



State of Utah

GARY R. HERBERT
Governor

SPENCER J. COX
Lieutenant Governor

Department of
Environmental Quality

Alan Matheson
Executive Director

DIVISION OF AIR QUALITY
Bryce C. Bird
Director

DAQ-040-17

MEMORANDUM

TO: Air Quality Board

THROUGH: Bryce C. Bird, Executive Secretary

FROM: Joel Karmazyn, Environmental Scientist

DATE: May 24, 2017

SUBJECT: PROPOSE FOR PUBLIC COMMENT: Amend R307-335. Degreasing and Solvent Cleaning Operations; and New Rule R307-304. Solvent Cleaning.

At the January 2017 Board meeting, the Board proposed to remove the volatile organic compound (VOC) limits for industrial solvents used for cleaning from R307-335 and add the limits to a new rule, R307-304. The public comment period for those proposals was from March 1 to March 31, 2017. A public hearing was held during the public comment period that was attended by major point sources. Commenters identified significant unintended consequences with the draft R307-304 rule. Consequently, we withdrew the rule after the public comment period in order to address valid concerns, and we have been engaged with a number of industry stakeholders and EPA to re-draft R307-304.

Rulemaking Proposal

The degreasing rule (R307-335) was amended under the Moderate PM_{2.5} State Implementation Plan (SIP) to include industrial solvent cleaning (R307-335-7 and 8) because solvent cleaning is technically a form of degreasing. In order to achieve further VOC reductions from industrial solvent cleaning operations, which will be required for the Serious area PM_{2.5} SIPs, we are proposing the following:

1. Amend R307-335 by removing the industrial solvent cleaning sections found in R307-335-7 and R307-335-8.
2. Move the industrial solvent cleaning requirements in R307-335 to a new solvent rule, R307-304.
3. Lower the threshold for gallons of solvent used in the applicability section of R307-304 to 55 gallons or more per year.
4. Introduce a solvent vapor pressure alternative to the density based limits.

Best Available Control Measure (BACM) Analysis

The requirements for R307-335-7 were derived from the EPA guidance for industrial solvent cleaning (EPA 453/R-06-001). EPA recommends that states set the applicability threshold for industrial solvent cleaning rules at 15 lbs. of VOCs/day or approximately 720 gallons of solvent/year in order to meet Reasonably Available Control Measures (RACM). The Board approved R307-335-7 at that level.

Based on EPA's reclassification of the Salt Lake and Utah County PM_{2.5} nonattainment areas from Moderate to Serious, Utah's area source rules will have to be based on the more stringent standard of BACM.

Several state and air district rules that regulate industrial solvent cleaning apply the EPA's VOC content limit recommendations for aqueous-based solvent cleaning and an applicability threshold of 15 lbs. of VOCs/day. The San Joaquin Valley Unified Air Pollution Control District Rule 4663, *Organic Solvent Cleaning, Storage, and Disposal*, is the most stringent rule because its applicability is set at 55 gallons or more of solvent products in any consecutive 12 month period. It also requires some solvent cleaning operations to use solvents at or below 0.21 lb/gallon.

Amending the current rule applicability to 55 gallons or more in a year (0.15 gallon/day) would essentially regulate most industrial solvent cleaning within the PM_{2.5} nonattainment areas that is not already regulated under industry specific coating rules.

R307-335-7 originally included the extremely low VOC content requirements found in Rule 4663. Unfortunately, stakeholders did not provide comments on the original rule until after the rule was approved by the Board. Subsequently, we began to receive industry complaints that the extremely low VOC content limits were not achievable. In some cases, the only option was to use an acetone based solvent. Sources cited flammability concerns, equipment damage and/or solubility incompatibility with acetone usage. The Board responded by amending the rule by increasing the solvent content limits, the lowest limit being set at 2.5 lb/gal. As we have proceeded to review all of the coating rules for the next SIP submittals, we continue to receive comments regarding stakeholder concern about cleaning solvent emission limits that are mandated in California rules. Consequently, we have worked with EPA and industry to find a solution to this issue. We are proposing to provide a vapor pressure limit as an alternative to the density based limits.

Basis for Solvent Vapor Pressure Alternative

Traditionally, we have developed density based limits (mass/volume) for solvent use categories, but as we tighten the density based limits in order to further improve our air quality, we are faced with technical and safety limitations. This is because the density limits become so stringent that we preclude the use of all solvents but acetone. Acetone is not a universal solvent. It cannot be used for every industrial solvent cleaning activity. There are also safety and health concerns with the wide use of acetone. Consequently, we are proposing to offer an alternative option of using low vapor pressure solvent formulations.

The advantages of low vapor pressure solvent formulations include:

- The low solvent evaporation rate reduces product wastage. Surface cleaning solvents are only effective in their liquid state. This means that the more they evaporate, the more solvent is needed to complete the task. Using less solvent reduces costs.
- The low solvent evaporation reduces emissions to the outside air.
- The low solvent evaporation reduces emissions in the work place, improving worker safety.
- Using low vapor pressure solvent formulations avoids the use of hazardous air pollutant chemicals like methylene chloride.

How Will Using A Vapor Pressure Limit Provide More Cleaning Options?

Excellent cleaning solvents like xylene have a high vapor pressure. If the vapor pressure of a xylene solution is suppressed, xylene could be used for cleaning while reducing emissions. This can be done by applying a physical-chemical phenomenon known as Raoult's Law. Raoult's Law states that when a substance is dissolved in a solution, the vapor pressure of the solution will decrease. Finding ways to formulate salts (the substance) for example, into a xylene solution, will dramatically reduce the vapor pressure of the solution. Changing the form of the limit will permit formulation chemists to come up with more cleaning options while reducing VOC emissions.

Selecting a Vapor Pressure Limit

The EPA industrial cleaning solvent guidance document provides recommended control measures that include options to reduce VOC emissions. One of those options is to apply a composite vapor pressure limit of 8 millimeters of mercury (mmHg) at 20 degrees Celsius.

Emission Reduction and Cost

R307-304 is estimated to reduce VOC emissions by 28% at a cost of approximately \$4.36/ton removed (assuming solvent substitution).

Recommendation: Staff recommends that the Board propose new rule R307-304 and the amendments to R307-335 for a 45-day public comment period.