

**Test/QA Plan for Testing of Dust Suppressant Products  
at Maricopa County, Arizona**

EPA Cooperative Agreement No. R 82943401 with RTI  
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MRI Project No. 101494

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at Maricopa County, Arizona

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## LIST OF ACRONYMS/ABBREVIATIONS

ADQ	audit of data quality	in.	inch(es)
AED	MRI's Applied Engineering Division	kg	kilogram(s)
ANSI	American National Standards Institute	kph	kilometer(s) per hour
APCTVC	Air Pollution Control Technology Verification Center (ETV program at RTI)	L	liter(s)
		L/m <sup>2</sup>	liter(s) per square meter
		lb	pound(s)
		m	meter(s)
ASTM	American Society for Testing and Materials	m/s	meter(s) per second
		m <sup>2</sup>	square meter(s)
CAR	corrective action report	m <sup>3</sup> /s	cubic meter(s) per second
CE	control efficiency	mg	milligram(s)
cfm	cubic feet per minute	mg/ft	milligram(s) per foot
cm	centimeter(s)	mm	millimeter(s)
cm <sup>2</sup>	square centimeter(s)	mph	mile(s) per hour
cmh	cubic meter(s) per hour	MRI	Midwest Research Institute
cms	cubic meter(s) per second	NIST	National Institute of Standards and Technology
DQO	data quality objective	PEA	performance evaluation audit
EPA	U.S. Environmental Protection Agency	PM	particulate matter
ETV	Environmental Technology Verification (EPA program)	QA	quality assurance
		QC	quality control
FLW	Fort Leonard Wood	QMP	quality management plan
ft	feet	QSM	quality system manual
g	gram(s)	RSD	relative standard deviation
g/L	gram(s) per liter	RTI	Research Triangle Institute
gal	gallon(s)	SOP	standard operating procedure
gal/yd <sup>2</sup>	gallon(s) per square yard	TP	total particulate
GVP	generic verification protocol	TSA	technical systems audit
HAP	hazardous air pollutant	VOC	volatile organic compound
hi-vol	high-volume	µm	micrometer(s)
IFR	isokinetic flow rate		

**DISTRIBUTION LIST**

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Greg Muleski  
Mary Ann Grelinger

**PREFACE**

This test/QA plan was prepared by Midwest Research Institute (MRI) and Research Triangle Institute (RTI) for the Air Pollution Control Technology Verification Center (APCTVC). The test/QA plan provides a detailed plan for conducting and reporting results from a test of dust suppressant products in Maricopa County, Arizona. The plan was reviewed by Maricopa County, Midwest Industrial Supply, Inc., RTI, MRI, and EPA.

## SECTION A: PROJECT MANAGEMENT

### A1: Project/Task Organization

The U.S. Environmental Protection Agency (EPA) has overall responsibility for the Environmental Technology Verification (ETV) Program and the Air Pollution Control Technology Verification Center (APCTVC). Research Triangle Institute (RTI) is EPA's verification partner in this effort. For this work, Midwest Research Institute (MRI) is the testing organization for the APCTVC. The APCTVC has selected Maricopa County, Arizona as the site for this test of the following dust suppressant products.

1. Midwest Industrial Supply, Inc. – EK<sup>®</sup> 35 (dust suppressant)
2. Midwest Industrial Supply, Inc. – EnviroKleen<sup>®</sup> C (dust suppressant)

Management and testing of dust suppressants within the APCTVC are performed in accordance with procedures and protocols defined by a series of quality management documents. The primary source for the APCTVC quality system is EPA Order 5360.1 A2 (May 2000).<sup>1</sup> The quality system is in compliance with

1. EPA's *Requirements for Quality Management Plan Plans* (EPA QA/R-2),<sup>2</sup>
2. EPA's *Quality and Management Plan* for the overall ETV program (EPA ETV QMP),<sup>3</sup>
3. MRI's Applied Engineering Division (AED) Quality System Manuals,<sup>4</sup>
4. RTI's APCTVC QMP,<sup>5</sup>
5. The *Generic Verification Protocol (GVP) for Dust Suppression and Soil Stabilization Products*,<sup>6</sup> and
6. This test/QA Plan.

Table 1 summarizes these documents. This test/QA plan is in conformance with *EPA Requirements for Quality Assurance Project Plans* (EPA QA/R-5).<sup>7</sup>

MRI will, for RTI, conduct a field test of dust suppression products at Maricopa County, Arizona, analyze data, and prepare a report. The various quality assurance (QA) and management responsibilities are divided between EPA, RTI, and MRI key project personnel as defined below. The lines of authority between key personnel for this project are shown on the project organization chart in Figure 1.

#### A1.1 Management Responsibilities

Project management responsibilities are divided among the EPA, RTI, and MRI personnel as listed in Sections A.1.1.1 through A.1.1.6 below.

**Table 1. Quality Management Documents Applicable to This Test of Dust Suppressant Products at Maricopa County**

Document	Description
EPA Order 5360.1 A2 (May 2000) <sup>1</sup>	EPA Order 5360.1 A2 <sup>1</sup> includes quality specifications for EPA organizations that produce or use environmental data. The Agency-wide Quality System is a management system that provides the necessary elements to plan, implement, document, and assess the effectiveness of quality assurance (QA) and QA activities applied to environmental programs conducted by or for EPA. A consistent Agency-wide Quality System provides the needed management and technical practices to assure that environmental data used to support Agency decisions are of adequate quality and usability for their intended purpose.
<i>EPA Requirements for Quality Management Plan, EPA QA/R-2</i> <sup>2</sup>	This document provides the development and content requirements for Quality Management Plans for organizations that conduct environmental data operations for EPA through contracts, assistance agreements, and interagency agreements.
EPA ETV QMP <sup>3</sup>	EPA ETV QMP <sup>3</sup> lays out the definitions, procedures, processes, inter-organizational relationships, and outputs that will assure the quality of both the data and the programmatic elements of ETV. Part A of the ETV QMP contains the specifications and guidelines that are applicable to common or routine quality management functions and activities necessary to support the ETV program. Part B of the ETV QMP contains the specifications and guidelines that apply to test-specific environmental activities involving the generation, collection, analysis, evaluation, and reporting of test data. (EPA's <i>Quality and Management Plan for the Pilot Period</i> (1995-2000), May 1998.)
MRI AED Quality System Manuals <sup>4</sup>	There are two Quality System Manuals for Environmental Systems including: <i>Quality Management Systems</i> , January 24, 2000, Revision 0 <sup>4</sup> and <i>Quality Systems for the Collection and Evaluation of Environmental Data</i> , August 1, 2000, Revision 0 <sup>4</sup> . These documents describe the quality systems in place for MRI's technical research unit participating in the APCT program. EED's quality manuals comply with American National Standards / American Society for Quality Control (ANSI/ASQC) Standard E4-1994. <sup>8</sup> The scope of these manuals encompasses performance criteria, requirements, and procedures for managing the quality of all work conducted by or on behalf of AED. Therefore, AED's quality manuals apply to all AED staff as well as people who perform work on behalf of AED, such as staff from other MRI research and administrative units, and others who contribute to projects managed by AED.
APCTVC QMP <sup>5</sup>	APCTVC QMP <sup>5</sup> describes the quality systems in place for the APCTVC. It was prepared by RTI and approved by EPA. Among other quality management items, it defines what must be covered in the GVPs and test/QA plans for technologies undergoing verification testing.
<i>GVP for Dust Suppression and Soil Stabilization Products</i> <sup>6</sup>	GVPs are prepared for each type of technology to be verified. These documents describe the overall procedures to be used for testing a specific technology and define the data quality objectives (DQO). With input from the Dust Suppressant Product Technical Panel, RTI and MRI prepared <i>the GVP for Dust Suppression and Soil Stabilization Products</i> <sup>6</sup> jointly with the Environmental Technology Evaluation Center and the Highway Innovative Technology Evaluation Center. The document was reviewed and approved by RTI and EPA.

**Table 1. (continued)**

Document	Description
This Test/QA Plan	This test/QA plan describes, in detail, how the testing organization will implement and meet the requirements of the <i>GVP for Dust Suppression and Soil Stabilization Products</i> <sup>6</sup> . The test/QA plan addresses issues such as the test organization's management structure, test schedule, test documentation, analytical methods, data collection requirements, and instrument calibration and traceability, and it specifies the QA and quality control (QC) requirements for obtaining verification data of sufficient quantity and quality to satisfy the DQO of the GVP.
<i>EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5</i> <sup>7</sup>	This document provides the Quality Assurance Project Plans requirements for organizations that conduct environmental data operations on behalf of EPA through contracts, financial assistance agreements, and interagency agreements. It provides suggestions on preparing, reviewing, and implementing QA Project Plans.

### **A1.1.1 EPA Program Manager**

The EPA Program Manager, Theodore Brna, has overall coordination responsibility for the APCTVC. He is responsible for obtaining final EPA approval of project test/QA plans and reports.

### **A1.1.2 RTI/APCTVC Director and RTI Task Leader**

The RTI/APCTVC Director is Jack Farmer. He has overall responsibility for the APCTVC and technology-specific verification tests. He will assign technology verification task leaders; oversee verifications; review technical panel makeup; and review GVP and test-specific documents. These responsibilities are described in greater detail in Section 2 of the APCTVC QMP.

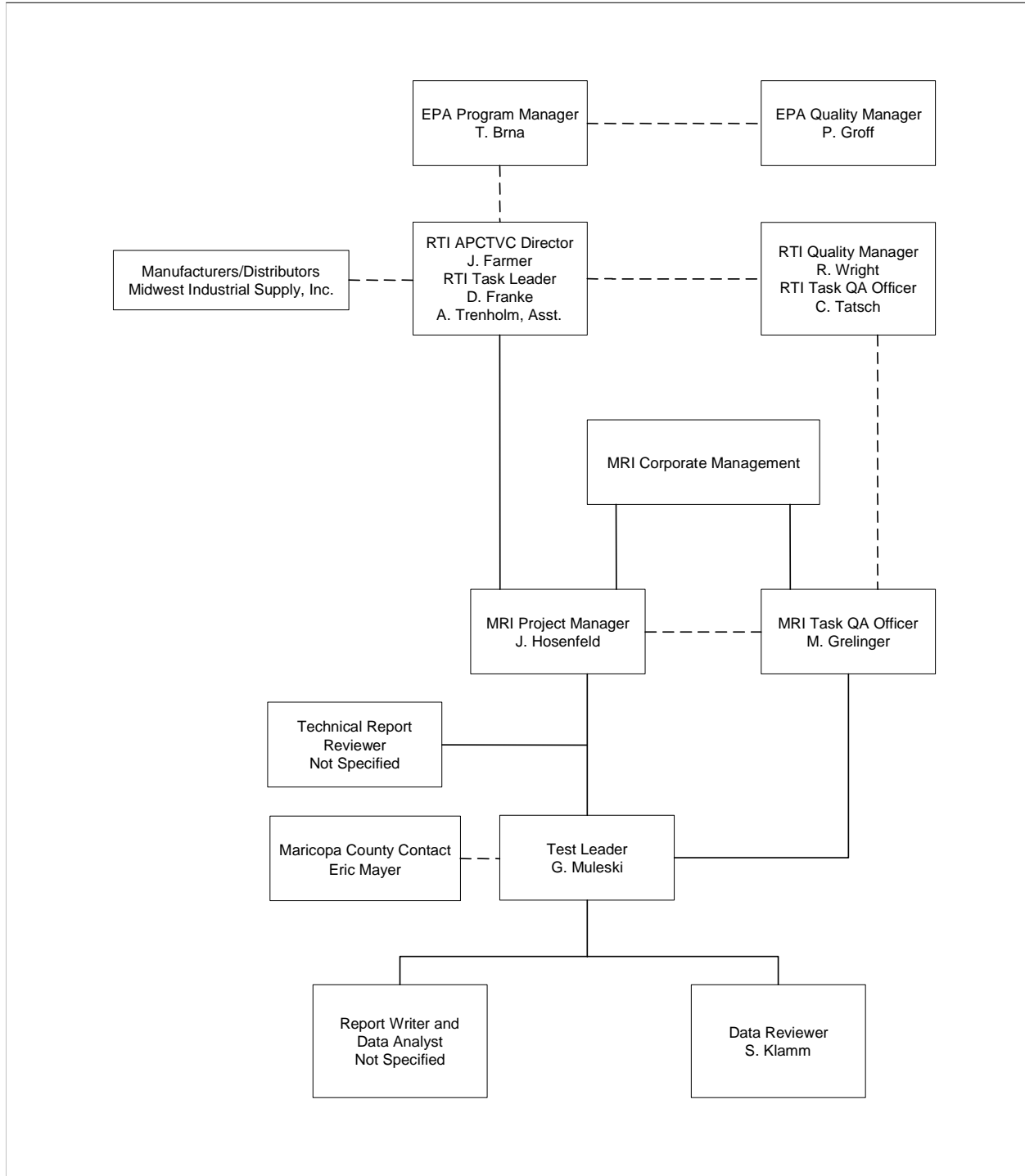
The RTI Task Leader, Deborah Franke, reports to the RTI/APCTVC Director. The Task Leader is responsible for any functions delegated to her by the RTI/APCTVC Director.

### **A1.1.3 MRI Project Manager**

The MRI Project Manager for this verification test is John Hosenfeld. He will manage MRI's conduct of the dust suppressant test, select a test leader, develop staffing requirements, and propose a budget for the test. After a technical assessment, the MRI Project Manager is responsible for developing and implementing corrective actions within MRI. These responsibilities are described in greater detail in Section 1 of MRI's AED QSM. Mr. Hosenfeld has more than 30 years of experience in environmental regulation and measurements with research organizations and private industry.

### **A1.1.4 MRI Test Leader**

The MRI Test Leader for this dust suppressant test is Greg Muleski. Dr. Muleski will manage the field testing and has responsibility for QC and on-site field activities. If test method QC



**Figure 1. Organizational chart.**  
**(Dashed lines indicate organizational independence)**

criteria are not met, he has the authority to halt testing until the sampling system is corrected and proven to meet the QC criteria. As the MRI Test Leader, he will oversee development of this test/QA plan and any standard operating procedures (SOPs) that are needed and prepare the draft

test report. Dr. Muleski is a principal scientist at MRI with more than 20 years of experience in the field of dust emission measurements.

#### **A1.1.5 MRI Data Reviewer**

The MRI Data Reviewer for the test is Scott Klamm. Mr. Klamm will, after the field test, be responsible for reviewing the field data package for completeness and general data quality. His function will be to serve as the first line, independent data quality reviewer of the field test data. Mr. Klamm has more than 10 years of direct experience in air pollutant measurements and related QA/QC procedures.

#### **A1.1.6 Facility Contact**

Eric Mayer will be the primary Maricopa County point of contact. Data provided by Maricopa County will be passed to the MRI Test Leader.

### **A1.2 Quality Assurance Responsibilities**

QA responsibilities are divided among the EPA, RTI, and MRI personnel as listed below.

#### **A1.2.1 EPA Quality Manager**

The EPA Quality Manager for the APCTVC is Paul W. Groff of EPA's Air Pollution Prevention and Control Division. In general, his responsibilities include:

1. Communicating quality systems requirements, quality procedures, and quality issues to the EPA Program Manager and the RTI APCTVC Director;
2. Reviewing and approving APCTVC quality systems documents to verify conformance with the quality provisions of the ETV Program's quality systems documents;
3. Performing technical systems audits (TSAs) and performance evaluation audits (PEAs) of APCTVC tests, as appropriate; and
4. Providing assistance to APCTVC personnel in resolving QA issues.

The EPA Quality Manager (or his designee) will perform the following specific activities associated with the tests of dust suppressants at Maricopa County:

1. Review and approve the GVP;
2. Review and approve the test/QA plan and the reports for dust suppressants verified at Maricopa County;
3. Conduct independent on-site technical and quality assessments of the tests of dust suppressants at Maricopa County; and
4. Determine whether the results of the tests of dust suppressants at Maricopa County conform to EPA quality requirements and whether test results attain the DQO.

### **A1.2.2 RTI Quality Manager**

The RTI Quality Manager for the APCTVC is Robert S. Wright of RTI's Center for Environmental Measurements and Quality Assurance. He is responsible for ensuring that all tests are performed in compliance with the QA requirements of the APCTVC QMP, GVPs, and test/QA plans. He has resources available to ensure conformance with the requirements and ensures that all personnel understand the requirements. Following are the general responsibilities of the RTI Quality Manager:

1. Preparing the APCTVC QMP and assisting the RTI APCTVC Director in the annual review and revision of this document, as needed;
2. Communicating with test-specific quality managers for specific tests;
3. Reviewing and approving the GVPs, test/QA plans, and any needed SOPs that will be developed by technology verification test leaders and test-specific quality managers;
4. Overseeing test-specific quality training;
5. Conducting independent technical and quality assessments in cooperation with the EPA Quality Manager and test-specific quality managers;
6. Reviewing and approving the test results and the QC results from tests;
7. Storing APCTVC documentation and data; and
8. Preparing the QA section of each test report.

The RTI Quality Manager will be assisted by the RTI Task QA Officer, C. E. Tatsch. They will perform the following specific activities associated with the tests of dust suppressants at Maricopa County:

1. Review the GVP;
2. Review the test/QA plan, test results, QC results, and the reports for dust suppression products;
3. Perform independent technical and quality assessments of the test of dust suppression products at Maricopa County; and
4. Determine whether the results of the tests of dust suppressants at Maricopa County conform to the APCTVC QMP and the test/QA plan and whether test results attain the DQO.

### **A1.2.3 MRI Task QA Officer**

The MRI Task QA Officer for this test is Mary Ann Grelinger. She will handle the QA activities directly associated with MRI's data collection and reporting for the dust suppressant test at Maricopa County. These activities will include:

1. Assist the Test Leader in preparing task-specific test/QA plans and SOPs to ensure that tests are implemented in conformance with these documents;
2. Conduct internal assessments of equipment calibration, equipment operation, sample handling, and data collection and reduction through oral communication with the testing team before the data packet has been prepared;

3. Perform internal on-site technical and quality assessments of the test of dust suppression products at Maricopa County to determine whether the tests of dust suppressants at Maricopa County are being implemented in accordance with the MRI quality system and the test/QA plan and prepare a written report of the assessment findings;.
4. Review test results within 30 days after each quarterly test campaign to make an independent determination whether QC criteria have been met and whether the project is on track to attain the DQO;
5. After all data has been analyzed, determine whether the tests of dust suppressants at Maricopa County conform with the MRI quality system and the test/QA plan and whether test results attain the DQO;
6. Upon completion of the testing and approval of the data packet by the MRI test leader, conduct an audit of data quality of a minimum of 10 percent of the quantitative data obtained in the field and laboratory to determine if they meet the specifications of the project and prepare a written report on the audit findings. Pseudo-random, systematic, and judgmental methods may be used to select the data to be reviewed;
7. Submit an assessment of test activities to MRI's program management and to RTI; and
8. Review the draft test report and participate in meetings with RTI's and MRI's program management.

For this project, Ms. Grelinger will report to MRI's QA Unit and will have no direct or indirect role in the data collection process. The QA Unit is a MRI corporate function that reports to senior corporate management and is independent of the section and division generating the data.

Ms. Grelinger is a Senior Environmental Scientist/Analyst with more than 20 years experience with emissions measurement and QA/QC activities. She has performed quality audits, directed quality reviews of emission inventories, and developed computer procedures to check emission inventory databases for completeness, consistency, and correctness.

## **A2: Problem Definition/Background**

The objective of the ETV APCTVC is to verify, with high data quality, the performance of air pollution control technologies. A subset of air pollution control technologies is products used to control dust emissions from unpaved roads. Control of dust emissions from unpaved roads is of increasing interest, particularly related to attainment of the ambient particulate matter (PM) standard. EPA recently issued a new ambient standard for particulate matter that specifies new air quality levels for particulate matter 2.5 micrometers ( $\mu\text{m}$ ) or less in aerodynamic diameter ( $\text{PM}_{2.5}$ ).

There are many products manufactured and sold to reduce unpaved road dust emissions. Two of these products, manufactured/distributed by one firm, are the subject of this test. The performance of these products will be assessed within a specified range of applicability as detailed in Section B1 of this test/QA plan, and reports will be produced. The goal of the test is to measure the performance of the products relative to uncontrolled sections of road.

### **A3: Project Description and Schedule**

#### **A3.1 Project Description**

Testing will be performed on two dust suppressant products on a rural, unpaved road in Maricopa County, Arizona. Test campaigns will be conducted at quarterly intervals over a 6-month period. Each test campaign will consist of five replicate dust emission measurements of controlled and uncontrolled road sections. Performance of the products will be determined in terms of dust control efficiency (CE) relative to uncontrolled roads. The CE will be determined relative to its decay over time and with traffic. The mobile dust sampler<sup>9</sup> will be used to obtain dust CE data for the products. The tests will gather information and data for evaluating the performance of the products as applied by the manufacturers/distributors. The critical measurement is the dust suppression CE. The specific conditions used during the testing will be documented. Table 2, in Section B2 of this test/QA plan, presents a summary of all measurements that will be made to either (1) evaluate the performance of the products or (2) document the test conditions.

#### **A3.2 Test Site Description**

The test will be conducted on rural, unpaved roads in Maricopa County, Arizona, approximately 50 miles west of Phoenix, near the towns of Buckeye and Wintersburg. The specific test locations are described in Section B2.1.

#### **A3.3 Product Descriptions**

The dust suppressant products to be evaluated during this test are described below.

Midwest Industrial Supply, Inc. – EK<sup>®</sup> 35: This product is a patent-pending dust control and soil stabilization agent formulated with continuous acting, long life synthetic fluids and naturally occurring rosos. It is uniquely developed with optimum environmental sensitivity especially for air, water, and stormwater criteria.

Midwest Industrial Supply, Inc. – EnviroKleen: This product is a patent-pending dust control and soil stabilization agent formulated with continuous acting, long life synthetic fluids and dust control modifiers. It is uniquely developed with optimum environmental sensitivity especially for air, water, and stormwater criteria.

<http://www.midwestind.com/envirokleen/envirobrochpg1.pdf> (for EnviroKleen)

#### **A3.4 Schedule**

The projected schedule for the dust suppressant test at Maricopa County is defined in Figure 2 and will start in February 2003.

















































































































