Implementation Plan
SO_2	sulfur dioxide
T/yr	tons per year
VOC	volatile organic compound
°F	degrees Fahrenheit

1. PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 58.01.01.200, *Rules for the Control of Air Pollution in Idaho,* for issuing permits to construct.

2. PROJECT DESCRIPTION

The Sprinkler Shop, Inc. (Sprinkler Shop) is proposing to construct a hot-dip galvanizing operation for steel agricultural equipment.

3. FACILITY DESCRIPTION

The existing facility currently contains storage, fabrication, and welding operations for manufacturing agricultural equipment. Upon issuance of PTC No. P-030408, the facility will construct a galvanizing shop.

4. SUMMARY OF EVENTS

March 31, 2003	The DEQ received a payment of $1000.00 for the PTC application fee.
April 2, 2003	DEQ received an application for a PTC from the Sprinkler Shop, Inc.
April 16, 2003	DEQ declared the application incomplete and requested additional information.
May 7, 2003	DEQ received a response to the incompleteness determination letter. The submittal was dated May 1, 2003.
July 2, 2003	The PTC application was declared complete.

5. PERMIT HISTORY

This facility has had no previous permits.

6. TECHNICAL ANALYSIS

Process Description

The steel pieces are cleaned to prepare them for the galvanizing process. Grease and paint are removed by soaking the pieces in a hot alkali solution of sodium hydroxide. This solution has an emulsifying agent and a detergent. The pieces are then rinsed in water. After the water rinse the pieces are soaked in hydrochloric acid to remove rust. The steel pieces are then dipped in a fluxing agent of zinc ammonium chloride to prepare them for galvanizing. The steel pieces are dipped into a molten zinc bath for galvanizing at a temperature of 840°F. The molten zinc bath is referred to as the zinc kettle. Emissions from the zinc kettle are emitted to the atmosphere through a stack with an elevation of 35 feet.

The zinc kettle is heated by a small natural gas-fired furnace, which consists of 12 individual burners with a combined heat input capacity of approximately 1.2 million British thermal units per hour (MMBtu/hr).

Equipment List

- Sodium hydroxide tank
- Water bath tanks (3)
- Hydrochloric acid tanks (2)
- Zinc ammonium chloride (flux) tank
- Zinc kettle
- Natural gas-fired furnace unit – 1.2 MMBtu/hr

Emission Estimates

Refer to the emissions inventory technical analysis memorandum contained in Attachment A of this memorandum to review a detailed discussion of the emissions estimates.

The pollutants of primary concern for this project are PM_{10} and several TAPs. The pollutant emissions are primarily emitted by the zinc kettle and the zinc kettle furnace and are emitted in relatively small quantities.

The Stationary Source Program Office requested the PTC incorporate an additional 20% allowance in capacity and emissions limits for operational flexibility. This will only affect the zinc throughput and the emissions limits for the zinc kettle. The zinc kettle furnace's emissions have been evaluated on the stated capacity of the furnace, and have not been increased by the 20% additional allowance. The pollutants of concern are listed in Table 6.1.

Table 6.1 POLLUTANT EMISSIONS

Pollutant	Furnace Unit (lb/hr)	Zinc Kettle Fumehood Stack (Taken from Application) (lb/hr)	Zinc Kettle Fumehood Stack With Additional 20% Capacity (lb/hr)	Total Daily Emissions for the Zinc Kettle Fumehood at 24 hours per day (lb/day)
NO_x	0.0114			
CO	0.096			
PM	0.0087			
PM_{10}		0.25	0.30	7.2
SO_2	0.00068			
VOCs	0.0063			
Chromium	1.60E-6			
Ammonium chloride		0.17	0.020	0.48
Zinc oxide		0.041	0.049	1.18
Zinc chloride		0.0102	0.012	0.29
Zinc		0.0127	0.015	0.36

Table 6.2 provides a comparison of the various PM_{10} emissions rates used in this project's permitting analysis.

Table 6.2. ZINC KETTLE PM_{10} EMISSION RATE COMPARISON

Source of Emission Estimate	Hourly Emissions (lb/hr)	Annual Emissions (T/yr)
Applicant's submittal	0.25	1.10
Permit limit reflecting an additional 20% allowance	0.30	1.31
DEQ verification estimate	0.15	0.66

Modeling

Refer to the modeling review memorandum contained in Attachment B of this memorandum to review the modeling analysis for this project.

The modeling analysis conducted by DEQ included chromium, PM_{10}, SO_2, NO_2, and CO. The modeling successfully demonstrates that the proposed project will not cause or significantly contribute to a violation of any ambient air quality standard.

This project creates emissions of several regulated TAPs. The modeling memo in Attachment B indicates that the emission of hexavalent chromium (Cr^{+6}) is the only TAP that exceeded the hourly screening emission level listed in IDAPA 58.01.01.585 and 01.586. The chromium emissions are created by the combustion of natural gas in the furnace. The modeling demonstrates that the proposed project will comply with the acceptable ambient concentration for carcinogens (AACC) for hexavalent chromium. All other TAP emissions were below the screening emissions limits specified in IDAPA 58.01.01.585 and 01.586.

Facility Classification

The facility is classified as a B source, because potential emissions for each criteria pollutant are below 100 T/yr, and potential emissions for aggregated HAPs are below 25 T/yr and are less than 10 T/yr for any individual HAP. The facility is not a designated facility as defined by IDAPA 58.01.01.006.27. Even though this facility will operate a zinc galvanizing operation, the standard industrial classification code of the facility is 3523–Farm Machinery and Equipment. This classification is established by the end use of the products manufactured. This facility is not affected by NSPS or NESHAP regulations.

Area Classification

The facility is located near Paul, Idaho, which is in Minidoka County, Air Quality Control Region 63, Zone 12. This area is unclassifiable for all criteria pollutants (NO_2, SO_2, PM_{10}, VOCs (ozone), CO, and lead.

7. PERMIT REQUIREMENTS

Regulatory Review

This PTC is subject to the following permitting requirements:

IDAPA 58.01.01.201 ..... Permit to Construct Required

This project involves the construction of a new zinc galvanizing operation at an existing facility. This constitutes a modification in accordance with IDAPA 58.01.01.006.58. The facility is not a major facility; and therefore, this project is required to demonstrate compliance with IDAPA 58.01.01.203.

The furnace is exempted from the PTC under IDAPA 58.01.01.222.02(c), Category II Exemption – Other Exempt Sources. This exemption provision does not require that the emissions unit demonstrate compliance with National Ambient Air Quality Standards. TAPs emissions of hexavalent chromium were determined to comply with IDAPA 58.01.01.223.02(b) by demonstrating that the uncontrolled ambient concentration will be less than the AACC at the point of compliance. This is a Level I exemption for TAPs emissions. This memorandum qualifies as documentation that the permittee may submit for annual Level I exemption reporting requirement specified by IDAPA 58.01.01.223.05.

IDAPA 58.01.01.210 ..... Demonstration of Preconstruction Compliance with Toxic Standards

The zinc galvanizing process creates emissions of ammonium chloride, zinc oxide, zinc chloride, zinc, and very small amounts of ammonia. The emissions of these TAPs were less than the screening levels listed under IDAPA 58.01.01.585.

Chromium emissions were not increased for the operational flexibility allowance. Chromium emissions required an ambient impact analysis to demonstrate compliance with the applicable AACC. Hexavalent chromium emissions from the furnace exceeded the screening level listed under IDAPA 58.01.01.586; therefore, ambient impact modeling was conducted, and the results were determined to be less than the applicable AACC. The provisions of IDAPA 58.01.01.210 have been satisfied. Refer to Table 7.1 to review the TAPs emissions levels.

Table 7.1. TOXIC AIR POLLUTANT EMISSIONS AND IDAPA 58.01.01.585 AND .01.586 EMISSIONS LEVELS

Pollutant	Project Emissions Rate (lb/hr)[a]	Project Emissions Rate at 120% of Requested Throughput (lb/hr)[a]	Screening Emissions Level (lb/hr)	Listing in IDAPA 58.01.01 et seq.	Meets or Exceeds the EL[b]
Chromium	1.6E-6	NA[c]	5.6E-7	01.586	Exceeds
Ammonium chloride	0.17	0.20	0.667	01.585	Meets
Zinc oxide (fume)	0.041	0.05	0.333	01.585	Meets
Zinc chloride	0.0102	0.012	0.067	01.585	Meets
Zinc	0.0127	0.015	0.667	01.585	Meets

[a] pounds per hour
[b] emissions limit
[c] Not applicable

40 CFR 52 ..... Prevention of Significant Deterioration

This facility is not an existing major facility as defined in IDAPA 58.01.01.006.55, therefore PSD requirements do not apply.

40 CFR 60 ..... New Source Performance Standards

This source is not an affected facility for any NSPS requirements.

40 CFR 61 and 63..... National Emission Standards for Hazardous Air Pollutants and Maximum Achievable Control Technology (MACT)

This is not an affected facility for any NESHAPs or MACT requirements.

7.1 Zinc Kettle Emissions Limits

PM_{10} Emissions

Daily and annual PM_{10} emissions limits were included for PM_{10} from the zinc kettle stack. The applicant's emission estimates were increased by an additional 20% to allow for operational and compliance flexibility per Stationary Source Program Office direction. Permitted emissions do not approach any permitting threshold due to the 20% increase. The hourly PM_{10} emission rate is directly related to the amount of zinc material added to the zinc kettle, which equates to 72 lb/hr. The hourly pollutant emission rate was used to establish a worst-case daily PM_{10} emission limit of 7.2 lb/day. This limitation supports the averaging period for the 24-hour PM_{10} NAAQS. Annual PM_{10} emissions are based on unrestricted operation of 24 hours per day and 365 days per year for a total of 8,760 hours per year.

Opacity

The application materials indicated that there is a potential for visible emissions to be caused by the zinc kettle operation. The fumes from this part of the process are collected by a fumehood and are then exhausted as a point source through a stack. Therefore, the opacity limitation specified in IDAPA 58.01.01.625 applies to the zinc kettle stack.

Process Weight Rate PM Limitation

A process weight rate limitation, specified by IDAPA 58.01.01.701, applies to this source. However, because the zinc kettle emissions unit is limited to less than 1 lb/hr of PM emissions through the 0.30 lb/hr PM_{10} emissions rate reflected in the daily PM_{10} emission limitation. The PM_{10} emissions limit is considered more stringent than the 1 lb/hr PM limit, so the process weight rate limitation is subsumed by the PM_{10} emissions limit.

Reasonable Control of Fugitive Emissions

Standard Permit Condition 2.6 was included in the PTC for sources with the potential to cause fugitive dust emissions.

7.2 Compliance Demonstration

PM_{10} Emissions/Zinc Addition Limit

The permittee is required to monitor and record the amount of zinc that is added to the zinc kettle on a daily basis. The amount of zinc added, in pounds per day (lb/day), for each 24-hour period must be recorded. Compliance with the 1,728 lb/day limit on zinc addition will be determined with the resulting value.

Daily zinc addition values in pounds per day must be summed for each one-month period. The monthly amount of zinc addition must then be added to for each consecutive 12-month period to determine the annual material addition in units of pounds per year (lb/yr). An annual zinc addition amount must be generated for that 12-month period, which will be used to establish compliance with the 630,720 lb/yr limit on zinc addition.

Compliance with the throughput limitation is deemed adequate as a surrogate compliance demonstration for the PM_{10} emissions limits.

Opacity

Significant visible emissions are not anticipated from this source. However, since there is a potential for visible emissions to be created by the process and exhausted from the stack, the permittee must determine that visible emissions are not a violation. Permit Condition 2.9 addresses the methods the permittee must use to demonstrate compliance with the opacity limit, which is specified by IDAPA 58.01.01.625 and Permit Condition 2.4. A see/no see evaluation method is provided for in the permit, which allows the permittee two options in the event **any** visible emissions are noted. The permittee may either perform a valid Method 9 visible emissions evaluation by following the methods required by IDAPA 58.01.01.625, or may take corrective action and document the steps taken to correct the cause(s) of the visible emissions as specified in Permit Condition 2.9.

8. AIRS INFORMATION

Table 8.1 AIRS/AFS[a] FACILITY-WIDE CLASSIFICATION[b] DATA ENTRY FORM

AIR PROGRAM / POLLUTANT	SIP	PSD	NSPS (Part 60)	NESHAP (Part 61)	MACT (Part 63)	TITLE V	AREA CLASSIFICATION[1] A – Attainment U – Unclassifiable N – Nonattainment
SO_2	B						
No_x	B						
CO	B						
PM_{10}	B						
PT (Particulate)							
VOC	B						
THAP (Total HAPs)	B						
			APPLICABLE SUBPART				

[a] Aerometric Information Retrieval System (AIRS) Facility Subsystem (AFS)

[b] AIRS/AFS Classification Codes:

A = Actual or potential emissions of a pollutant are above the applicable major source threshold. For NESHAP only, class "A" is applied to each pollutant which is below the 10 T/yr threshold, but which contributes to a plant total in excess of 25 T/yr of all NESHAP pollutants.

SM = Potential emissions fall below applicable major source thresholds if and only if the source complies with federally enforceable regulations or limitations.

B = Actual and potential emissions below all applicable major source thresholds.

C = Class is unknown.

ND = Major source thresholds are not defined (e.g., radionuclides).

9. FEES

The Sprinkler Shop paid the $1,000 application fee as required in IDAPA 58.01.01.224 on March 31, 2003.

A PTC processing fee of $2,500 was required in accordance with IDAPA 58.01.01.225 because the increase in emissions from the modification was 3.5 T/yr as indicated in Table 9.1. The processing fee was received on September 16, 2003.

The Sprinkler Shop facility is not a major facility as defined in IDAPA 58.01.01.008.10. Therefore, registration fees are not applicable in accordance with IDAPA 58.01.01.387.

Table 9.1 EMISSIONS INVENTORY

Emissions Inventory			
Pollutant	Annual Emissions Increase (T/yr)[a]	Annual Emissions Reduction (T/yr)	Annual Emissions Change (T/yr)
NO_X[b]	0.50	0	0.50
SO_2[c]	0.003	0	0.003
CO[d]	0.42	0	0.42
PM_{10}[e]	1.34	0	1.34
VOC[f]	0.028	0	0.028
TAPs/HAPs[g]	1.25	0	1.25
Total:	3.541	0	**3.541**
Fee Due	$ 2,500.00		

[a] tons per year
[b] nitrogen oxides
[c] sulfur dioxide
[d] carbon monoxide
[e] particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
[f] volatile organic compound
[g] toxic air pollutants/hazardous air pollutants

10. RECOMMENDATION

Based on review of application materials and all applicable state and federal rules and regulations, staff recommend that The Sprinkler Shop be issued PTC No. P-030408 for the construction of a zinc galvanizing process. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

DAM/sm P-030408

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Attachment A

Technical Analysis Memorandum, Emission Inventory

by Dan Pitman, Senior Engineer

dated June 26, 2003

Technical Analysis

June 26, 2003

The Sprinkler Shop, Paul, Idaho

P-030408

Prepared by:

Dan Pitman, Senior Engineer
Division of Technical Services

Acronyms, Units, and Chemical Nomenclatures

Btu	British thermal unit
CO	carbon monoxide
Department	Department of Environmental Quality
DEQ	Department of Environmental Quality
EPA	Environmental Protection Agency
lb/hr	pound per hour
m	meter(s)
MMBtu	Million British thermal units
NO_2	nitrogen dioxide
NO_X	nitrogen oxides
PM	Particulate Matter
PM-10	Particulate Matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SO_2	sulfur dioxide
T/yr	Tons per year
$\mu g/m^3$	micrograms per cubic meter

PURPOSE

The purpose for this memorandum is to review the validity of the emissions estimates submitted by the Sprinkler Shop for a zinc galvanizing process.

PROJECT DESCRIPTION

The Sprinkler Shop is proposing to construct a zinc galvanizing shop.

TECHNICAL ANALYSIS

Process Description

Grease and paint are removed from base metal by soaking in a hot sodium hydroxide solution, then rinsing in water. Then the base metal is soaked in hydrochloric acid to remove rust and next, soaked in zinc ammonium chloride or "flux". Finally, the base metal is dipped into a bath of molten zinc (the zinc kettle). The molten zinc is kept at a temperature of approximately 840 degrees Fahrenheit. Emissions from the zinc kettle are emitted to the atmosphere through a 35-foot tall stack.

Equipment Listing

Sodium hydroxide tank
Water bath tanks (3)
Hydrochloric acid tanks (2) – (3 feet by 9 feet)
Zinc ammonium chloride (flux) tank
Zinc kettle
Natural gas combustion – 1.2 MMBtu/hr

Emission Estimates

Emission from the sodium hydroxide tank, water bath tanks, and flux tanks are assumed to be negligible. The primary sources of emissions are the hydrochloric acid tanks, the zinc kettle, and natural gas combustion.

No emission factors were available for the zinc ammonium chloride (flux) tanks. The applicant assumed the emissions were negligible. Zinc ammonium chloride is not listed as a toxic air pollutant. However, the William Blythe Company published a Chemical Safety Data Sheet (see Attachment A) which includes an occupational exposure level for zinc ammonium chloride at 4,000 micrograms per cubic meter 8-hour time-weighted average (TWA). The state of Idaho's acceptable ambient concentrations for non-carcinogens is based on the 8-hour TWA divided by 20; for zinc ammonium chloride this equals 4,000/20 or 200 micrograms per cubic meter 24-hour average concentration. This is higher than the PM-10 National Ambient Air Quality Standard. Based on this information and the fact that zinc ammonium chloride will be in solution the applicant's assumption that emissions will be negligible relative to its toxicity is accepted.

Boiler Emissions

Boiler emissions estimates were made using EPA AP-42[1], Section 1.4 dated July 1998. Pounds per hour and tons per year emission estimates were made assuming the boiler operates at maximum capacity year round. Emission estimates may be seen in Attachment B as can the toxic air pollutant emission inventory. Table 1 gives a summary of the criteria air pollutant emission rate estimates.

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[1] *Compilation of Air Pollutant Emission Factors* (AP-42), Fifth Edition, Volume I: *Stationary Point and Area Sources* Section 1.4, U. S. Environmental Protection Agency, Washington, DC, July 1988.

Table 1. Summary of Natural Gas Combustion Emission Estimates

Nitrogen Oxides		Carbon Monoxide		Particulate Matter		Sulfur Dioxide		VOC[1]	
lb/hr[2]	T/yr[3]	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr	lb/hr	T/yr
0.114	0.5	0.096	0.42	0.0087	0.038	0.00068	0.003	0.0063	0.0276

1. volatile organic compounds
2. pounds per hour
3. tons per year

Hydrochloric Acid Tanks

There are two 3-foot by 9-foot hydrochloric acid tanks. The applicant estimated hydrochloric acid emissions from the tank using Texas Commission on Environmental Quality data. The hydrochloric acid emission rate is 0.0009 pounds of hydrochloric acid per square feet of exposed liquid per hour. Each tank is 27 square feet, for a total of 54 square feet. Hydrochloric acid emissions are then estimated at 0.049 pounds per hour. The applicant's emission estimate calculation may be seen in Attachment C.

Uncontrolled hydrochloric acid emissions are estimated to be 0.049 pounds per hour, which is less than the toxic air pollutant screening emission value for hydrochloric acid of 0.05 pounds per hour. Therefore, air pollutant dispersion modeling is not required for hydrochloric acid.

Zinc Kettle Emissions

Using an emission factor of 0.52 pounds of PM-10 per ton of production, the applicant estimated particulate emissions from the zinc kettle at 0.25 pounds of PM-10 per hour. The applicant did not document the source of this emission factor.

DEQ performed a confirmatory emission calculation using information published in *Emission Estimation Technique Manual for Galvanizing*[2], which gives an emission factor of 2.5 kilograms PM-10 per metric ton of zinc. This factor was used to establish how many pounds of zinc may be used to emit 0.25 pounds of PM-10 per hour. The amount of zinc that may be used is 100 pounds per hour or 2,400 pounds per day. Therefore, limiting the process to 60 pounds per hour of zinc (or 1,440 pounds per day), as proposed by the applicant is acceptable based on this confirmatory emission assessment. Table 2 gives a summary of the emission factor and emission estimates for PM-10 emissions from the zinc kettle. Emission estimate calculations may be seen in Attachment D.

Table 2. PM-10 Emissions From the Zinc Kettle

PM-10 Emission Factor (Kg/metric ton zinc)[1]	Zinc Usage Rate (lb/hr)[2]	Emission Rate (lb/hr)	PM-10 Emission Rate (T/yr)[3]
2.5	60	0.15	0.657

1. kilograms per ton of zinc
2. pounds per hour
3. tons per year

The Department used the applicant's emission estimate of 0.25 pounds per hour of PM-10 in the air dispersion modeling exercise, even though the Department's confirmatory emission estimate was 0.15 pounds per hour. Modeling emissions at the higher emission rate provides a level of conservatism in the ambient impact assessment.

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[2] National Pollutant Inventory, *Emission Estimation Technique Manual for Galvanizing*, Version 1.1, Environment Australia-Commonwealth of Australia, February 8, 2001.
http://www.npi.gov.au/handbooks/approved_handbooks/fgalvan.html

The applicant estimated toxic air pollutant emissions from the zinc kettle using EPA AP-40[3], Table 114. This table gives the chemical analysis of particulate matter collected in a baghouse that was used to control emissions from a zinc kettle. This methodology of estimating emissions of toxic air pollutants is accepted as accurate enough due to the relatively low toxicity of the air pollutants that are expected to be emitted and the overall low predicted ambient impact of toxic pollutants. Table 3 summarizes this argument. This table shows that emission estimates may be off by a factor of 18 times and still not cause an unacceptable ambient impact.

Table 3. Toxic Pollutant Summary

Pollutant	AP-40 Chemical Speciation of Particulate Captured in a Baghouse	Estimated Emissions Based on PM Emissions at 0.25 lb/hr[1]	Estimated Ambient Impact ($\mu g/m^3$)[2] 24 Hour Average	Acceptable Ambient Impact ($\mu g/m^3$)[2] 24 Hour Average
Ammonium chloride	68%	(.68)*(.25)= 0.17	11.2	500
Zinc Oxide	16%	0.041	2.7	50
Zinc Chloride	4%	0.0102	0.67	50
Zinc	5%	0.0127	0.84	500

1. pounds per hour
2. micrograms per cubic meter

Small quantities of ammonia are also expected to be emitted. The emission rate of ammonia is expected to be much less than the toxic emission screening value of 1.2 pounds per hour as indicated by EPA AP-40, Table 114 and the applicant's emission estimate of 0.0025 pounds per hour.

Stack Parameter Basis

Table 4 lists stack parameters provided by the applicant.

The zinc kettle stack gas velocity and the boiler stack gas velocity were adjusted to 0.001 meters per second (or 0.0033 feet per second) because the stacks will have rain caps.

Table 4. Stack Parameters

Emission Unit	Stack Height (ft)	Stack Diameter (ft)	Gas Velocity (fps)[1]	Stack Temp. (°K)[2]
Boiler	25	1.0	0.0033	699
Zinc Kettle	35	1.0	0.0033	293

1. feet per second
2. Kelvin

Operating Parameters

The boiler, sodium hydroxide tank, hydrochloric acid tanks and zinc ammonium chloride (flux) tank may be operated without the need for any controls or restrictions on operations.

Emissions from the zinc kettle must be limited by the amount of zinc that is used. Zinc usage must be limited to 60 pounds per hour, or 1,440 pounds per day, in order for the emission estimates in this analysis to be valid.

No air pollution control devices are used by this facility.

[3] *Air Pollution Engineering Manual*, Second Edition, U.S. Environmental Protection Agency, May 1973.

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Attachment A

Chemical Safety Data Sheet

William Blythe

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY UNDERTAKING

Chemical Name	**Zinc Ammonium Chloride Triple Salt**
Synonyms	Dross Salt
Chemical Formula	$ZnCl_2.3NH_4Cl$
Supplier	William Blythe Limited, Church, Accrington, Lancashire, BB5 4PD, England.
Emergency Telephone Number	(01254) 320000 [International +44 1254 320000]
Emergency Fax Number	(01254) 320001

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS-No	%	EINECS-NR	EC-No	Symbol(s)	R-phrase(s)
Zinc Chloride	7646-85-7	55.5	231-592-0	231-592-0	C - Corrosive	34
Ammonium Chloride	12125-02-9	42.5	235-186-4	235-186-4	Xn - Harmful	22, 36
Zinc AmmoniumChloride Triple Salt	14639-98-6	98	Not available	N/A	C - Corrosive	34
Optional Wetting Agent(Non-hazardous)		<0.5				

3. HAZARDS IDENTIFICATION

Physical/Chemical hazards	No significant chemical hazard.
Environmental hazards	Toxic to aquatic organisms.
Human health hazards	Corrosive to skin and eyes on prolonged contact. Harmful if swallowed.

4. FIRST AID MEASURES

Effects and symptoms	
Ingestion	Ingestion may cause nausea and vomiting.
Inhalation	Prolonged exposure may cause irritation.
Skin contact	Skin irritation can lead to dermatitis.
Eye contact	Eye irritation.
First aid measures	
Ingestion	Immediately give plenty of water to drink. Call a physician immediately.
Inhalation	Move to fresh air.
Skin contact	Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.
Eye contact	Rinse thoroughly with plenty of water, also under the eyelids. If eye irritation persists, consult a specialist.

5. FIRE-FIGHTING MEASURES

Flammability	Non-flammable.
Suitable extinguishing media	
Suitable	Water, dry powder, foam, carbon dioxide (CO2).
Not suitable	
Hazardous decompostion products	Zinc Chloride and Ammonium Chloride fumes.
Special protective equipment for firefighters	Wear self-contained breathing apparatus and protective suit.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Wear suitable gloves and eye/face protection.
Environmental precautions	Do not let product enter drains. Do not flush into surface water or sanitary sewer system. Contact the proper local authorities if spillage seeps into water bodies.
Methods for cleaning up	Sweep up and shovel into suitable containers for disposal. Do not allow material to contaminate ground water system.

7. HANDLING AND STORAGE

Storage / Handling	No special storage conditions required.
Packaging Material	
Suitable	Polyethylene containers.
Not Suitable	Mild steel.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

National Occupational Exposure limits	
Chemical Name	Zinc Chloride Anhydrous : Ammonium Chloride.
OEL (United Kingdom)	Zinc Chloride/Ammonium Chloride : 10 mg/m^3 8-hour TWA Total Inhalable Dust 4 mg/m^3 8-hour TWA Respirable Dust. Ammonium Chloride : Fume : 10 mg/m^3 8-hour TWA. : 20 mg/m^3 15-minute. Zinc Chloride : Fume : 1 mg/m^3 8-hour TWA. : 2 mg/m^3 15-minute.
Recommended monitoring procedures	
Personal protection equipment	
Respiratory protection	
Skin and body protection	Protective suit.
Hand protection	Rubber or plastic gloves.
Eye protection	Goggles.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	Crystalline solid.
Colour	White.
Odour	None.
Molecular weight	Not applicable.
Boiling Point / range	
Melting point / range	>200'C
Freezing point	
Decomposition temperature	
Bulk Density	
Specific gravity (H_2O = 1)	
pH	5 (10%)
Solubility	>50% w/w

10. STABILITY AND REACTIVITY

Stability	Stable.
Conditions to avoid	Excessive heating.
Materials to avoid	Concentrated Sulphuric Acid liberates Hydrogen Chloride gas. Hot caustic soda liberates ammonia vapour.
Hazardous decomposition products	Zinc chloride fume/Ammonium Chloride fume.

11. TOXICOLOGICAL INFORMATION

Main Constituent(s)	Zinc Chloride Anhydrous (component contributing main toxicity effects).
Acute toxicity	
Oral	LD50/oral/rat = 350 mg/kg. Harmful if swallowed.
Inhalation	TCLo, Inhalation, human = 4800 mg/m3/3H. Causes pulmonary changes.
Chronic toxicity	Reproductive effector.
Skin irritation	Severe skin irritation.
Eye irritation	Severe eye irritation.
Carcinogenicity	Questionable carcinogen with experimental tumorigenic effects.
Mutagenicity	Human mutation data reported. Mutation, Cytogenic analysis, Human/Lymphocytes = 300 micromol/L.

12. ECOLOGICAL INFORMATION

Persistence and degradability	Not Biodegradable - highly water contaminating.
Ecotoxicity effects	Known to be toxic to aquatic organisms - no data available.

13. DISPOSAL CONSIDERATIONS

Methods of disposal	Must be disposed of in accordance with local and national legislation
Other Information	

14. TRANSPORT INFORMATION

UN-No	1759.
IMDG/ADR Class	8 - Corrosive.
IATA Class	8 - Corrosive
UN Packing group	* III

15. REGULATORY INFORMATION

EC Regulations	
EC Classification (67/548/EEC-88/379/EEC - 92/32/EEC)	C - Corrosive
Label name	ZINC AMMONIUM CHLORIDE TRIPLE SALT.
R-phrases(s)	R34 - Causes burns.
S-phrases(s)	S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Symbols

Corrosive

16. OTHER INFORMATION

History

Date of issue	09/18/2001	Previous Revision	2
Revision Number	3	Date Previous SDS	05/17/1999
SDS prepared by	SB		
SDS revised by	SB		

* Denotes changes from last revision

The above information is based on current knowledge at the time of publication and is given in good faith. William Blythe implies no warranty as to the suitability of the product for any particular purpose. Purchasers should make their own tests to determine the suitability of this product for a particular purpose. Reference should be made to a Product Data Sheet regarding the quality or specification of the product.

The information contained in this data sheet does not constitute an assessment of workplace risks.

This safety data sheet complies with directive 91/155/EEC as amended by 93/112/EEC and 96/54/EC.

The reference sources used in preperation of this data include:
The Chemical (Hazard Information and Packaging for Supply) (Amendment) Regulations 1997 and related ACOP's
EH 40 Occupational Exposure limits
Registry of Toxic Effects of Chemical Substances
The Dictionary of substances and their Effects 1992. Richardson/Gangolli
Dangerous Properties of industrial Materials, 8th Edn. Sax/Lewis

Attachment B

The Sprinkler Shop

Natural Gas Combustion 1.20E+06 Btu/hr

Emission Factors are from AP-42 Section 1.4, 7/98 (< 100E6 Btu/hr)

Pollutant	Emission Factor (lb/1E6scf)	Emission Rate (lb/hr)	Screening Emission Rate (lb/hr)	Meets or exceeds screening level
NOx	100	1.14E-01		
CO	84	9.60E-02		-
PM	7.6	8.69E-03		
SO2	0.6	6.86E-04		
VOC	5.5	6.29E-03		
2-Methylnaphthalene	2.45E-05	2.80E-08		
3-Methylchloranthrene	1.80E-06	2.06E-09		
7,12-Dimethylbenz(a)anthracene	1.60E-05	1.83E-08		
Acenaphthene	1.80E-06	2.06E-09		
Acenaphthylene	1.80E-06	2.06E-09		
Anthracene	2.40E-06	2.74E-09		
Benz(a)anthracene (1)	1.80E-06	2.06E-09		
Benzene	2.10E-03	2.40E-06	8.00E-04	Meets
Benz(a)pyrene (1)	1.20E-06	1.37E-09	2.00E-06	Meets
Benzo(b)fluoranthene (1)	1.80E-06	2.06E-09		
Benzo(g,h,I)perylene	1.20E-06	1.37E-09		
Benzo(k)fluoranthene (1)	1.80E-06	2.06E-09		
Butane	2.10E+00	2.40E-03		
Chrysene (1)	1.80E-06	2.06E-09		
Dibenzo(a,h)anthracene (1)	1.20E-06	1.37E-09		
Dichlorobenzene	1.20E-03	1.37E-06	0.333	Meets
Ethane	3.10E+00	3.54E-03		
Fluoranthene	3.00E-06	3.43E-09		
Fluorene	2.80E-06	3.20E-09		
Formaldehyde	7.50E-02	8.57E-05	5.10E-04	Meets
Hexane	1.80E+00	2.06E-03	12	Meets
Indeno(1,2,3-cd)pyrene (1)	1.80E-06	2.06E-09		
Naphthalene	6.10E-04	6.97E-07	3.33	Meets
PAH (2)	1.14E-05	1.30E-08	9.10E-05	Meets
Pentane	2.60E+00	2.97E-03	118	Meets
Phenanathrene	1.70E-05	1.94E-08		
Arsenic	2.00E-04	2.29E-07	1.50E-06	Meets
Barium	4.40E-03	5.03E-06	0.033	Meets
Beryllium	1.20E-05	1.37E-08	2.80E-05	Meets
Cadmium	1.10E-03	1.26E-06	3.76E-06	Meets
Chromium	1.40E-03	1.60E-06	5.60E-07	Exceeds
Cobalt	8.40E-05	9.60E-08	0.0033	Meets
Copper	8.50E-04	9.71E-07	0.013	Meets
Manganese	3.80E-04	4.34E-07	0.067	Meets
Mercury	2.60E-04	2.97E-07	0.003	Meets
Molybdenum	1.10E-03	1.26E-06	0.333	Meets
Nickel	2.10E-03	2.40E-06	2.70E-05	Meets
Selenium	2.40E-05	2.74E-08	0.013	Meets
Vanadium	2.30E-03	2.63E-06	0.003	Meets
Zinc	2.90E-02	3.31E-05	0.667	Meets

(1) Compounds which make up PAH
(2) Sum of emission factors which make up PAH

Attachment C

GTI ENGINEERING

HCL PICKLE TANK EMISSIONS CALCULATIONS
TCEQ HOT DIP GALVANIZING FACILITY CALCULATION SHEET

SOURCE NAME	SOURCE ID
TANK 1	T1

SOURCE DIMENSIONS	LENGTH	WIDTH	DEPTH
FEET	9	3	4
METERS	2.7	0.9	1.2

A=TANK SURFACE AREA	27	SQ FT		2.5 SQ M
T=OPERATING TEMPERATURE -C	30	DEGREES		
C=CONCENTRATION HCL WT%	16.0	%	TCEQ DATA	
V=AIR VELOCITY ACROSS TANK	1.0	FPS	TCEQ DATA	
P=VAPOR PRESSURE HCL	0.106	MM HG	TCEQ DATA	
E=EVAPORATION RATE	0.0009	LB/HR SQ FT	TCEQ DATA*	

ER1=EVAPORATION TOTAL	0.02	LB/HR	0.01	KG/HR
FE=SUPRESSANT EFFICIENCY	0.5		0.5	
CE=HOOD CAPTURE EFFICIENCY	DNA		DNA	
AE=ABATEMENT DEVICE EFFICIENCY	DNA		DNA	
ER4=EMISSION RATE CONTROLLED	0.01	LB/HR	0.01	KG/HR
FUG=FUGATIVE EMISSIONS	0.01	LB/HR	0.00	KG/HR
OY=OPERATING HOURS/YEAR	8760	HOURS	8760	HOURS
AFUG=ANNUAL FUGATIVE EMISSIONS	0.03	TONS/YR	0.02	MTONS/YR
AER=ANNUAL RATE ABATED	DNA		DNA	

TCEQ = TEXAS COMISSION ON ENVIRONMENTAL QUALITY
* EVAPORATION RATE CALCULATED AT STANDARD CONDITIONS

This emission estimate is for one tank, there are two HCl tanks at the facility.

Attachment D

Idaho Department of Environmental Quality
Office of Technical Services

CALCULATION SHEET

Sheet 1 of 1

Project: The Sprinkler Shop | Work Order: | File No.:

Title of Calculation: Zinc Kettle Emission | Prepared By: | Date: 6/26/03

Item: Attachment D | Checked By: | Date:

PM-10 Emission from Zinc Galvanizing Kettle

$$\text{Emission factor} = \frac{2.5 \text{ Kg PM-10}}{\text{metric ton zinc}} \star$$

$\star$ Emission Estimate Technique Manual for Galvanizing

Environment Australia, First Published 7/1999 Version 1.1-5, February 2001

Zinc usage 60 lb/hr per applicant submittal

Calculating Emissions

$$PM\text{-}10 = \frac{60 \text{ lb Zn}}{\text{hr}} \left(\frac{2.5 \text{ Kg PM-10}}{\text{tonne zinc}}\right)\left(\frac{\text{tonne}}{2204 \text{ lb}}\right)\left(\frac{1000 \text{ g}}{\text{Kg}}\right)\left(\frac{\text{lb}}{454 \text{ g}}\right)$$

$$PM\text{-}10 = 0.15 \frac{\text{lb}}{\text{hr}}$$

10-01-01

Attachment B

Modeling Memorandum

by Dan Pitman, Senior Engineer

dated July 2, 2003

MEMORANDUM

TO: Kevin Schilling, Air Quality Scientist, State Office of Technical Services

FROM: Dan Pitman, Senior Engineer, State Office of Technical Services

SUBJECT: Atmospheric Dispersion Modeling for the Sprinkler Shop permit to construct.

DATE: July 2, 2003

1.0 SUMMARY:

The modeling analyses conducted by the Department: 1) utilized appropriate methods and models; 2) was conducted using proper model parameters and accurate input data; 3) adhered to established Departmental guidelines for new source review dispersion modeling; 4) demonstrated that predicted pollutant concentrations from facility-wide emissions, when appropriately combined with background concentrations, were below applicable air quality standards.

2.0 DISCUSSION:

2.1 Applicable Air Quality Impact Limits

This section identifies applicable ambient air quality limits and analyses used to demonstrate compliance.

2.1.1 Area Classification

The Sprinkler Shop is located in Minidoka County, designated as an attainment or unclassifiable area for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), lead (Pb), ozone (O_3), and particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}). There is no Class I area within 10 kilometers of the facility.

2.1.2 Full Impact Analyses

The Department has determined that a full impact analysis is necessary for this Permit to Construct (PTC) application to demonstrate compliance with IDAPA 58.01.01.203.02. A full impact analysis for attainment area pollutants involves adding ambient impacts from facility-wide emissions to Department-approved background concentration values that are appropriate for the criteria pollutant/averaging-time at the facility location. The resulting maximum pollutant concentrations in ambient air are then compared to the NAAQS listed in Table 1. Table 1 also lists significant contribution levels and specifies the modeled value that must be used for comparison to the NAAQS.

Table 1. Applicable regulatory limits				
Pollutant	**Averaging Period**	**Significant Contribution Levels ($\mu g/m^3$)[a, b]**	**Regulatory Limit ($\mu g/m^3$)[c]**	**Modeled Value Used[d]**
PM_{10}[e]	Annual	1	50[f]	Maximum 1st highest[g]
	24-hour	5	150[h]	Maximum 6th highest[i]
CO	8-hour	500	10,000[j]	Highest 2nd highest[g]
	1-hour	2000	40,000[j]	Highest 2nd highest[g]
SO_2	Annual	1	80[j]	Maximum 1st highest[g]
	24-hour	5	365[j]	Highest 2nd highest[g]
	3-hour	25	1,300[j]	Highest 2nd highest[g]
NO_2	Annual	1	100[f]	Maximum 1st highest[g]
Chromium	Annual	N/A	8.3E-05	Maximum 1st highest[g]

a. IDAPA 58.01.01.006.93
b. Micrograms per cubic meter
c. IDAPA 58.01.01.577 for criteria pollutants, IDAPA 58.01.01.585 for non-carcinogenic toxic air pollutants IDAPA 58.01.01.586 for carcinogenic toxic air pollutants.
d. The maximum 1st highest modeled value is always used for significant impact analysis and for all toxic air pollutants.
e. Particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
f. Never expected to be exceeded in any calendar year.
g. Concentration at any modeled receptor.
h. Never expected to be exceeded more than once in any calendar year.
i. Concentration at any modeled receptor when using five years of meteorological data.
j. Not to be exceeded more than once per year.

2.1.3 Toxic Air Pollutant Impact Analysis

Chromium emissions from natural gas combustion is the only toxic air pollutant that was emitted above the toxic screening levels published in IDAPA 58.01.01.585 or IDAPA 58.01.01.586. SCREEN3 modeling was conducted and the predicted ambient impact of chromium emission is 5.8E-5 micrograms per cubic meter annual average concentration. The predicted impact is less than the acceptable ambient concentration for chromium (8.3E-5 micrograms per cubic meter annual average).

2.2 Background Concentrations

Background concentrations were revised for all of Idaho by the Department in March 2003[1]. Background concentrations in areas where no monitoring data are available were based on monitoring data from areas with similar population density, meteorology, and emissions sources. The Department determined that default values for rural agricultural areas are appropriate for the area surrounding the Sprinkler Shop Facility, Table 2 lists these revised background concentrations

1 Hardy, Rick and Schilling, Kevin. *Background Concentrations for Use in New Source Review Dispersion Modeling*. Memorandum to Mary Anderson, March 14, 2003.

Table 2. Background Concentrations		
Pollutant	**Averaging Period**	**Background Concentration ($\mu g/m^3$)[a]**
PM_{10}[b]	24-hour	73
	Annual	26
CO[c]	8-hour	2,300
	1-hour	3,600
SO_2[d]	Annual	8
	24-hour	26
	3-hour	34
NO_2[e]	Annual	17

a. micrograms per cubic meter
b. particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
c. carbon monoxide
d. sulfur dioxide
e. nitrogen dioxide

2.3 Modeling Impact Assessment

Table 3 provides a summary of the modeling parameters.

2.3.1 Modeling protocol

A modeling protocol was not submitted to the Department prior to the application.

Table 3. Modeling Parameters

Parameter	Description/Values	Documentation/Additional Description
Model	SCREEN3	
Meteorological data	Full Meteorology	
Model options	Regulatory Default	
Land use	Rural	Based on population density and actual land use
Terrain	None	Area is effectively flat
Building downwash	Considered	Building dimensions entered into model
Receptor grid	Discrete & Model Generated	Use maximum ground-level concentration at or beyond distance to property boundary(279 meters)

2.3.2 Model Selection and General Methodology

The ambient air impact analyses were performed by DEQ using the model SCREEN3. SCREEN3 estimates maximum 1-hour concentrations for plume centerline locations (plume centerline in the horizontal direction). Concentrations for other averaging periods are calculated from the 1-hour results by multiplying the 1-hour result by an appropriate persistence factor. The following are the persistence factors used for the Department's analysis:

- 1-hour to 3-hour factor = 0.9
- 1-hour to 8-hour factor = 0.7

- 1-hour to 24-hour factor = 0.4
- 1-hour to annual factor = 0.08

SCREEN3 can only predict impacts for a single emissions source. This facility consists of two point sources of emissions. A conservative ambient impact may be estimated by adding the maximum ambient impact from the two sources together. In this modeling exercise the maximum impact from the two point sources of emissions are added together to give a conservative cumulative impact.

2.3.3 Land Use Classification

The area within three kilometers of the facility includes a large fraction of rural land use, therefore the rural land use classification was selected for modeling.

2.3.4 Meteorological Data

Model options in SCREEN3 were set to use full meteorology. This option utilizes worst-case meteorology for the source configuration.

2.3.5 Complex Terrain

The Department reviewed USGS 7.5 minute maps of the area surrounding the Sprinkler Shop no significant terrain features where found in the areas where emissions from the Sprinkler Shop could have a measurable impact.

2.3.6 Facility Layout

Facility layout is not critical for these SCREEN3 modeling analyses because maximum ground-level modeled concentrations were used to evaluate compliance at or beyond the property boundary.

2.3.7 Building Downwash

Plume downwash effects caused by the structure associated with the point sources of emissions at the facility were accounted for in the modeling analyses. Vertical, horizontal and lateral dimensions of the building associated with the stack were input into the SCREEN3 model.

2.3.8 Ambient Air Boundary

The nearest distance to ambient air from emission sources is 179 meters. The facilities property is fenced or fences are being constructed. The property is also monitored to prevent trespassers because of safety concerns.

2.3.9 Receptor Network

The model was set to calculate the maximum ground-level concentration, regardless of the downwind distance. A discrete receptor was placed at 179 meters, the distance to ambient air.

2.3.10 Emission Rates

Emissions rates used in the dispersion modeling analyses submitted by the applicant were reviewed against those in the permit application and the proposed permit. The following approach was used for DEQ verification modeling:

- All modeled emissions rates were equal to or slightly greater than the facility's emissions calculated in the permit application or the permitted allowable rate.

- Modeling results were compared to "significant contribution" thresholds. More extensive review of modeling parameters selected was conducted when model results approached applicable thresholds.

Table 4 provides emission rates that were used to predict ambient impacts from the boiler and zinc kettle.

Table 4. Emission Rates

Pollutant	Boiler (lb/hr)[a]	Zinc Kettle (lb/hr)[a]
NOx[b]	0.114	-
CO[c]	0.096	-
PM-10[d]	8.69E-3	0.25
SO_2[e]	6.86E-4	-
Chromium	1.6E-6	-

a. pound per hour
b. nitrogen oxides
c. carbon monoxide
d. particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
e. sulfur dioxide

SCREEN3 modeling was conducted using unit emissions rates. Maximum 1-hour averaged ambient pollutant concentrations were then calculated by multiplying the potential emissions rates by the dispersion factor obtained from the modeling results (the dispersion factor has units of $\mu g/m^3$ per pound).

2.3.11 Emission Release Parameters

Table 5 provides emissions release parameters, including stack height, stack diameter, exhaust temperature, and exhaust velocity. The exit velocity of the boiler and the zinc kettle was set at 0.001 meters per second to account for the rain caps. This effectively eliminates any momentum induced plume rise.

Table 5. Emissions and Stack Parameters

Release Point	Source Type	Stack Height (m)[a]	Modeled Diameter (m)	Stack Gas Temp. (K)[b]	Stack Gas Flow Velocity (m/sec)[c]
Boiler	Point	7.62	0.305	366	0.001
Zinc Kettle	Point	10.67	0.305	293	0.001

a. Meters
b. Kelvin
c. Meters per second

3.0 MODELING RESULTS:

Dispersion modeling results for nitrogen oxides, carbon monoxide, particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers, sulfur dioxide and chromium from the use of unit

emissions rates are presented in Table 6, along with the calculated ambient concentrations. Attachment A provides calculations and model output from the Department's analyses. Modeled concentrations of all criteria air pollutants were well below NAAQS.

Table 7 gives a summary of the cumulative impact from the facility, background concentrations and the national ambient air quality standard.

Table 6. Emission Rate and Ambient Impact

		Boiler		Zinc Kettle		Boiler + Zinc Kettle
Pollutant	Averaging period	Emission Rate (lb/hr)[a]	Ambient Impact (μg/m³)[b]	Emission Rate (lb/hr)[a]	Ambient Impact (μg/m³)[b]	Ambient Impact (μg/m³)[b]
NO_2[c]	Annual	0.114	4.15	NA	NA	4.15
CO[d]	8-hour	9.6E-2	30.6	NA	NA	30.6
	1-hour		43.7		NA	43.7
PM-10[e]	Annual	8.69E-3	0.32	0.25	3.3	3.62
	24-hour		1.58		16.5	18.08
SO_2[f]	Annual	6.86E-4	0.025	NA	NA	0.025
	24-hour		0.125		NA	0.125
	3-hour		0.28		NA	0.28
Chromium	Annual	1.6E-6	5.8E-5	NA	NA	5.8E-5

a. pounds per hour
b. micrograms per cubic meter
c. nitrogen dioxide
d. carbon monoxide
e. particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
f. sulfur dioxide

Table 7. Summary of Ambient Impact and National Ambient Standards

Pollutant	**Averaging Period**	**Background Concentration (μg/m³)[a]**	**Total Facility Impact (μg/m³)[a]**	**Facility Impact +Background (μg/m³)[a]**	**National Ambient Standard (μg/m³)[a]**
PM_{10}[b]	24-hour	73	18.08	91.08	150
	Annual	26	3.62	29.62	50
CO[c]	8-hour	2,300	30.6	2,330.6	10,000
	1-hour	3,600	43.7	3,643.7	40,000
SO_2[d]	Annual	8	0.025	8.025	80
	24-hour	26	0.125	26.125	365
	3-hour	34	0.28	34.28	1,300
NO_2[e]	Annual	17	4.15	21.15	100

a. micrograms per cubic meter
b. particulate matter with an aerodynamic diameter less than or equal to a nominal ten micrometers
c. carbon monoxide
d. sulfur dioxide
e. nitrogen dioxide

ATTACHMENT A

DEPARTMENT'S DISPERSION MODELING ANALYSES RESULTS FOR the SPRINKLER SHOP

06/11/03

09:38:04
*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

Sprinkler Shop, Galvanizing Tank

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	.126000
STACK HEIGHT (M)	=	10.6700
STK INSIDE DIAM (M)	=	.3050
STK EXIT VELOCITY (M/S)	=	.0010
STK GAS EXIT TEMP (K)	=	293.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	1.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	.0000
MIN HORIZ BLDG DIM (M)	=	.0000
MAX HORIZ BLDG DIM (M)	=	.0000

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

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

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
100.	183.1	3	1.0	1.0	320.0	9.76	12.46	7.44	NO
200.	162.1	5	1.0	1.0	10000.0	9.76	11.63	6.24	NO
300.	142.5	5	1.0	1.0	10000.0	9.76	16.89	8.70	NO
400.	145.2	6	1.0	1.0	10000.0	9.76	14.64	7.05	NO
500.	130.9	6	1.0	1.0	10000.0	9.76	17.97	8.40	NO

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 100. M:

100.	183.1	3	1.0	1.0	320.0	9.76	12.46	7.44	NO

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

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

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

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
179.	165.6	4	1.0	1.0	320.0	9.76	14.05	7.72	NO

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

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

CALCULATION PROCEDURE	MAX CONC (UG/M**3)	DIST TO MAX (M)	TERRAIN HT (M)
SIMPLE TERRAIN	183.1	100.	0.

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

The Sprinkler Shop 6/16/03, Dan Pitman

Calculating Ambient Impact Zinc Kettle Emissions

Pollutant	Averaging Period	Emission Rate(lb/hr)	Dispersion Factor [micrograms/(lb/hr)][a]	Persistence Factor - dimensionless	Ambient Impact- micrograms/meter^3
PM-10	24-hour	2.50E-01	165	0.4	16.500
	Annual	2.50E-01	165	0.08	3.300

a. From SCREEN3 modeling; one pound per hour emission rate = 456 micrograms per cubic meter [1-hr]

Sample Calculation:

Calculating PM-10 annual ambient impact:

(emission rate x dispersion factor x persistence factor) = impact

0.25 lb/hr x 165 micrograms/ lb/hr x 0.08 = 3.3

06/13/03

09:28:25
*** SCREEN3 MODEL RUN ***
*** VERSION DATED 95250 ***

Sprinkler Shop, Boiler

SIMPLE TERRAIN INPUTS:

SOURCE TYPE	=	POINT
EMISSION RATE (G/S)	=	.126000
STACK HEIGHT (M)	=	7.6200
STK INSIDE DIAM (M)	=	.3050
STK EXIT VELOCITY (M/S)	=	.0010
STK GAS EXIT TEMP (K)	=	366.0000
AMBIENT AIR TEMP (K)	=	293.0000
RECEPTOR HEIGHT (M)	=	1.0000
URBAN/RURAL OPTION	=	RURAL
BUILDING HEIGHT (M)	=	6.0900
MIN HORIZ BLDG DIM (M)	=	18.2900
MAX HORIZ BLDG DIM (M)	=	36.6000

BUOY. FLUX = .000 M**4/S**3; MOM. FLUX = .000 M**4/S**2.

*** FULL METEOROLOGY ***

****
*** SCREEN AUTOMATED DISTANCES ***
****

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

DIST (M)	CONC (UG/M**3)	STAB	U10M (M/S)	USTK (M/S)	MIX HT (M)	PLUME HT (M)	SIGMA Y (M)	SIGMA Z (M)	DWASH
5.	.0000	0	.0	.0	.0	.00	.00	.00	NA
100.	778.5	6	1.0	1.0	10000.0	7.62	4.07	6.94	SS
200.	409.7	6	1.0	1.0	10000.0	7.62	7.73	8.29	SS
300.	271.0	6	1.0	1.0	10000.0	7.62	11.23	9.59	SS
400.	197.0	6	1.0	1.0	10000.0	7.62	14.64	10.83	SS
500.	155.1	6	1.0	1.0	10000.0	7.62	17.97	11.55	SS

MAXIMUM 1-HR CONCENTRATION AT OR BEYOND 5. M:

19.	1763.	6	1.0	1.0	10000.0	7.62	.91	3.83	SS

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

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

   DIST      CONC              U10M   USTK  MIX HT   PLUME   SIGMA   SIGMA
    (M)    (UG/M**3)   STAB   (M/S)  (M/S)    (M)    HT (M)   Y (M)   Z (M)
DWASH
-------   ----------  ----  -----  -----  ------  ------  ------  ------
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    179.    456.0        6     1.0    1.0 10000.0    7.62    6.98    8.01
SS

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

  *** CAVITY CALCULATION - 1 ***        *** CAVITY CALCULATION - 2 ***
   CONC (UG/M**3)       =    .0000        CONC (UG/M**3)       =    .0000
   CRIT WS @10M (M/S)   =   99.99         CRIT WS @10M (M/S)   =   99.99
   CRIT WS @ HS (M/S)   =   99.99         CRIT WS @ HS (M/S)   =   99.99
   DILUTION WS (M/S)    =   99.99         DILUTION WS (M/S)    =   99.99
   CAVITY HT (M)        =    6.29         CAVITY HT (M)        =    6.09
   CAVITY LENGTH (M)    =   25.59         CAVITY LENGTH (M)    =   18.28
   ALONGWIND DIM (M)    =   18.29         ALONGWIND DIM (M)    =   36.60

 CAVITY CONC NOT CALCULATED FOR CRIT WS > 20.0 M/S.  CONC SET = 0.0

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

  CALCULATION       MAX CONC   DIST TO  TERRAIN
   PROCEDURE       (UG/M**3)   MAX (M)   HT (M)
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 SIMPLE TERRAIN     1763.          19.       0.


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 ** REMEMBER TO INCLUDE BACKGROUND CONCENTRATIONS **
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The Sprinkler Shop 6/16/03, Dan Pitman

Calculating Ambient Impact From Boiler Emissions

Pollutant	Averaging Period	Emission Rate(lb/hr)	Dispersion Factor [micrograms/(lb/hr)][a]	Persistence Factor - dimensionless	Ambient Impact- micrograms/meter^3
NOx	Annual	0.114	456	0.08	4.159
CO	8-hour	9.60E-02	456	0.7	30.643
	1-hour	9.60E-02	456	1	43.776
PM-10	24-hour	8.69E-03	456	0.4	1.585
	Annual	8.69E-03	456	0.08	0.317
SO_2	Annual	6.86E-04	456	0.08	0.025
	24-hour	6.86E-04	456	0.4	0.125
	3-hour	6.86E-04	456	0.9	0.282
Chromium	Annual	1.60E-06	456	0.08	5.84E-05

a. From SCREEN3 modeling; one pound per hour emission rate = 456 micrograms per cubic meter [1-hr]

Sample Calculation:

Calculating NOx annual ambient impact:

(emission rate x dispersion factor x persistence factor) = impact

0.114 lb/hr x 456 micrograms/ lb/hr x 0.08 = 4.159