



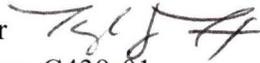
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
RESEARCH TRIANGLE PARK, NC 27711

JUN 30 2015

OFFICE OF
AIR QUALITY PLANNING
AND STANDARDS

MEMORANDUM

SUBJECT: Summary of CALPUFF Ownership since 2003 Promulgation

FROM: Tyler J. Fox, Group Leader 
Air Quality Modeling Group, C439-01
Office of Air Quality Planning and Standards

TO: Proposed Regulatory Docket No. EPA-HQ-OAR-2015-0310

Introduction

The 2003 *Guideline* recommended the CALPUFF modeling system as the preferred model for long-range transport (*i.e.*, source-receptor distances of 50 to several hundred kilometers) of emissions from point, volume, area, and line sources for primary criteria pollutants (*e.g.*, PM and SO₂). EPA issued a number of communications in 2004 with the model developer, Earth Tech's Atmospheric Studies Group, to address the use of this modeling system for long range assessments consistent with the *Guideline*, to emphasize the need for modeling protocols, and to provide clarity on need for EPA approval to change the "EPA recommended" version of the model in the context of continual evolution of the modeling system (Fox, 2004; U.S. EPA, 2004). To facilitate the process of updating the system, EPA developed the CALPUFF Update Tool for use in the approval process that first presented at the 8th Modeling Conference and has been applied for each model update since 2007.

Over the past decade, we have experienced a number of complex applications of the CALPUFF modeling system that challenged its regulatory performance and required frequent interactions across the modeling community including those between EPA, the model developer and other stakeholders. During this same timeframe, there were a number of developments to the CALPUFF modeling system that necessitated additional interactions across EPA, the model developer and other stakeholders. These interactions have been complicated by the changes in ownership and the related uncertainties of the development process which was evident during the update to the VISTAS version of CALPUFF as summarized by EPA presentations at the 9th Modeling Conference.

This memorandum provides details on the frequent changes in ownership of this modeling system as support of the EPA's concerns about the management and maintenance of the model code since its promulgation in the 2003 *Guideline*.

Chronology of Model Updates and Changes in Ownership

- April 2003: EPA promulgates the CALPUFF modeling system, version 5.7, as its preferred long-range transport model for regulatory applications under the 2003 revisions to the *Guideline*.
- May 2004: EPA formally arranges for Earth Tech's Atmospheric Studies Group to openly distribute at no cost on their website (www.src.com) the CALPUFF modeling system code, processors, and documentation (Fox, 2004)
- April 2006: EPA learns that TRC Environmental Corporation has purchased the CALPUFF modeling system from Earth Tech Inc. with management and staff of the Atmospheric Studies Group joining TRC.
- April 2006: Model developer updates the CALPUFF modeling system with a new Version 6 series in conjunction with MMS and updates to Version 5 series in conjunction with VISTAS.
- May 2006: EPA approves an update to the CALPUFF modeling system to version 5.711a to address various bug fixes (as described in Model Change Bulletin A).
- June 2007: EPA approves update to the CALPUFF modeling system to version 5.8 based on the VISTAS series of codes (as described in Model Change Bulletins B, C, and D).
- November 2010: Model developer updates the CALPUFF modeling system, version 6 series, with new chemistry options based on Karamchandani et al (2008).
- May 2011: EPA learns of the departure of key management and staff of TRC's Atmospheric Studies Group responsible for the CALPUFF modeling system to Exponent, Inc.
- December 2013: EPA approves updates to the CALPUFF modeling system to version 5.8.4 to address various bug fixes (as described in Model Change Bulletins E, F, and G).
- June 2014: EPA is advised by TRC Environmental Corporation that it has assigned all rights to the CALPUFF Modeling System to Exponent, Inc (Dodd, 2015)
- June 2015: Model developer updates the CALPUFF modeling system with a new Version 7 series and bug fixes to the EPA recommended version 5.8.4.

Summary

To summarize, the EPA is providing this memorandum to the docket of the “Revision to the Guideline on Air Quality Models: Enhancements to the AERMOD Dispersion Modeling System and Incorporation of Approaches to Address Ozone and Fine Particulate Matter” proposed rule as support of the EPA’s concerns about the management and maintenance of the CALPUFF modeling system since its promulgation in the 2003 *Guideline*. As shown above, there have been a number of updates to the CALPUFF modeling system both in the EPA approved series 5 versions and in the model developer’s series 6 versions with a lag in the ability for EPA to adequately understand, review and approve changes largely due to the lack of an open development process. In fact, just prior to release of this memorandum, EPA was informed by Exponent, Inc of updates to the CALPUFF modeling system with a new Version 7 release and bug fixes to the EPA recommended version 5.8.4 without any prior notice. Since the promulgation of the CALPUFF modeling system, the regulatory application of this modeling system has been unduly complicated by these changes in ownership and the related uncertainties of the development process for this modeling system.

If you have additional questions regarding this memorandum or the proposed rulemaking, please feel free to contact me, (919) 541-5562 or fox.tyler@epa.gov, or contact George Bridgers, (919) 541-5563 or bridgers.george@epa.gov.

References

- Dodd, Martin H, 2015. “RE: CALPUFF”, Letter to Tyler Fox, U.S. EPA, June 17, 2014.
- Fox, Tyler J, 2006. “EPA approval of CALPUFF v5.711a”, Letter to Joseph S. Scire, TRC, May 26, 2006.
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- Karamchandani, P., S Chen, and C Seigneur, 2008. “CALPUFF Chemistry Updates”, Report prepared for American Petroleum Institute. Atmospheric & Environmental Research Inc, San Ramon, CA. February 2008.
- U.S. EPA, 2004. “Application of CALPUFF for Long-Range Transport”, Memorandum from Peter Tsirigotis, U.S. EPA/OAQPS, Research Triangle Park, NC. May 10, 2004.

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