Air Quality Permitting
Technical Analysis

January 29, 2003

Permit to Construct No. 009-00032

North Idaho Metal Works, St. Maries

Project No. P-020117

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FINAL PERMIT

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ACRONYMS, UNITS, AND CHEMICAL NOMENCLATURES

acfm	actual cubic feet per minute
AFS	AIRS Facility Subsystem
AIRS	Aerometric Information Retrieval System
AQCR	Air Quality Control Region
CFR	Code of Federal Regulations
CO	carbon monoxide
DEQ	Department of Environmental Quality
dscf	dry standard cubic feet
HAPs	Hazardous Air Pollutants
IDAPA	A numbering designation for all administrative rules in Idaho promulgated in accordance with the Idaho Administrative Procedures Act
lb/hr	pound per hour
m	meter(s)
MACT	Maximum Achievable Control Technology
NESHAP	Nation Emission Standards for Hazardous Air Pollutants
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
Rules	*Rules for the Control of Air Pollution in Idaho*
scf	standard cubic feet
SO_2	sulfur dioxide
SO_x	sulfur oxides
T/yr	Tons per year
VOC	volatile organic compound

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

North Idaho Metal Works is proposing to modify Permit to Construct (PTC) #009-00032, issued on September 23, 1999, to allow construction of an additional hard chromium electroplating tank.

3. FACILITY DESCRIPTION

Hard chromium electroplating is the process of depositing a relatively thick layer of chromium on a base metal to provide the surface wear resistance, low coefficient of friction, hardness, and corrosion resistance, or to build up surfaces that have been eroded with use. Hard plating is used for items such as hydraulic cylinders and rods, industrial rolls, zinc die castings, plastic molds, engine components, and marine hardware.

Metals are pre-treated in a caustic soda solution. This cleaning is used to dislodge surface soil and strip chromium. The final step is electroplating.

The new hard chromium electroplating tank process is identical to the existing system, with the only exception being the size of the tank.

4. SUMMARY OF EVENTS

July 17, 2002	DEQ received North Idaho Metal Works PTC application
July 18, 2002	DEQ informed North Idaho Metal Works in writing that the application was received.
September 19, 2002	DEQ received a permit application fee from North Idaho Metal Works
January 10, 2003	Public comment period on draft permit ended. No comments were received.

5. PERMIT HISTORY

The following is a summary of the permit history:

September 23, 1999	DEQ issued North Idaho Metal Works a permit to construct a hard chromium electroplating process. North Idaho metal works informed in writing of the Title V permitting requirements at the time of this PTC issuance.

6. TECHNICAL ANALYSIS

Process Description

Two process tanks were used in the electroplating process prior to the proposed modification. The first tank is filled with a sodium hydroxide solution that carries a small electrical charge. The electrical charge is placed through the tank to drive chromium from plated material placed in the tank into solution and precipitate it in the tank. This step of the process is also used to dislodge surface contamination. Emissions of chromium from this process are expected to be negligible.

The second tank is the electroplating tank. The electroplating tank is proposed to contain up to 36 ounces of chromium per gallon of sulfuric acid solution. A current is passed through the solution causing the chromium to plate on metal substrates in the tank. The tank is heated to 170° Farhenheit or less.

This proposed modification entails the addition of an electroplating tank. The new hard chromium electroplating tank process is similar to the existing system, with the only exception being the size of the tank. Emissions from the electroplating tanks are controlled by a composite mesh pad. The composite mesh pads are a mist eliminator system that is based on inertial impact.

Equipment Listing

Existing Chrome Stripping Tank – Sodium hydroxide solution

Existing Chrome Electroplating Tank - 48" W x 48" L x 144" H

New Chrome Electroplating Tank - 48" W X 72" L x 76" H

One Composite Mesh Pad air pollution control device.

Emission Estimates

Performance testing on the existing electroplating tank was conducted on October 2, 2000. Emissions were determined to be 3.0 E-4 mg/dscf. The chromium emission factor from AP-42 Chapter 12.20, dated July 1996, for hard chromium tanks with composite mesh pad emissions control is 3.8E-6 grains/dscf (2.46E-4 mg/dscf).

Emission estimates from the proposed modification were made using the EPA AP-42 chromium emission factor of 3.8 E-6 grains/dscf. The proposed post modification design flow rate is 3,200 acfm. Using the AP-42 emission factor, hourly emissions are calculated to be 1.04E-4 lb/hr. (Please note that using a design flow rate in acfm in this calculation is conservative compared to using dscf).

$$(3.8E\text{-}6 \text{ grains/ft}^3)(3{,}200 \text{ ft}^3\text{/min.})(60 \text{ min./hr})(\text{lb}/7000 \text{ grains}) = 1.04E\text{-}4 \text{ lb/hr}$$

The potential to emit chromium for the facility is limited by the MACT standard in this permit to 0.015 mg/dscm. At a design flow rate of 3,200 acfm, the annual potential to emit is 0.0008 tons per year. (Please note that using a design flow rate in acfm in this calculation is conservative compared to using dscf).

$$6.6E\text{-}6\text{gr/dscf } (3{,}200 \text{ ft}^3\text{/min})(60 \text{ min/hr})(1 \text{ lb}/7000 \text{ gr.}) = 0.0002 \text{ lb/hr}$$

$$0.0002 \text{ lb/hr } (8{,}760 \text{ hr/yr})(\text{ton}/2000 \text{ lb}) = 0.0008 \text{ ton/yr}$$

Criteria pollutant emissions are negligible. There are no combustion sources and only insignificant amounts of PM_{10} are expected to be generated from the wet hard chromium electroplating process. The facility does not have the potential to emit at major source thresholds for hazardous air pollutants.

Modeling

No modeling was conducted for this source. Emissions are limited by the National Emission Standards for Hazardous Air Pollutants (40 CFR 63.340). In accordance with IDAPA 58.01.01.210.20, Demonstration of Preconstruction Compliance With Toxic Standards, no further procedures for demonstrating preconstruction compliance will be required under 210 for that toxic air pollutant as part of the application since the source is regulated by the Department and EPA under 40 CFR 63.

Facility Classification

The facility is not a major source of air pollution in accordance with IDAPA 58.01.01.006.55 or in accordance with IDAPA 58.01.01.008.10. Emissions of criteria pollutants are negligible and the chromium potential to emit is much less than 0.1 tons per year. The facility classification for the Aerometric Information Retrieval System is "B" because the facilities potential to emit is below major source thresholds.

Area Classification

St. Maries, Idaho is classified as attainment or unclassifiable for all criteria pollutants.

7. PERMIT REQUIREMENTS

Regulatory Review

The following permitting requirements were reviewed as part of this air permitting analysis:

IDAPA 58.01.01.201 ..... Permit to Construct Required

A permit to construct is required for this facility because they are planning to construct/install a new hard chromium electroplating operation.

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

In accordance with IDAPA 58.01.01.210.20, Demonstration of Preconstruction Compliance With Toxic Standards, since the source is regulated by the Department and EPA under 40 CFR 63, no further procedures for demonstrating preconstruction compliance will be required under 210 for that toxic air pollutant as part of the application.

40 CFR 52 ..... Prevention of Significant Deterioration (PSD)

This source is an existing minor source. Emissions from the proposed construction will not approach the 100-tons/yr major facility threshold.

40 CFR 60 ..... New Source Performance Standards (NSPS)

This source does not have any affected emission units that are regulated by a NSPS.

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

This source is an affected facility in accordance with 40 CFR 63.340 *National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks*. The permit incorporates all of these requirements. The standard includes a chromium emission concentration limit of 0.015 mg/dscm, operating requirements and the requirement to develop an operation and maintenance plan.

Chromium Electroplating Tanks

7.1 Chromium Emissions Limits

Chromium emission concentration limits are established by *National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks* (40 CFR 63.340). The chromium emission standard is 0.015 mg/dscm. The emission rate of chromium is restricted by the facility's operational design capacity, and by the standard of 0.015 mg/dscm, to well below the major source

threshold of 10 tons per year for chromium. The operational design flowrate is 3,200 acfm. Hourly and annual emission rates, as determined using the aforementioned flow rate and a concentration of chromium at the standard of 0.015 mg/dscf, is less than 6.3E-3 lb/hr or 2.8E-2 ton/yr. The potential to emit of the facility is limited significantly below the major facility threshold without the need to establish a specific pound per hour or ton per year emission rate limit.

7.2 Compliance Demonstration

The *National Emission Standards for Chromium Emissions From Hard and Decorative Chromium Electroplating and Chromium Anodizing Tanks* (40 CFR 63.340) specifies operating, monitoring and source testing requirements to assure compliance with the 0.015 mg/dscm chromium emission limit. All of these requirements have been incorporated into the permit.

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 A – Attainment U – Unclassifiable N – Nonattainment
SO_2	B						
NO_x	B						
CO	B						
PM_{10}	B						
PT (Particulate)	B						
VOC	B						
THAP (Total HAPs)	B						U
			APPLICABLE SUBPART				
					N		

[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

North Idaho Metal Works paid the $1,000 application fee as required in IDAPA 58.01.01.224.

A permit to construct processing fee of $1000.00 was required in accordance with IDAPA 58.01.01.225 because the increase in emissions from the modification was less than 0.0278 tons per year T/yr as indicated in Table 9.1 The processing fee was received on **Date.**

The North Idaho Metal Works 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 FOR FEES PURPOSES ONLY

Emissions Inventory			
Pollutant	**Annual Emissions Increase (T/yr)**	**Annual Emissions Reduction (T/yr)**	**Annual Emissions Change (T/yr)**
NO_X	0.0	0	0.0
SO_2	0.0	0	0.0
CO	0.0	0	0.0
PM_{10}	0.0	0	0.0
VOC	0.0	0	0.0
TAPS/HAPS	< 0.0008	0	< 0.0008
Total:	< 0.0008	0	< 0.0008
Fee Due	**$1,000.00**		

10. RECOMMENDATION

Based on review of application materials and all applicable state and federal rules and regulations, staff recommend that North Idaho Metal Works be issued amended and modified PTC No. 009-00032 for the new and existing hard chromium electroplating tanks. No public comment period is recommended, no entity has requested a comment period, and the project does not involve PSD requirements.

DP/sd Project No. P-020117 G:\AQ\STASRC\SS LTD\PTC\N ID METAL WORKS\P-020117 TECH MEMO .DOC