

Silver Bell Mining, LLC.
Air Quality Operating Permit 2028
Technical Support Document (TSD)

I. General Comments:

A. Company Information

1. Source Name: Silver Bell Mining, L.L.C.
2. Source Address: 25000 W. Avra Valley Road, Marana, AZ 85653

B. Background

The facility operates under the following industrial classifications:

- Copper Ore Mining, SIC code: 1021,
- North American Industry Classification System (NAICS): 212234

This technical support document (TSD) has been prepared for the second renewal of the 5-year air quality operating permit. The current permit was issued on December 6, 2005 to Silver Bell Mining (SBM), L.L.C. and expired December 5, 2010. SBM continues to operate under the expired permit pursuant to Pima County Code (PCC) 17.12.165.J.

Table 1
Summary of Permit Actions Within Previous Permit Term

Date Received	Permit Action
02/23/2008	2028-1P ,2P: Notification Notification and annual log of changes not requiring a permit revision.
07/30/2009	2028-3P: Minor Revision: Application received to include an additional 2937 hp diesel motivator/emergency generator. Discussion regarding applicability, nonroad engine definitions and portable sources.
08/07/2009	2028-4P: Renewal: Application received to renew the air quality operating permit. Updated 11/18/2010 & 6/24/2013
08/11/2009	2028-5P: Amendment Added Mark Kalmi as Responsible Official.
07/5/2011	2028-6P: Minor Revision Application received to add emergency UPS Generator to the facility, subject to NSPS, subpart III
09/07/2011	2028-7P: Minor Permit Revision Application to add diesel ICE emergency portable pump. Discussion regarding applicability and nonroad engine definitions, and portable sources.
11/25/2011	2028-8P: Minor Permit Revision: Application to add a building and cartridge filter control device for a stationary buffing machine to buff stateless steel sheets used in the Electro-Winning (EW) process.
4/23/2012	2028-10P: Facility Change without permit revision Added a cartridge filter in the Metallurgical Lab and passive attic fans in the EW tankhouse

Date Received	Permit Action
3/26/2012	2028-11P: Other Notification
1/13/2013	2028-12P: Minor Permit Revision Added a 768,000 Btu/hr stationary steam pressure truck washer
8/23/2013	2028-13P: Minor Permit Revision Revision to replace 8.369 MMBtu/hr diesel fired boiler (S20178) used for SX-EW liquid process heating with two LPG fired boilers 4.6 MMBtu/each.
4/30/2014	2028:14P: Facility Change w/o Revision Removal of roof and wall panels in the EW tank house
7/3/2014	2038:-15P: Other Notification Notification of Compliance Status (Subpart JJJJJ) for boiler (S20178). The affected boiler was decommissioned and taken out of service on May 27, 2014.

C. Area Attainment Classification

The facility is located in an area that is designated as non-attainment for PM₁₀ (Rillito PM₁₀ Nonattainment Area). In June 2008, the Arizona Department of Environmental Quality submitted a state implementation plan (SIP) revision to the Environmental Protection Agency EPA requesting redesignation of the area to attainment (*Rillito Moderate Area PM₁₀ Maintenance Plan and Request for Redesignation to Attainment*). The action to redesignate the area as attainment is still pending as of the date of this writing.

II. Source Description

For Title V purposes, the facility is classified as a true minor source of criteria pollutants and an area source of hazardous air pollutants. The facility is not subject to 40 CFR Part 60, Subpart LL – Metallic Mineral Processing Plants at this time, as the facility predates 1982 (exceptions are not covered by LL and the facility has not constructed any affected facilities subject to the standard). The source is a non-categorical source and fugitive PM₁₀ emissions are not considered for Title V purposes. The source requires a permit in accordance with PCC 17.12.140.B.3.b and c.

A. Process Description

Emissions from the facility consist primarily of fugitive particulate matter from its mining operations. The mining operations of SBM includes mining from four open pits, with chalcocite as the principal copper-bearing mineral. Ore is mined in two ways: 1) by conventional open-pit mining i.e., blasting and hauling the ore to heap leach dumps, and 2) rubblizing the ore in place in heaps inside the pits. The dumps and heaps are leached through the application of sulfuric acid. Copper-laden leach solution, called pregnant leach solution (PLS), drains from the base of each dump and heap into collection ponds.

The copper in the PLS is then extracted producing cathode copper using solvent extraction (SX) and electro-winning (EW) processes (SX-EW). In the SX-EW process, the PLS is pumped from the collection ponds to the SX-EW plant. The SX process at SBM utilizes two solvent extraction trains, each with three processing stages (two solvent extraction stages and one stripping stage). In the SX process, copper from the PLS is selectively recovered and concentrated in to a purified acidic copper solution called rich electrolyte. At the EW tank-house, the heated rich electrolyte undergoes an electro-chemical process resulting in the copper being plated from the rich electrolyte onto cathodes. This process produces a high-purity, metallic, cathode copper that can be sold directly on the world market. The copper-depleted, aqueous solution leaving the EW tank house, called lean electrolyte, is recycled back to the stripping stage of the SX process. SBM's production rate of cathode copper currently averages 65 tons/day.

In the renewal application SBM has indicated that it plans to expand the current mining operations (100% increase in mining operations) and applied for authority to construct a duplicate SX-EW tank house or the addition of SX trains and EW cells to accommodate a corresponding potential 100 % increase in the cathode copper production rate and included estimates of the potential emissions from the expansion of operations. This expansion would increase fugitive particulate emissions as a result of increased mining activity, including drilling, blasting, loading, and hauling of ore to dumps. Other than the addition of two additional emergency generators, mobile mining equipment, and additional SX-EW components including two LPG boilers, there will be no other changes in the method of operation or products produced at the facility. This permit renewal incorporates the (new) proposed installations as a result of the planned expansion of existing mining operations. The emissions increase from the proposed affected facilities and operations is below major source thresholds for Title V and NSR/PSD purposes.

The air pollutant emitting equipment and/or affected operations at SBM consists of the following:

- Fugitive dust emitting operations, mineral tailings, dumps, ore handling, haul roads, stockpiles, dozing, and blading, and other sources.
- For recordkeeping purposes: The hours of operation and daily process rates of mines, material handling facilities, and loaders.
- 7 internal combustion engines (ICE) that are used as generators:
- 3 Nonroad engines for non-emergency portable power and a pump that are not required to be permitted but may need to verify their portable nonroad engine status.
- 4 Permitted stationary emergency generators (including 2 new emergency generators as part of facility expansion).
- 4 LPG fired process heating boilers (including two LPG fired process boilers as part of facility expansion).
- Electro-winning tank-house air pollution control equipment.
- Various fuel and process chemical storage tanks.
- Periodic maintenance related surface coating operations (including spray painting) and solvent degreasing/cleaning operations.
- Periodic abrasive blasting operations.

B. Operating Capacity and Schedule

The operating schedule at the facility is not limited and the facility can operate 7 days/week, 24hours a day, 365 days a year.

The operating capacity of stationary ICE used as emergency generators are limited by the permit to 100 hours each for maintenance and readiness testing, including non-emergency use in accordance with applicable local and federal standards (hours are not limited when operating in response to an emergency). The capacity of all other facility equipment and operations are not limited by the permit such as the periodic surface coating and solvent degreasing/cleaning operations, periodic abrasive blasting operations, and the hours of process heating boilers hours (limited to propane fuel), however any modifications to mining operations as defined by ARS §49-401.01(24) may be subject to revision requirements.

The facility operates in an area of non-attainment for PM₁₀ however it is not subject to a SIP determination of reasonably available control technology requirements (RACT) or best available control measures for fugitive dust (BACM). Nevertheless, the fugitive dust provisions in Title 17 of the PCC code incorporate elements of BACM taken from the EPA publication EPA450/2-92-004, as a result of implementing the natural events action plan (NEAP) for Pima County.

C. Air Pollution Control Equipment

The permit requires the use and maintenance of air pollution control equipment from unclassified sources (sulfuric acid mist from the EW tank-house operations and metal HAP from the stainless steel buffing building) in accordance with PCC 17.16.430.F. The controls employed are 99% efficient in reducing the pollutants collected. The collection efficiency of the stripping machine demister for sulfuric acid mist generated at the tankhouse is estimated to be 60%.

III. Emission Estimates

Table 2: Controlled Potential to Emit (Tons/yr)

Emission Sources	PM	PM ₁₀	PM _{2.5}	NO _x	SO ₂	CO	VOC	H ₂ SO ₄ Mist	HAP Total	HAP Single
Emergency generators ¹	0.54	.45	.37	5.61	1.68	1.31	0.25	-	3.30 E ⁻³	<3.30 E ⁻³
Boiler Emissions	0.81	0.81	0.81	9.68	0.08	13.22	3.02	-	.14	<0.14
Storage Tanks	-	-	-	-	-	-	1.41	-	-	-
EW Tank-House	0.04	0.04	0.04	-	-	-	-	0.04	-	-
Stainless Steel Buffing Bldg.	0.15	0.01	0.01	-	-	-	-	-	.005	<.005
Prill (Amonium Nitrate) Loading	1.10	1.10	1.10	-	-	-	-	-	-	-
Facility Wide Regulated Point Source Emissions (Controlled) ²	2.64	2.41	2.34;	15.28	1.76	14.52	4.68	0.04	<0.16	<0.16
Facility Wide (Non-point Fugitives) ³	1568.53	444.86	48.12	54.42	6.40	214.49	-	2.47	-	-
Facility Wide Total (Point & Nonpoint Emissions)	1571.54	447.27	50.46	69.70	8.16	229.01	4.68	2.51	0.16	<0.16

- No Data

¹ PTE for the emergency generators/engines is calculated on a 100 hour/year basis. Other sources are based on annual usage or operation 8760 hours/year.

² These estimates are the controlled emissions from regulated point sources and the basis for the facility's PTE and status as a true minor source of criteria pollutants.

³ Fugitive Emissions estimated from Drilling & Blasting, Dozing, Blading, Ore Handling, Ore Haulage, Tailings, Overburden and Leach Dumps. Silver Bell Mine is a non-categorical stationary source. For title V purposes, fugitive emissions from non-categorical sources are not considered in determining whether the source is a major stationary source.

IV. Applicable Requirements

40 CFR, Part 60 Standards of Performance for New Stationary Sources

Subpart A	General Provisions
Subpart IIII	NSPS for Stationary Compression Ignition Internal Combustion Engines
Appendix A	Test Methods

40 CFR Part 63 National Emission Standards for Hazardous Air Pollutants for Source Categories

Subpart A	General Provisions
Subpart ZZZZ	NESHAP for Reciprocating Internal Combustion Engines 'RICE'

Pima County Code Title 17, Chapter 17.12 – Permits and Permit Revisions

Article I – General Provisions

17.12.010	Statutory authority
17.12.020	Planning, constructing, or operating Without a Permit
17.12.040	Reporting requirements
17.12.045	Test methods and procedures
17.12.050	Performance tests
17.12.080	Permit Display or posting

Article II – Individual Source Permits

17.12.140	Applicability - Classes of permits
17.12.165	Permit application processing procedures for Class II and Class III permits
17.12.185	Permit contents for Class II and Class III permits
17.12.235	Facility Changes that require a permit revision
17.12.240	Procedures for certain changes that do not require a permit revision Class II or Class III
17.12.255	Minor Permit Revision
17.12.260	Significant Permit Revision
17.12.270	Permit Reopenings – Revocation and reissuance – Termination
17.12.300	Portable sources
17.12.350	Material permit condition
17.12.470	Fugitive dust activity permits

Article VI – Fees

17.12.520	Fees related to Class II and Class III permits
-----------	--

Pima County Code Title 17, Chapter 17.16 – Emission Limiting Standards

Article I – General Provisions

17.16.010	Local rules and standards; Applicability of more than one standard
17.16.020	Noncompliance with applicable standards
17.16.030	Odor limiting standards

Article II – Visible Emission Standards

- 17.16.040 Standards and applicability (includes NESHAP)
- 17.16.050 Visibility limiting standard

Article III – Emissions from Existing and New Nonpoint Sources

- 17.16.060 Fugitive dust producing activities
- 17.16.070 Fugitive dust emissions standards for motor vehicle operation
- 17.16.080 Vacant lots and open spaces
- 17.16.090 Roads and streets
- 17.16.100 Particulate materials
- 17.16.110 Storage piles
- 17.16.120 Mineral tailings

Article IV – New and Existing Stationary Source Performance Standards

- 17.16.130 Applicability
- 17.16.165 Standards of performance for fossil-fuel fired industrial and commercial equipment
- 17.16.340 Standards of performance for stationary rotating machinery
- 17.16.360 Standards of performance for nonferrous metals industry sources
- 17.16.400 Organic solvents and other organic materials
- 17.16.430 Standards of performance for unclassified sources
- 17.16.450 Standards of performance for off-road machinery
- 17.16.470 Standards of performance for roadway and site cleaning machinery

Pima County Code Title 17, Chapter 17.20 – Emissions Source Testing and Monitoring

- 17.20.010 Source sampling, monitoring and testing
- 17.20.040 Concealment of emissions

Pima County Code Title 17, Chapter 17.24 – Emissions Source Recordkeeping and Reporting

- 17.24.020 Recordkeeping for compliance determination

Pima County Code Title 17, Chapter 17.28 – Violations and Conditional Orders

V. Requirements Specifically Identified as Non-Applicable:

40 CFR, Part 60 Standards of Performance for New Stationary Sources

- Subpart K Storage Vessels for Petroleum Liquids for which Construction, Reconstruction or Modification Commenced After June 11, 1973, and Prior to May 19, 1978
- Subpart Ka Storage Vessels for Petroleum Liquids for which Construction, Reconstruction or Modification Commenced After May 18, 1978, and Prior to July 23, 1984
- Subpart Kb Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction or Modification Commenced After July 23, 1984
- Subpart LL Metallic Mineral Processing Plants

VI. Permit Changes and Applicability Determinations.

A. Permit and Permit Summary:

The specific conditions for non-point fugitive dust is provided in Section 3 .

The specific conditions for mining activities have been provided in Section 4.

The facility has two LPG gas boilers (process tank heaters) and plans to install two new units that are subject to PCC standards. The specific conditions for the LPG gas boilers have been included in Permit Section 5.

The facility has stationary NSPS and NESHAP affected ICE. Sections 6 and 7 contain provisions for stationary NSPS and NESHAP affected ICE

B. Applicability (Section 1):

Section 1 of the permit provides a reference for the specific PCC and federal rules that apply to the facility, operations, and to help organize the permit sections.

C. Facility-Wide Operations (Section 2):

1. This section incorporates the facility-wide standards that apply generally to all sources in Pima County and is used to streamline facility-wide provisions for monitoring, recordkeeping, reporting, facility changes, and testing provisions that apply facility-wide. Provisions for the following general standards are included in this section: General control standards, Materials handling standards, Odor limiting standard, Opacity limit, Visibility Limiting Standard, and Authorization to conduct fugitive dust producing activities.
2. This section also incorporates specific conditions for monitoring, monitoring records, recordkeeping for compliance determinations, reporting requirements, facility changes, and testing requirements that apply facility-wide.

D. Emissions from New and Existing Nonpoint Sources (Section 3):

For the purpose of PCC 17.16.050.D the County non-point source fugitive dust control standards and actions constituting reasonably necessary and feasible precautions to prevent excessive amounts of particulate matter from becoming airborne are provided in this section of the permit.

E. Mining Operations (Section 4):

This section includes provisions for the following: Electro-winning tank-house operations, Petroleum liquid storage tanks, Portable sources, Surface coating and solvent degreasing/cleaning operations, and Abrasive blasting operations.

1. Electro-Winning Tank House Operations

This section requires the use and operation of controls to reduce emissions of sulfuric acid mist generated during the operation of the electro-winning cells. Sulfuric acid mist is a pollutant defined in PCC 17.04.340.A (212) with a significance level of 7 tons. The facility is an unclassified source per PCC 17.16.430, and is subject to PCC 17.16.430.F.

2. Petroleum Liquid Storage Tanks

This section has provisions, taken from 40 CFR 60.110b(b) (NSPS, Subpart Kb cutoff levels for monitoring) which limits the volatility of petroleum or organic liquids that can be stored in tanks at the facility and to avoid triggering federally applicable monitoring and control requirements.

3. Portable Sources

This section has provisions for monitoring the status of portable sources, and for co-located portable facilities that require a permit. The Permittee may need to demonstrate the nonroad engine status of portable ICE generators used at the facility and that they are not stationary sources subject to regulation.

4. Surface Coating and Solvent Degreasing/Cleaning Operations

The previous permit had labeled these activities as insignificant (Surface Coating and Solvent Degreasing/Cleaning Operations and Abrasive Blasting Operations). The renewal permit requires minimal recordkeeping for these periodic operations to demonstrate compliance with the standards when engaged in them.

- a. Applicable provisions for solvent degreasing and cleaning and surface coating operations are incorporated into this section directly from 17.16.400.C. Surface coating operations includes spray paint operations. I.D.1 of Section 4 applies to all spray paint operations except as provided in Tech policy 202 ([see PDEQ Policy No.: TECH-202](#)).
- b. Surface coating, spray paint and architectural coating ‘operations’ as provided in I.D.1 through 4 of Section 3 of the permit applies to any operation or project that uses surface coatings that contain organic solvents or employ organic solvents to apply a protective or decorative polymeric coating to a substrate, unless otherwise excluded by an applicable federal rule in 40 CFR Part 60 – Standards of Performance for new Stationary Sources (NSPS) or Part 63 – National Emission Standards for Hazardous Air Pollutants (NESHAP) and as provided below:
 - i. Per PCC 17.04.340.A (136) and 17.16.400.C.5 the per gallon surface coating standards in I.D.2of Section 4 apply to the application of surface coatings to miscellaneous metal parts and products and include the following:

Large farm machinery, such as harvesting, fertilizing and planting machines, tractors, and combines; Small farm machinery, such as lawn and garden tractors, lawn mowers, and rototillers; Small appliances, such as fans, mixers, blenders, crock pots, dehumidifiers, and vacuum cleaners; Commercial machinery, such as office equipment, computers and auxiliary equipment, typewriters, calculators, and vending machines; Industrial machinery, such as pumps, compressors, conveyor components, fans, blowers, and transformers; Fabricated metal products, such as metal covered doors and frames; and any other industrial category which coats metal parts or products under the code in the "Standard Industrial Classification Manual, 1987" of Major Group 33 (primary metal industries), Major Group 34 (fabricated metal products), Major Group 35 (nonelectric machinery), Major Group 36 (electrical machinery), Major Group 37 (transportation equipment), Major Group 38 (miscellaneous instruments), and Major Group 39 (miscellaneous manufacturing industries).

- ii. The following are excluded from the industrial categories above:

Automobiles and light duty trucks; Metal cans; Flat metal sheets and strips in the form of rolls or coils; Magnet wire for use in electrical machinery; Metal furniture; Large appliances; Exterior of airplanes; Automobile refinishing; Customized top coating of automobiles and trucks, if production is less than 35 vehicles per day; and the exterior of marine vessels.

- iii. The Permittee is prohibited from performing paint stripping operations that involve the use of methylene chloride (MeCl, CAS # 75092), and, except for facility maintenance, the Permittee is prohibited from conducting any spray application of coatings that contain target Hazardous air Pollutants (HAP) unless a revision application and Initial Notification is submitted to the Control Officer in accordance with 40 CFR Part 63, Subpart HHHHHH ([See Summary of Regulations Brochure](#)).

- c. Solvent Degreasing/Cleaning provisions in I.D.3 and II.E of Section 4 of the permit apply to any operation engaged in the employment or application of organic solvents.

5. Abrasive Blasting Operations

The previous permit had labeled these activities as insignificant. The renewal permit requires minimal recordkeeping for these operations when engaged in these operations to demonstrate compliance with the applicable standard in PCC 17.16.100.D.

F. Fossil Fuel Fired Industrial and Commercial Equipment (Section 5)

This Section incorporates applicable PCC requirements and operating restrictions to fire only LPG in the applicable equipment to avoid certain requirements in PCC 17.16.165, and 40 CFR Part 63, NESHAP Subpart JJJJJ for certain classes of boilers.

G. NSPS for Stationary Internal Combustion Engines 'ICE' (Section 6) and NEHSHAP for Stationary Reciprocating ICE (Section 7):

These Sections incorporate specific federal emission limits and requirements for installation and/or operation of emergency compression ignition engines subject to 40 CFR Part 60, NSPS Subpart IIII or 40 CFR Part 63, Subpart ZZZZ. The federal requirements limit emergency engines to less than 100 hours per calendar year for maintenance and testing and emergency demand response, and less than 50 of the 100 hours per year for non-emergency situations if they qualify in accordance with applicable provisions. There are no limitations for the use of the emergency generators for true emergencies.

VI. Periodic Monitoring

This is a class II permit and does not include a semiannual summary report of required monitoring or annual compliance certifications. The permit requires the facility to maintain the required periodic monitoring records on site or as requested by the control officer in order to demonstrate compliance with the standards.

VII. Insignificant Activities.

The insignificant activities in PCC 17.04.340.A (114) and additional sources that have been determined by the control officer, because of their size or production rate, to be de minimus emission sources and insignificant activities are provided in I.C.1 of Section 4 and Attachment 3 of the Permit.

VIII. Impact to Ambient Air Quality

Not a major source for Title V purposes so no impact studies are required.

IX. Control Technology Determination

No control technologies needed to be determined; the source is not subject to RACT, BACT or LAER.

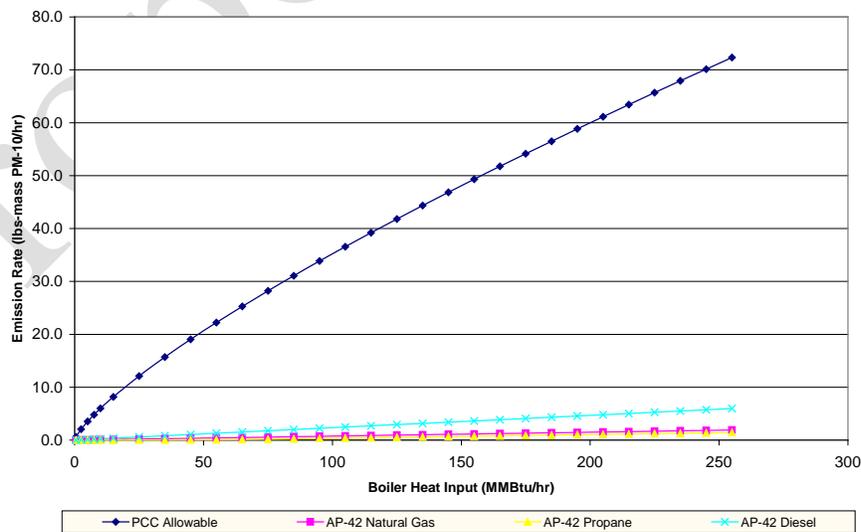
X. Exclusion of PCC Particulate Matter Discharge Rate Standards

The applicable PCC rules for the maximum particulate discharge rates are not normally included for Class II and III area source permits as explained below.

For particulate matter sources, the calculated maximum particulate matter discharge rate, as provided in Title 17, yields maximum rates that far exceed the emissions expected from most typical area sources. For example a 200 ton/hour process source, which is typical for an average construction aggregate screening operation, would be limited to a maximum discharge rate of 40.4 lbs/hour or 177 tons/year. This limit far exceeds estimated emissions from typical sources and the source is far more likely to exceed opacity and visibility limiting standards well before reaching this limit.

With regard to fuel burning equipment, PCC 17.16.165.C limits the emissions of particulate matter from commercial and industrial fossil-fuel fired equipment (including but not limited to boilers). This limit is not normally included in permits because allowable emissions are consistently over an entire order of magnitude higher than EPA AP-42 estimated potential emissions. The chart below, illustrates the point.

Comparison of Emissions of PM-10 for Boilers: PCC Allowable vs AP-42 Estimated



Comparative Chart of Allowable Particulate Emissions Under Pima County Code, Title 17, and Estimated Potential Emissions based on EPA AP-42 Estimates for External Combustion Sources. Allowable emissions are consistently over ten times estimated potential emissions. Therefore, it is not necessary to include the standard in the permit explicitly, but by reference in Attachment 1.