MEMORANDUM

TO: Kim Teal and Keith Barnett, U.S. Environmental Protection Agency

FROM: Eastern Research Group, Inc. (ERG)

DATE: January 12, 2015

SUBJECT: Methodology for Estimating Emission Reductions from Specialty Coating Application Operations for Proposed Amendments to 40 CFR 63, Subpart GG, National Emission Standards for Aerospace Manufacturing and Rework Facilities

1.0 INTRODUCTION AND SUMMARY OF RESULTS

This memorandum describes the methodology and summarizes the results of estimating the potential emission reductions from specialty coating operations for the proposed amendments to the Aerospace NESHAP. Potential emission reductions were calculated as a result of complying with the requirements to meet VOC and HAP emission limits for specialty coating operations, and for complying with requirements to use high-efficiency application methods for spray applied specialty coatings.

The EPA estimated that annual HAP emissions from specialty coatings are about 360 tpy; inorganic HAP emissions are about 5 tpy and the remainder is organic HAP emissions. These baseline emission estimates are based on the specialty coating emissions estimate used in the final residual risk modeling file, which was developed from the 2011 information collection request for 2008 emissions data, and supplemented with data from the 2011 National Emission Inventory (NEI) and 2005 National Air Toxics Assessment (NATA).

The estimated emission reductions are 58 tons of HAP from the proposed regulation of specialty coatings.

2.0 ESTIMATED EMISSION REDUCTIONS FROM COMPLIANCE WITH PROPOSED VOC AND HAP EMISSION LIMITS

The EPA estimated that compliance with the proposed VOC and HAP emission limits would achieve a HAP emission reduction of 14.3 tons per year of organic HAP.

To determine emission reductions from compliance with the proposed VOC and organic HAP emission limits, the EPA compared the calculated HAP content of each specialty coating, in units of grams of HAP per liter of coating (g/liter), to the proposed VOC and organic HAP content limits. However, it is important to note that the proposed VOC limits are in units of VOC g/liter (less water and exempt solvents), and the HAP limits are in units of HAP g/liter (less water).

The EPA did not have sufficient information from the ICR data on water content to convert the HAP content in g/liter to g/liter (less water), or to calculate the VOC content as VOC g/liter (less water and exempt solvents). If water is present in any of the coatings, then correcting for the water content would increase the calculated HAP content relative to the proposed HAP limit for that coating category, and could possibly increase the number of coatings that would not be in compliance, and this may increase the estimated HAP reductions.

It is also important to note that these reductions are based on the assumption that facilities will not use averaging of specialty coatings to demonstrate compliance. The use of averaging would reduce the potential emission reductions.

These reductions are also based on the assumption that a non-compliant coating would be replaced with a coating with a HAP content exactly equal to the limit for that specialty coating category, instead of with another coating that would have a HAP content lower than the limit. The latter would lead to greater emission reductions than estimated.

3.0 ESTIMATED EMISSION REDUCTIONS FROM COMPLIANCE WITH PROPOSED REQUIREMENTS FOR HIGH EFFICIENCY COATING APPLICATION METHODS

The EPA estimated that compliance with the proposed requirements for high-efficiency coating application methods would achieve an estimated HAP emission reduction of 43.4 tons per year. The high-efficiency application methods would affect both organic and inorganic HAP emissions equally, but the reductions would be almost entirely of organic HAP emissions because organic HAP represent over 98 percent of the HAP emissions from specialty coatings.

The EPA assumed a 20 percent reduction in emissions for each spray applied specialty coating used at a facility outside California. The 20 percent reduction in emissions would be due to a 20 percent reduction in coating consumption when switching to high-efficiency coating application methods. The 20 percent reduction in consumption and emissions would be equivalent to an increase in transfer efficiency from 40 percent efficiency to 50 percent efficiency.

For example, at 40 percent transfer efficiency, a coating applicator needs to spray 2.5 gallons of coating to achieve 1.0 gallon of coating on the part's surface. At 50 percent transfer efficiency, a coating applicator needs to spray only 2.0 gallons of coating to achieve 1.0 gallon of coating on the part's surface. The reduction from 2.5 gallons to 2.0 gallons represents a 20 percent reduction in coating consumption and emissions.

The EPA did not apply these reductions to specialty coatings used at facilities in California because many of the California aerospace surface coating rules require the use of high efficiency application methods for all coatings, with no exceptions for specialty coating application operations. State rules outside California, based on the Aerospace CTG,[1] often allow an

[1] Guideline Series: Control of Volatile Organic Compound Emissions from Coating Operations at Aerospace Manufacturing and Rework Operations. Emission Standards Division, U. S. Environmental Protection Agency, Office of Air and Radiation, Office of Air Quality Planning and Standards, Research Triangle Park, NC 27711, December 1997. Publication No. EPA-453/R-97-004.

exemption from the application equipment requirements for specialty coatings, as found on the Aerospace CTG model rule.

In addition, the EPA applied this reduction only to specialty coating categories that were assumed to be spray applied. The following specialty coating categories were assumed to be applied with non-spray application methods, and no reductions were not applied to these specialty coating categories:

- Adhesive – Nonstructural
- Adhesive - Structural Autoclavable
- Adhesive - Structural Nonautoclavable
- Caulking and Smoothing Compound
- Critical use and line sealer maskant
- Cyanoacrylate Adhesive
- Dry lubricative material
- Fuel Tank Adhesive
- Rocket motor bonding adhesive
- Rubber-Based Adhesive
- Screen Print Ink
- Seal coat maskant
- Sealant - Extrudable / Rollable / Brushable