



State of Utah

GARY R. HERBERT
Governor

GREG BELL
Lieutenant Governor

Department of
Environmental Quality

Amanda Smith
Executive Director

DIVISION OF AIR QUALITY
Cheryl Heying
Director

DAQE-AN0112050018-11

March 2, 2011

Jo Ann Tischler
Denison Mines (USA) Corp.
Independence Plaza
1050 17th Street, Suite 950
Denver, CO 80265

Dear Ms. Tischler:

Re: Approval Order: Approval Order Modification to Add a Baghouse, to Allow Alternate Fuel Usage and to Incorporate Work Practice Standards
Project Number: N011205-0018

The attached document is the Approval Order for the above-referenced project. Future correspondence on this Approval Order should include the engineer's name as well as the DAQE number as shown on the upper right-hand corner of this letter. The project engineer for this action is Maung Maung, who may be reached at (801) 536-4153.

Sincerely,

M. Cheryl Heying, Executive Secretary
Utah Air Quality Board

MCH:MM:sa

cc: Southeastern Utah District Health Department

STATE OF UTAH

Department of Environmental Quality

Division of Air Quality

**APPROVAL ORDER: Approval Order Modification to Add a
Baghouse, to Allow Alternate Fuel Usage and to
Incorporate Work Practice Standards**

**Prepared By: Maung Maung, Engineer
Phone: (801) 536-4153
Email: mmaung@utah.gov**

APPROVAL ORDER NUMBER

DAQE-AN0112050018-11

Date: March 2, 2011

Denison Mines (USA) Corp.

White Mesa Mill

Source Contact:

Ms. Jo Ann Tischler, Compliance Specialist

Phone: (303) 389-4132

**M. Cheryl Heying
Executive Secretary
Utah Air Quality Board**

Abstract

Denison Mines (USA) Corp. has requested a modification to add a baghouse, to allow the use of either propane or liquified natural gas (LNG) fuel and to document work practice standards to control fugitive dust for the White Mesa Mill. The Mill is located six miles south of Blanding on Highway 191 in San Juan County.

San Juan County is an attainment area of the NAAQS for all pollutants. White Mesa Mill is subject to NSPS 40 CFR Part 60 Subpart Dc (Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units). NESHAP 40 CFR Part 61 Subpart W (National Emission Standards for Radon Emissions from Operating Mill Tailings) applies to this source. MACT regulations do not apply to this source. Title V of the 1990 Clean Air Act for an area sources applies to this source. This area source does not require a Title V operating permit at the present time. The emissions, in tons per year (tpy), will increase as follows: PM_{10} (including $PM_{2.5}$) = 0.16 and $PM_{2.5}$ = 0.08. The change in emissions will result in the following, in tons per year, potential to emit totals: PM_{10} (including $PM_{2.5}$) = 34.07, $PM_{2.5}$ = 17.08 (not accounted for before), SO_2 = 2.91, NO_x = 39.61, CO = 10.49, VOC = 4.03, hexane = 0.63 and formaldehyde = 0.03.

This air quality AO authorizes the project with the following conditions and failure to comply with any of the conditions may constitute a violation of this order. This AO is issued to, and applies to the following:

Name of Permittee:

Denison Mines (USA) Corp.
Independence Plaza
1050 17th Street, Suite 950
Denver, CO 80265

Permitted Location:

White Mesa Mill
6 Miles south of Blanding
on Highway 191
San Juan County, UT 84511

UTM coordinates: 632,200 m Easting, 4,155,400 m Northing, UTM Zone 12

SIC code: 1094 (Uranium-Radium-Vanadium Ores)

Section I: GENERAL PROVISIONS

- I.1 The limits set forth in this AO shall not be exceeded without prior approval. [R307-401]
- I.2 Modifications to the equipment or processes approved by this AO that could affect the emissions covered by this AO must be reviewed and approved. [R307-401-1]
- I.3 All records referenced in this AO or in other applicable rules, which are required to be kept by the owner/operator, shall be made available to the Executive Secretary or Executive Secretary's representative upon request, and the records shall include the two-year period prior to the date of the request. Unless otherwise specified in this AO or in other applicable state and federal rules, records shall be kept for a minimum of two (2) years. [R307-401-8]
- I.4 At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any equipment approved under this AO, including associated air pollution control equipment, in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to

the Executive Secretary which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source. All maintenance performed on equipment authorized by this AO shall be recorded. [R307-401-4]

- I.5 The owner/operator shall comply with R307-150 Series. Inventories, Testing and Monitoring. [R307-150]
- I.6 The owner/operator shall comply with UAC R307-107. General Requirements: Unavoidable Breakdowns. [R307-107]
- I.7 All definitions, terms, abbreviations, and references used in this AO conform to those used in the UAC R307 and 40 CFR. Unless noted otherwise, references cited in these AO conditions refer to those rules. [R307-101]

Section II: SPECIAL PROVISIONS

II.A The approved installations shall consist of the following equipment:

II.A.1 Uranium Mill

II.A.2 Uranium Drying and Pollution Control
(Yellowcake Circuit)

II.A.3 One (1) Yellowcake South Dryer YC

Dryer Type:	Six hearth rotary Skinner dryer
Fuel Type:	Propane or liquified natural gas
Heat Input Capacity:	3 MMBtu/hr

II.A.4 Air Pollution Equipment for the South Dryer - One (1) Ducon Dry Cyclone followed by one (1) Ducon scrubber with cyclonic separator

Wet Scrubber Model:	UW4, Size 36, Scrubber with Demister
Design Flow Rate:	3,800 acfm (150 degrees F)
Estimated Emission Rate:	0.016 gr/dscf PM ₁₀ 0.02 gr/dscf PM

II.A.5 One (1) Yellowcake North Dryer

Dryer Maker:	Six hearth rotary Skinner dryer
Fuel Type:	Propane or liquified natural gas
Heat Input Capacity:	2.4 MMBtu/hr

- II.A.6 Air Pollution Equipment for the North Dryer - Dry cyclonic separator followed by one (1) Ducon Venturi scrubber with Ducon packed demister
- Design Flow Rate: 3,160 acfm (140 degrees F)
 Estimated Emission Rate: 0.016 gr/dscf PM₁₀
 0.02 gr/dscf PM
- II.A.7 Packaging Area Baghouse: Both dryers (south & north) discharge into a common hopper located in the enclosed packing area. The packing area is under negative pressure and all the generated dust discharges through a baghouse.
- Design Flow Rate: 5,000 acfm (68 degrees F)
 Estimated Emission Rate: <0.01 gr/dscf, PM
- II.A.8 **Vanadium Dryer and Pollution Control**
- II.A.9 One (1) Ammonium Meta-Vanadate (AMV) Dryer
- Fuel Type: Propane or liquified natural gas
 Heat Input Capacity: 7.74 MMBtu/hr
- II.A.10 Two (2) Fusion Furnaces and casting wheels vented through the AMV Dryer
- Furnace Type: Single Burner for each furnace
 Fuel Type: Propane or liquified natural gas
 Heat Input Capacity: up to 1.8 MMBtu/hr
- II.A.11 Air Pollution Equipment for AMV Dryer & Furnaces: Dry cyclone followed by the Sly # 6 Ducon Venturi scrubber. The scrubber is connected in parallel to a mist eliminator and a fan which discharges to the final stack.
- Scrubber Flow: 7,910 acfm (370 degrees F)
- II.A.12 Two (2) Multi Hearth Dryers serve as back up for the fusion furnaces. Controlled with a Kice Dry Cyclone followed by a Ducon Venturi wet scrubber. The scrubber is connected in parallel to a mist eliminator and a fan which discharges to the final stack.
- Scrubber Flow: 27,800 acfm (440 degrees F)
- II.A.13 One (1) Rotary Calciner. Controlled by the Sly #6 Ducon Venturi scrubber listed above
- Dryer Make: Barlett/Snow Rotary Multi Burner
 Fuel Type: Propane or liquified natural gas
 Heat Input Capacity: 4.0 MMBtu/hr
- II.A.14 One (1) Mist Eliminator

II.A.15 **Leach Process Control**

Leach Mist Eliminator

II.A.16 **Boilers**

II.A.17 One (1) Superior Boiler - Pre-NSPS (Manufactured in 1987)

Fuel Type: Propane or liquified natural gas
 Type of Burner: 66 ppm NO_x
 Heat Input Capacity: up to 23.5 MMBtu/hr

II.A.18 One (1) Cyclotherm Boiler

Fuel Type: Propane or liquified natural gas
 Heat Input Capacity: up to 5.0 MMBtu/hr

II.A.19 One (1) Low NO_x Superior Boiler Works

Model: 6X-5-3000-5151-PF-LPG
 Fuel Type: Propane or liquified natural gas
 Heat Input Capacity: up to 25.2 MMBtu/hr

II.A.20 **Baghouses**

II.A.21 One (1) Grizzly Baghouse

Design Rate: 5,000 acfm
 Grain Loading: 0.02 gr per acf

II.A.22 One (1) Baghouse for Yellowcake Dryer Enclosures and Hoppers

Emission Rate: 0.02 gr/dscf PM (0.73 lb/hr)
 0.16 gr/dscf PM₁₀ (0.58 lb/hr)

II.A.23 Dry Soda Ash Silo Bin Baghouse (Scientific Dust Collectors), and Packing Area Vents Baghouse

II.A.24 Cartridge Filter Baghouse with 24 cartridges

Design Rate: 12,500 acfm
 Grain Loading: 0.0014 gr/scf

II.A.25 Analytical Laboratory Sample Preparation Room (Bucking Room) Baghouse (new addition)

Design Rate: 1,000 acfm
 Grain Loading: 0.005 gr/scf (estimated)

II.A.26 Leaching and Vanadium Demister Scrubber

Process Rate: 250 tons/year
 Design Rate: 0.07 lb/hr of SO₂

II.A.27 Fire Pump

Fuel Type: # 2 Diesel
 Rated at: up to 365 bhp

II.A.28 Emergency Generator

Fuel Type: #2 Diesel
 Electrical Output: up to 565 kW

II.B Requirements and Limitations

II.B.1 Uranium Mill

II.B.1.a Denison Mines (USA) Corp. shall notify the Executive Secretary in writing when the installation of the baghouse in Bucking Room has been completed and is operational. To ensure proper credit when notifying the Executive Secretary, send your correspondence to the Executive Secretary, attn: Compliance Section.

If the installation has not been completed within 18 months from the date of this AO, the Executive Secretary shall be notified in writing of the status of the installation. At that time, the Executive Secretary shall require documentation of the continuous installation of the operation and may revoke the AO. [R307-401-18]

II.B.1.b The following production and/or consumption limits shall not be exceeded:

- 1) 720,720 tons of ore processing per rolling 12-month total
- 2) Total 267,960 MMBtu heat input per rolling 12-month total for the entire source except the Superior Boiler Works outlined below.
- 3) Total 220,752 MMBtu heat input per rolling 12-month total for the Superior Boiler Works model X6-5-3000-5150-PF-LPG

To determine compliance with a rolling 12-month total, by the first day of each month a new 12-month total shall be calculated using data from the previous 12 months. Monthly calculations shall be made no later than 20 days after the end of each calendar month. Records of production/consumption shall be kept for all periods when the plant is in operation. Ore production shall be determined from plant records. The records of production shall be kept on a daily basis. Propane or liquified natural gas consumption shall be determined from purchase order receipts and monthly inventories. The annual total heat input shall be calculated by using heat value of 82,265 Btu per gallon for LNG and 90,500 Btu per gallon for propane. Records of purchase orders shall be maintained. [R307-401-8]

II.B.1.c Visible emissions from the following emission points shall not exceed the following values:

- 1) Ore loading Areas - 15% opacity
- 2) Vanadium Circuit - 15% opacity
- 3) All baghouses - 10% opacity
- 4) All diesel engines - 20% opacity
- 5) Conveyor drop points - 20% opacity
- 6) Propane or liquified natural gas-fired, low NO_x boiler - 10% opacity
- 7) All other points - 20% opacity

Opacity observations of emission from stationary sources shall be conducted in accordance with 40 CFR Part 60, Appendix A, Method 9. [R307-201-3]

II.B.1.d Emergency generators shall be used for electricity-producing operation only during the periods when electric power from the public utilities is interrupted, or for regular maintenance of the generators. Records documenting generator usage shall be kept in a log; and they shall show the date the generator was used, the duration in hours of the generator usage, and the reason for each generator usage. [R307-401-8]

II.B.2 **Limits and Test Procedures**

II.B.2.a Emissions to the atmosphere at all times from the indicated emission points shall not exceed the following ratings and concentrations:

Source: Vanadium Circuit scrubbers

Pollutant	lb/hr	grains/dscf (68 degrees F, 29.92 Hg)
PM ₁₀	2.5	0.02

Source: Yellowcake Dryer scrubbers

Pollutant	lb/hr	grains/dscf (68 degrees F, 29.92 Hg)
PM ₁₀	0.4	0.003 each

[R307-401-8]

II.B.2.b Stack testing to show compliance with the emission limitations stated in the above condition shall be performed as specified below:

Compliance Test: A compliance test shall be done at least once every five years subsequent to the initial compliance test on the Vanadium Circuit Scrubber and Yellowcake Dryers. The Executive Secretary may require testing at any time. If an existing source is modified, a compliance test is required on the modified emission point that has an emission rate limit.

Notification: The Executive Secretary shall be notified at least 30 days prior to conducting any required emission testing. A source test protocol shall be submitted to DAQ when the testing notification is submitted to the Executive Secretary.

The source test protocol shall be approved by the Executive Secretary prior to performing the test(s). The source test protocol shall outline the proposed test methodologies, stack to be tested, and procedures to be used. A pretest conference shall be held, if directed by the Executive Secretary.

Sample Location: The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or other methods as approved by the Executive Secretary. An Occupational Safety and Health Administration (OSHA) or Mine Safety and Health Administration (MSHA) approved access shall be provided to the test location.

Volumetric Flow Rate: 40 CFR 60, Appendix A, Method 2 or other testing methods approved by the Executive Secretary.

PM₁₀: For stacks in which no liquid drops are present, the following methods shall be used: 40 CFR 51, Appendix M, Methods 201, 201a, or other testing methods approved by the Executive Secretary. The back half condensibles shall also be tested using the method specified by the Executive Secretary. All particulate captured shall be considered PM₁₀.

For stacks in which liquid drops are present, methods to eliminate the liquid drops should be explored. If no reasonable method to eliminate the drops exists, then the following methods shall be used: 40 CFR 60, Appendix A, Method 5, 5a, 5d, or 5e as appropriate, or other testing methods approved by the Executive Secretary. The back half condensibles shall also be tested using the method specified by the Executive Secretary. The portion of the front half of the catch considered PM₁₀ shall be based on information in Appendix B of the fifth edition of the EPA document, AP-42, or other data acceptable to the Executive Secretary.

The back half condensibles shall not be used for compliance demonstration but shall be used for inventory purposes.

Existing Source Operation: For an existing source/emission point, the production rate during all compliance testing shall be no less than 90% of the maximum production achieved in the previous three (3) years. [R307-165]

II.B.3 **Fuel**

II.B.3.a The owner/operator shall use propane or liquified natural gas as fuel in the two yellowcake dryers, vanadium multi hearth dryer, rotary calciner, AMV dryer, fusion furnaces and boilers. [R307-401-8]

II.B.3.b Number 2 or better diesel fuel shall be used in the mobile equipment, emergency generator and fire pump engine.

The sulfur content of any fuel oil or diesel burned shall not exceed 0.05 percent by weight for diesel fuels consumed in all other equipment. The sulfur content shall be determined by ASTM Method D-4294-89 or approved equivalent. Certification of sulfur content oil shall be either by Denison Mines (USA) Corporation's own testing or test reports from the fuel marketer. [R307-401-8]

II.B.4 **Roads & Fugitive Dust**

II.B.4.a Denison Mines (USA) Corp. shall comply with all applicable requirements of R307-205 for Fugitive Emission and Fugitive Dust sources. To be in compliance, the source must operate in accordance with the most current version. [R307-205]

II.B.4.b Visible fugitive dust emissions from haul-road traffic and mobile equipment in operational areas shall not exceed 20% opacity. Visible emissions determinations from traffic sources shall use procedures similar to Method 9. The normal requirement for observations to be made at 15-second intervals over a six-minute period, however, shall not apply. Visible emissions shall be measured at the densest point of the plume but at a point not less than half vehicle length behind the vehicle and not less than half the height of the vehicle. [R307-205]

II.B.4.c All unpaved roads and other unpaved operational areas that are used by mobile equipment shall be water sprayed and/or chemically treated to control fugitive dust. Treatment shall be of sufficient frequency and quantity to maintain the surface material in a damp/moist condition. The opacity shall not exceed 20% during all times the areas are in use or unless it is below freezing. If chemical treatment is to be used, the plan must be approved by the Executive Secretary. [R307-401-8]

II.B.4.d Any section of paved road under the owner/operator's jurisdiction shall be periodically swept or sprayed clean as dry conditions warrant or as determined necessary by the Executive Secretary. Records of cleaning paved roads shall be made available to the Executive Secretary or the Executive Secretary's representative.

All records shall include the following items:

- 1) Date
- 2) Number of treatments made
- 3) Rainfall received, if any, and approximate amount
- 4) Time of day treatments was made

[R307-205-7]

II.B.4.e Unpaved haul/access road shall have at least one inch of gravel as road-base surface or will be watered and/or chemically treated as needed to meet the 20% opacity requirement. [R307-401-8]

- II.B.4.f The storage piles shall be watered to minimize generation of fugitive dusts as dry conditions warrant or as determined necessary by the Executive Secretary. [R307-401-8]
- II.B.4.g Fugitive dust from the disturbed areas shall be controlled through the use of watering as dry conditions warrant or as determined necessary by the Executive Secretary. The speed of compactors shall not exceed three (3) miles per hour (mph) at any time. [R307-401-8]
- II.B.4.h For front-end loading operations and truck-dumping operations, the drop distances shall be kept as small as practicable. The speed of the scrapers shall not exceed three (3) mph while loading and twelve (12) mph while dumping. The moisture content of the materials shall be no less than four percent by weight during these operations. The moisture content shall be tested if directed by the Executive Secretary using a test method approved by the Executive Secretary. [R307-401-8]
- II.B.4.i The ore grizzly shall be enclosed on three sides and have wetting agents applied at the apron feeder and the conveyor discharge as needed. Additionally the baghouse dust collection system shall be utilized at the grizzly and apron feeder tunnel. [R307-401-8]
- II.B.4.j The tailings retention areas shall be sprayed with water or a crusting agent when dry conditions exist or as determined necessary by the Executive Secretary. [R307-401-8]
- II.B.4.k The mill area shall be graveled and shall be sprayed with water to minimize fugitive dust as dry conditions warrant or as determined by the Executive Secretary. [R307-401-8]

Section III: APPLICABLE FEDERAL REQUIREMENTS

In addition to the requirements of this AO, all applicable provisions of the following federal programs have been found to apply to this installation. This AO in no way releases the owner or operator from any liability for compliance with all other applicable federal, state, and local regulations including UAC R307.

- NESHAP (Part 61), A: General Provisions
- NESHAP (Part 61), W: Radon From Operating Mill Tailings
- NSPS (Part 60), A: General Provisions
- NSPS (Part 60), Dc: Small Indus Com InstittnSteam Generator

PERMIT HISTORY

This AO is based on the following documents:

- | | |
|-----------------|--|
| Incorporates | Additional Information dated August 26, 2010 |
| Incorporates | Additional information dated June 23, 2010 |
| Supersedes | DAQE-AN0112050017 dated May 10, 2010 |
| Is Derived From | NOI dated January 5, 2009 |

ADMINISTRATIVE CODING

The following information is for UDAQ internal classification use only:

San Juan County

CDS B

Attainment Area, NESHAP (Part 61), NSPS (Part 60)

ACRONYMS

The following lists commonly used acronyms and associated translations as they apply to this document:

40 CFR	Title 40 of the Code of Federal Regulations
AO	Approval Order
BACT	Best Available Control Technology
CAA	Clean Air Act
CAAA	Clean Air Act Amendments
CDS	Classification Data System (used by EPA to classify sources by size/type)
CEM	Continuous emissions monitor
CEMS	Continuous emissions monitoring system
CFR	Code of Federal Regulations
CO	Carbon monoxide
CO ₂	Carbon Dioxide
CO ₂ e	Carbon Dioxide Equivalent - 40 CFR Part 98, Subpart A, Table A-1
COM	Continuous opacity monitor
DAQ	Division of Air Quality (typically interchangeable with UDAQ)
DAQE	This is a document tracking code for internal UDAQ use
EPA	Environmental Protection Agency
GHG	Greenhouse Gas(es) - 40 CFR 52.21 (b)(49)(i)
GWP	Global Warming Potential - 40 CFR Part 86.1818-12(a)
HAP or HAPs	Hazardous air pollutant(s)
ITA	Intent to Approve
LB/HR	Pounds per hour
MACT	Maximum Achievable Control Technology
MMBTU	Million British Thermal Units
NAA	Nonattainment Area
NAAQS	National Ambient Air Quality Standards
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOI	Notice of Intent
NO _x	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
PM ₁₀	Particulate matter less than 10 microns in size
PM _{2.5}	Particulate matter less than 2.5 microns in size
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
R307	Rules Series 307
R307-401	Rules Series 307 - Section 401
SO ₂	Sulfur dioxide
Title IV	Title IV of the Clean Air Act
Title V	Title V of the Clean Air Act
TPY	Tons per year
UAC	Utah Administrative Code
UDAQ	Utah Division of Air Quality (typically interchangeable with DAQ)
VOC	Volatile organic compounds