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(EIR 2466)

DESIGN VERIFICATION TEST REPORT FOR THE M43A1 UPGRADE

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13. ABSTRACT *(Maximum 200 words)*

This report provides the results of performance testing conducted at the U.S. Army Edgewood Research, Development and Engineering Center (ERDEC) * on prototype Ion Mobility Spectrometry (IMS) upgraded M43A1 Detectors, identified as the M43-APD. The M43-APD, developed by Environmental Technologies Group, Inc. (ETG), is an adaption of ETG's ICAM-APD Chemical Agent Detector. The M43A1 Detector was modified by removing the existing ionization detection components and replacing them with ETG's IMS-based components. The upgraded M43-APD provides increased sensitivity to nerve agents, improved interference rejection for fewer false alarms and the capability to detect blister agents. The testing was conducted in two phases under contract DAAM01-97-C-0033. The first phase was performed at ETG and included low temperture storage/operation, high temperature storage/operation, and simulant response testing. The second phase was performed at ERDEC and included agent vapor testing at the Government's surety facilities and battlefield interference testing at ERDEC's M-Field. In general, the M43-APD prototypes performed well, however, some minor deficiencies were noted in the detection of GD vapor at ambient temperatures and HD vapor at high temperatures.

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PREFACE

The work described in this report was authorized under Contract No. DAAM01-97-C-0033. This work was started in September 1997 and completed in November 1998.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1. EXECUTIVE SUMMARY

The M43A1 Chemical Detector, part of the M8A1 Chemical Detection System, is and will be for the immediate future the primary chemical detector for the U.S. forces worldwide. Since its initial fielding in 1985, approximately 35,000 systems have been manufactured and placed in over 20 countries. The M43A1 Upgrade Chemical Agent Detector (M43-APD) has been developed at ETG to improve the performance and extend the useful life of the current worldwide inventory.

The M43-APD upgrade is an adaptation of ETG's ICAM-APD chemical agent detector. The M43A1 detector is refurbished by removing the existing ionization detector (cell, pump, electronics) and replacing it with ETG's IMS-based sensor module. With the new sensor module, the M43A1 upgrade now has the capability to detect blister agents (the baseline M43A1 detects only nerve agents) and offers much improved interference rejection for fewer false alarms.

Under contract DAAM01-97-C-0033 to the U.S. Army ERDEC, ETG manufactured and tested two prototype M43-APD detectors. The testing was conducted in two phases. The first phase was performed at ETG and included low temperature storage/operation, high temperature storage/operation, and simulant response testing. The second phase was performed at ERDEC and included agent vapor testing at the Government's surety lab, and battlefield interference testing at M-field.

In general, the M43-APD detectors performed very well. The electronics, pumps, sensor and other hardware operated through the duration of the testing without a single failure. The agent vapor testing showed that the sensitivity and response times for the M43-APD are comparable to those established by ETG's ICAM-APD. Battlefield interference testing also showed that the M43-APD retains the ICAM-APD's high level of interference rejection.

There were, however, two problems encountered during the Government's agent vapor testing. In the first instance, the detectors did not alarm to GD vapor at ambient lab temperature. The test data showed that the GD agent vapor was producing strong peaks in the IMS signature, indicating good sensitivity, but the peaks were outside of the alarm windows that are defined by the agent detection algorithm. These no-alarm conditions can be improved with modification to the agent detection algorithm.

In the second instance, the M43-APD detectors did not alarm to HD at an elevated temperature of +52 °C. There is a contaminant in the negative-mode IMS signature which impedes the formation of a strong reactant ion, with a corresponding reduction in the sensitivity to HD. The precise location of the contaminant could not be isolated, but it appears to be within the M43A1 case assemblies. With some minor changes to the M43-APD pneumatics, ETG believes that this problem can be overcome and the M43-APD will have the same agent detection as the ICAM-APD.

2. INTRODUCTION

2.1 Test objectives. The M43A1 Upgrade Chemical Agent Detector (M43-APD) was developed by ETG under contract to the U.S. Army ERDEC (DAAM01-97-C-0033). This contract was part of an engineering study to determine the feasibility of developing a low-cost option to upgrade the capability of the existing M43A1 Chemical Agent Detectors and extend their useful life.

Testing was conducted in two separate phases. In the first phase, ETG conducted design verification testing of two prototype M43-APD detectors. This testing was conducted prior to delivery of the prototypes to the Government, and was limited to simulant testing using H-type and G-type simulants, and operational testing at low temperature (-40 °F) and high temperature (+120 °F).

The second phase was government evaluation testing to characterize the agent-detection performance and the false-alarm performance of the prototype detectors. The second phase of testing was performed at ERDEC using not only the two ETG prototype M43-APD detectors, but also prototype detectors from two other companies. The objective of this testing was to validate contractor performance claims, and to provide a comparison of the prototypes against each other and against the Army's general requirements for chemical-agent detection.

2.2 Description of the equipment under test: M43A1 Upgrade Chemical Agent Detector. The M43A1 Chemical Detector, part of the M8A1 Chemical Detection System, is and will be for the immediate future the primary chemical detector for the U.S. forces worldwide. Since its initial fielding in 1985, approximately 35,000 systems have been manufactured and placed in over 20 countries. The M43A1 Upgrade Chemical Agent Detector (M43-APD) has been developed at ETG to improve the performance and extend the useful life of the current worldwide inventory.

The M43-APD is shown in Figures 1 and 2. In general, the M43A1 detector is refurbished by removing the existing ionization detector (cell, pumps, electronics) and replacing it with ETG's IMS-based ICAM-APD sensor module. This approach improves the performance over the baseline M43A1 detector in several ways. First, the IMS sensor will detect blister agents (mustard gases and lewisite) which the baseline M43A1 does not. Second, the IMS sensor has a lower limit of detection for nerve agents, with response times generally between 10 and 30 seconds. Third, the ETG sensor contains an automatic cleardown following an alarm, eliminating the need for a soldier to manually reset the detector. Finally, the ETG sensor is remarkably better at rejecting battlefield interferences.

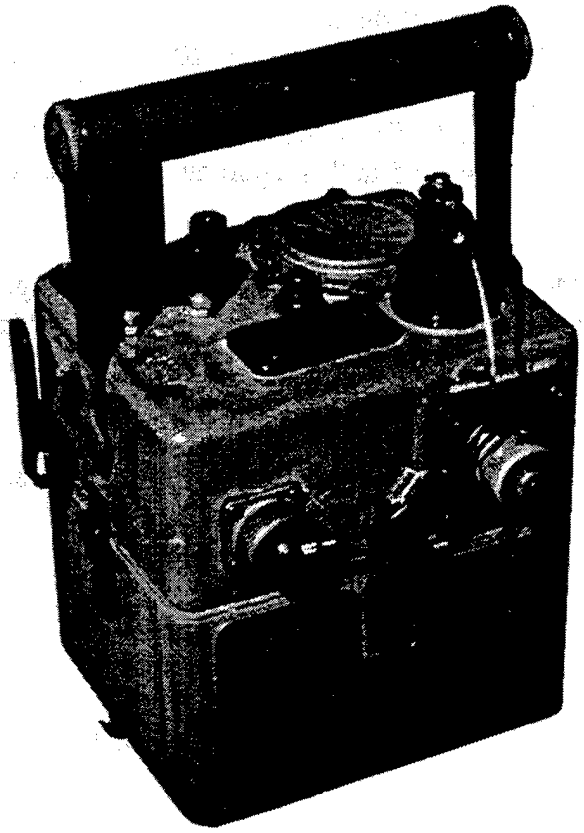


FIGURE 1. *Prototype M43A1 Upgrade Chemical Agent Detector (M43-APD)*

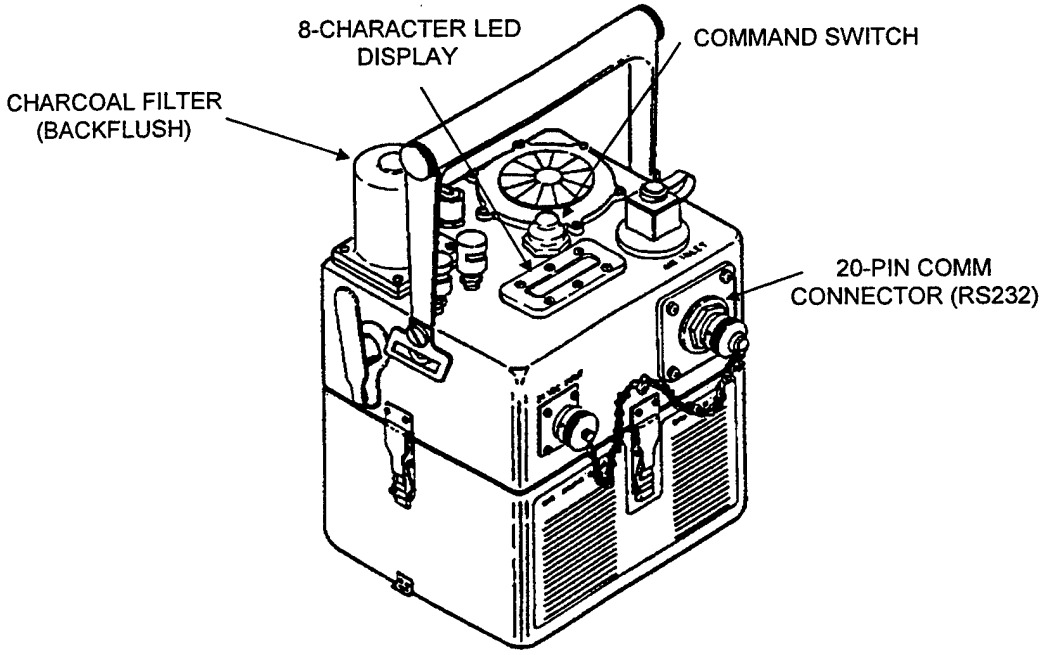


FIGURE 2. *M43A1 Upgade (M43-APD), overview of new features.*

2.2.1 Serial numbers of the M43-APD detectors. Two prototype M43-APD chemical agent detectors were tested. The serial numbers are 980206-4 and 980206-5. Both detectors are identical in physical configuration. Serial number 980206-4 is also referred to as Detector 4 in this report and is the first Government prototype. Serial number 980206-5 is also referred to as Detector 5 in this report and is the second Government prototype.

2.2.2 Software version. The version of the operating software and agent-detection algorithm used during each phase of the testing is shown below in Table 1. For reference, a summary of software development during the M43-APD development is included as Table 2.

TABLE 1. *Software version used during M43-APD testing*

Test	Software Version
Low temperature	M502a
High temperature	M502b
Simulant sensitivity	M502a / M502b
Agent vapor	M502b
M-field	M502b / M502d

TABLE 2. *Summary of improvements made to the ETG operating software and agent-detection algorithm that have been made since ICAM-APD testing in July 97 (DAAM01-97-M-0071) and which have been incorporated into the M43-APD software.*

Date	Version	Features and Changes
June 97	A422c	• Configuration baseline, delivered with 6 ICAM-APD detectors at the conclusion of contract DAAM01-97-M-0071.
June 97	A423c	• Provides additional interference rejection for AFFF.
Aug 97	A425b	• Updated GA, GB, GD, VX detection windows based on testing during June and July 1997. • Revised criteria which defines allowable positions of the reactant ion peaks during startup. • Revised the criteria that defines when the detector automatically re-calibrates based on movement of the reactant ions. • Revised agent-detection classifiers that are used during cold-temperature operation. • Raised the upper limit at which the ammonia-source heater is turned

Date	Version	Features and Changes
		on at cold temperatures.
Mar 98	M500	• Added hardware drivers and operator interfaces required to operate the M43-APD.
Mar 98	M502a	• Updated the agent-detection algorithm to improve GD sensitivity. • Revised agent-detection classifiers that are used during cold-temperature operation to correct for differences in the internal case temperature between ICAM-APD and M43-APD. • Corrected a software bug which was preventing the ammonia source heater from turning on at low temperatures. • Raised the upper limit at which the ammonia-source heater is turned on at cold temperatures to correct for differences in the internal case temperature between ICAM-APD and M43-APD.
7 May 98	M502b	• Lowered the alarm thresholds for HD in order to allow the H confidence sample to alarm following high-temperature storage.
30 Aug 98	M502d	• Disabled the built-in test feature which checks for a short across the remote terminals in order to allow the M43-APD to operate with the Government's prototype battery box.

3. ETG DESIGN VERIFICATION TESTING: HIGH/LOW TEMPERATURE AND SIMULANT SENSITIVITY

Design verification testing of the two prototype detectors was performed at ETG from March through May 1998. The testing included climatic testing (high temperature storage/operation, low temperature storage/operation), and simulant response testing.

Climatic testing was performed in ETG's environmental chambers by conditioning the detectors in a shutdown state, and then performing a startup test. Following startup, the detectors were operated for four hours and confidence tests performed at the end of this period.

Simulant response testing was performed using the standards generator that ETG uses for acceptance testing of the CAM and ICAM-APD. The simulant concentrations are the same as described in the CAM purchase descriptions for a "7-bar H" and "5-bar G" response. The requirement is that the detectors alarm within 10 seconds to these concentrations and then clear to a no-alarm status within two minutes.

The M43-APD detectors passed all design verification testing. Detailed test logs are presented in Table 3 and Table 4.

During high temperature testing, the test data showed a contaminant in the negative mode signature (blister mode). The contaminant interferes with formation of both the negative reference peak and subsequently the ability of the H-simulant from forming a well-defined ion peak. As a result, the detector has reduced sensitivity to the H confidence sample, and as we discovered during the Government's agent vapor testing it has also reduced the sensitivity to HD agent vapor. The source of the contamination appears to be a material within the M43A1 case assembly which is outgassing at high temperatures. The contaminant probably enters the sensor module through the sieve pack assembly, which uses a vent to equalize pressure between the interior volume of the cell and the case interior.

The precise source of the contamination has not yet been isolated, and it is unlikely that a single component will be found which is the sole contributor. Regardless of whether the source of contamination is found, there is one design approach to minimize its impact. The current sieve pack vents to the inside of the case, therefore the sieve breather effect is pulling case air into the sensor. The pneumatics can be modified to vent to the outside of the case, probably through the inlet assembly.

TABLE 3. *Test log, M43-APD design verification testing, detector S/N 980206-4*

DATE		DESCRIPTION	COMMENTS
3/24/98	6:00 PM	STARTUP TEST (AMBIENT)	PASSED
		CONFIDENCE CHECK (AMBIENT)	PASSED
		H/G SIMULANT TEST	PASSED
	7:00 PM	MOVED TO EVC 001, BEGIN COLD SOAK AT -40 C	
3/25/98	12:10 PM	STARTUP (-40 C)	PASSED (NOTE 1)
		CONFIDENCE CHECK (-40 C)	PASSED (NOTE 1)
	5:28 PM	CONFIDENCE CHECK (-30 C)	PASSED (NOTE 1)
3/26/98	1:15 PM	CONFIDENCE CHECK (-30 C)	PASSED (NOTE 1)
	3:15 PM	BEGIN RAMP TO AMBIENT TEMPERATURE	
3/27/98	9:15 AM	STARTUP (AMBIENT)	PASSED
		CONFIDENCE CHECK (AMBIENT)	PASSED

TABLE 3. *Test log, M43-APD design verification testing, detector S/N 980206-4*

NOTE 1 -- ALTHOUGH DETECTOR 4 PASSES THE PERFORMANCE CHECKS, THE SIGNATURES SHOW BROAD-BAND NOISE WHICH EXCEED M43-APD / ICAM-APD ACCEPTANCE CRITERIA. CAUSE WAS ISOLATED TO A GROUND LOOP CREATED BY CONTACT BETWEEN THE IMS SENSOR MODULE AND THE NICKEL PLATING OF THE M43A1 CASETOP. RE-TESTED ON 3/30 TO 4/1.
(NOTE THAT DETECTOR 4 IS THE FIRST OF TWO GOVERNMENT PROTOTYPES.

3/30/98	3:15 PM	STARTUP (AMBIENT)	PASSED (RE-TEST)
		CONFIDENCE CHECK (AMBIENT)	PASSED (RE-TEST)
		H/G SIMULANT TEST	PASSED (RE-TEST)
	5:45 PM	MOVED TO EVC 001, BEGIN COLD SOAK AT -40 C	
3/31/98	8:38 AM	STARTUP (-40 C)	PASSED (RE-TEST)
		CONFIDENCE CHECK (-40 C)	PASSED (RE-TEST)
	4:30 PM	CONFIDENCE CHECK (-30 C)	PASSED (RE-TEST)
4/1/98	8:35 AM	CONFIDENCE CHECK (-30 C)	PASSED (RE-TEST)
	8:45 AM	BEGIN RAMP TO AMBIENT TEMPERATURE	
	3:00 PM	CONFIDENCE CHECK (AMBIENT)	PASSED (RE-TEST)
5/22/98	4:17 PM	STARTUP (AMBIENT)	PASSED (NOTE 2)
		CONFIDENCE CHECK (AMBIENT)	PASSED
		H/G SIMULANT TEST	PASSED
	6:15 PM	MOVE TO EVC POOL NO. 0277, BEGIN HOT SOAK AT +52 C	
5/26/98	8:57 AM	STARTUP (+52 C)	PASSED
		CONFIDENCE CHECK (+52 C)	PASSED
	1:16 PM	CONFIDENCE CHECK (+52 C)	PASSED

NOTE 2 - FOLLOWING THE SUCCESSFUL COMPLETION OF LOW-TEMPERATURE TESTING, THE TEST PROGRAM WAS INTERUPTED DUE TO PROBLEMS WITH DETECTOR 5, THE SECOND OF THE TWO GOVERNMENT PROTOTYPES. DURING HIGH-TEMPERATURE TESTING OF DETECTOR 5 (SEE TABLE 4 ENTRY FOR 3/31/98), THERE WAS A CONTAMINANT IN BOTH THE NEGATIVE AND POSITIVE MODES. THE IMPACT OF THE CONTAMINANT WAS TO INCREASE STARTUP TIME BY REDUCING SENSITIVITY TO THE H CONFIDENCE SAMPLE. FOLLOWING AN INVESTIGATION, THE FOLLOWING CORRECTIVE ACTIONS WERE IMPLEMENTED ON BOTH OF THE PROTOTYPE DETECTORS, AND THE TEST PROGRAM WAS RE-STARTED. THE COMPONENTS WERE WASHED AND BAKED, ACTIVATED CHARCOAL WAS ADDED TO THE VENT WITHIN THE SIEVE PACK ASSEMBLY, THE INLET ASSEMBLY WAS REDESIGNED, AND THE H-ALARM THRESHOLD WAS LOWERED.

TABLE 4. *Test log, M43-APD design verification testing, detector S/N 980206-5*

DATE		DESCRIPTION	COMMENTS
3/24/98	6:00 PM	STARTUP TEST (AMBIENT)	PASSED
		CONFIDENCE CHECK (AMBIENT)	PASSED
		H/G SIMULANT TEST	PASSED
	7:00 PM	MOVED TO EVC 001, BEGIN COLD SOAK AT -40 C	
3/25/98	12:10 PM	STARTUP (-40 C)	PASSED
		CONFIDENCE CHECK (-40 C)	PASSED
	5:37 PM	CONFIDENCE CHECK (-30 C)	PASSED
3/26/98	1:32 PM	CONFIDENCE CHECK (-30 C)	PASSED
	3:15 PM	BEGIN RAMP TO AMBIENT TEMPERATURE	
3/27/98	9:30 AM	STARTUP (AMBIENT)	PASSED
		CONFIDENCE CHECK (AMBIENT)	PASSED
3/30/98	5:00 PM	MOVE TO EVC POOL NO. 0277, BEGIN HOT SOAK AT +52 C	
3/31/98	9:30 AM	STARTUP (+52 C)	FAILED (NOTE 3)

NOTE 3 -- DATA AND SIGNATURES SHOW A CONTAMINANT IN THE POSITIVE MODE WHICH PROHIBITS FORMATION OF THE NH3 REACTANT ION. CAUSE DETERMINED TO BE A LEAK IN THE SIEVE PACK ASSEMBLY. CORRECTIVE ACTION WAS TO REMOVE AND REPLACE THE SIEVE PACK ASSEMBLY. ALSO, CONTAMINANTS IN THE NEGATIVE MODE ARE REDUCING SENSITIVITY TO H CONFIDENCE SAMPLE. CORRECTIVE ACTIONS -- WASHED AND BAKED COMPONENTS, ADDED ACTIVATED CHARCOAL TO VENTS WITHIN THE SIEVE PACK ASSEMBLY, RE-DESIGNED INLET ASSEMBLY AND INLET CAP, LOWERED ALARM THRESHOLD REQUIRED FOR H ALARM. RE-TESTED 5/22 TO 5/26.

5/22/98	5:30 PM	STARTUP (AMBIENT)	PASSED (RE-TEST)
		CONFIDENCE CHECK (AMBIENT)	PASSED
		H/G SIMULANT TEST	PASSED
	6:15 PM	MOVE TO EVC POOL NO. 0277, BEGIN HOT SOAK AT +52 C	
5/26/98	8:40 AM	STARTUP (+52 C)	PASSED
		CONFIDENCE CHECK (+52 C)	PASSED
	1:28 PM	CONFIDENCE CHECK (+52 C)	PASSED

4. GOVERNMENT TESTING, AGENT VAPOR

Two prototype M43-APD detectors were subjected to agent-vapor evaluation testing at the ERDEC surety laboratories from 3 Aug to 18 Aug 1998. ETG personnel were present to support testing, perform maintenance and capture detector digital data. Table 5 summarizes the agent test results.

In general, the M43-APD detectors performed very well. The electronics, pumps, sensor and other hardware operated through the duration of the testing without a single failure. The agent vapor testing showed that the sensitivity and response times for the M43-APD are comparable to those established by ETG's ICAM-APD. Battlefield interference testing also showed that the M43-APD retains the ICAM-APD's high level of interference rejection. Most test trials resulted in proper alarms as expected. The exceptions are described below.

In most cases GD did not alarm at ambient lab temperature (+20 °C). Analysis showed that the GD agent vapor produced strong peaks in the IMS signature, indicating good sensitivity. However, the position of the peak was not within the alarm criteria for GD as defined by the agent detection algorithm. The positions for all IMS peaks (reactant ion reference and agent) were at longer drift times than normal (to the right). This caused the peak location ratios (PLR) to be smaller than normal (to the left). Although these no-alarm conditions could be improved by modifying the GD peak position criteria, the improved agent detection may come at the expense of increased false alarms. Evaluation of interference materials with peaks in this region showed a potential for false alarms. One possibility is that replacing the sieve pack with newly charged one would restore the peak drift times and ratios to their normal values. Any hardware evaluation would require additional effort to isolate the cause of this observation.

In most cases GB alarmed at low temperature (-30 °C), but two misses did occur. The GB peak location ratios were near the lower edge of the defined window. This window could be expanded. Evaluation of interference material peaks showed no new potential GB false alarms in the region of interest. However, as with GD, a hardware evaluation may produce an action for restoring peak positions.

VX detection was very good at all conditions. In the case of ambient temperature, some no-alarms occurred earlier in the day before the concentration of VX was accurately established. Also, prior to VX testing, high concentration HD was performed at 50 mg/m^3 and significant HD peaks were observed, sometimes producing HD alarms before a VX alarm was triggered. As time went on, the residual HD disappeared and VX was detected.

Both H confidence sample and HD agent detection were affected by high temperature operation. The test chamber temperature was +52 °C, while the internal detector temperature was observed to be +53 to +54 °C. In most cases an H-simulant and HD peaks positions were in the HD window, but the amplitudes (SECD) were below the

alarm threshold. The negative reactant ion (Rx-) peak was observed to be a triple peak, rather than the normal single peak. It should be noted that during outdoor interference testing on 31 Aug, the ambient temperature was +34 °C, but because of sun loading the internal detector temperature was measured at +48 to 49 °C. Under these conditions, no triple peak was observed for the Rx- ion and the H confidence sample alarmed consistently with a very strong peak.

TABLE 5. *Summary of Agent Vapor Testing, ERDEC, August 1998*

Date	Agent	Conc. (ug/L)	RH	Temp. (°C)	Det #	Response	Alarm Time (mm:ss)	Clear Time (mm:ss)	Notes
8/3/98	GD	0.091	0%	20	1	NO ALARM			1
8/3/98	GD	0.091	0%	20	1	NO ALARM			1
8/3/98	GD	0.091	0%	20	1	NO ALARM			1
8/3/98	GD	0.091	0%	20	2	NO ALARM			1
8/3/98	GD	0.091	0%	20	2	NO ALARM			1
8/3/98	GD	0.091	0%	20	2	NO ALARM			1
8/4/98	GD	0.122	90	20	1	NO ALARM			1
8/4/98	GD	0.122	90	20	2	NO ALARM			1
8/4/98	GD	0.13	90	20	1	NO ALARM			1
8/4/98	GD	0.13	90	20	2	NO ALARM			1
8/4/98	GD	0.122	90	20	1	NO ALARM			1
8/4/98	GD	0.122	90	20	2	NO ALARM			1
8/4/98	GD	1.017	90	20	1	NRV LOW	01:13	01:54	
8/4/98	GD	1.017	90	20	2	NO ALARM			1
8/4/98	GD	1	90	20	1	NRV LOW	00:10	00:37	
8/4/98	GD	1	90	20	2	NO ALARM			1
8/4/98	GD	1	90	20	1	NRV LOW	00:20	00:47	
8/4/98	GD	1	90	20	1	NRV LOW	00:40		2
8/4/98	GD	1	90	20	2	NO ALARM			1
8/4/98	GD	1	90	20	2	NO ALARM			1
8/5/98	GA	0.104	2	20	1	NRV LOW	00:32	00:30	
8/5/98	GA	0.104	2	20	2	NRV LOW	00:13	00:33	
8/5/98	GA	0.115	2	20	1	NRV LOW	00:19	00:29	
8/5/98	GA	0.115	2	20	2	NRV LOW	00:15	00:30	
8/5/98	GA	0.116	2	20	1	NRV LOW	00:20	00:30	
8/5/98	GA	0.116	2	20	2	NRV LOW	00:10	00:30	
8/5/98	GA	0.14	92	20	1	NRV LOW	00:23	00:18	
8/5/98	GA	0.14	92	20	2	NRV LOW	00:15	00:30	
8/5/98	GA	0.111	92	20	1	NRV LOW	00:25	00:30	
8/5/98	GA	0.111	92	20	2	NRV LOW	00:13	00:29	
8/5/98	GA	0.119	92	20	1	NRV LOW	00:34	00:29	
8/5/98	GA	0.119	92	20	2	NRV LOW	00:14	00:31	

TABLE 5. *Summary of Agent Vapor Testing, ERDEC, August 1998*

Date	Agent	Conc. (ug/L)	RH	Temp. (°C)	Det #	Response	Alarm Time (mm:ss)	Clear Time (mm:ss)	Notes
8/6/98	GB	0.099	3	20	1	NRV LOW	00:20	00:19	
8/6/98	GB	0.099	3	20	2	NRV LOW	00:18	00:22	
8/6/98	GB	0.113	3	20	1	NRV LOW	00:17	00:20	
8/6/98	GB	0.113	3	20	2	NRV LOW	00:20	00:24	
8/6/98	GB	0.117	3	20	1	NRV LOW	00:17	00:19	
8/6/98	GB	0.117	3	20	2	NRV LOW	00:18	00:19	
8/6/98	GB	0.108	90	20	1	NRV LOW	00:16	00:20	
8/6/98	GB	0.108	90	20	2	NRV LOW	00:18	00:19	
8/6/98	GB	0.109	90	20	1	NRV LOW	00:20	00:20	
8/6/98	GB	0.109	90	20	2	NRV LOW	00:18	00:19	
8/6/98	GB	0.114	90	20	1	NRV LOW	00:15	00:19	
8/6/98	GB	0.114	90	20	2	NRV LOW	00:17	00:19	
8/7/98	HD	1.933	3	20	1	BLS LOW	00:06	00:30	
8/7/98	HD	1.933	3	20	2	BLS LOW	00:03	00:29	
8/7/98	HD	2.12	3	20	1	BLS LOW	00:04	00:29	
8/7/98	HD	2.12	3	20	2	BLS LOW	00:03	00:26	
8/7/98	HD	2.047	3	20	1	BLS LOW	00:06	00:29	
8/7/98	HD	2.047	3	20	2	BLS LOW	00:09	00:27	
8/7/98	HD	2.197	88	20	1	BLS LOW	00:07	00:29	
8/7/98	HD	2.197	88	20	2	BLS LOW	00:07	00:30	
8/7/98	HD	2.154	88	20	1	BLS LOW	00:03	00:29	
8/7/98	HD	2.154	88	20	2	BLS LOW	00:08	00:29	
8/7/98	HD	2.258	88	20	1	BLS LOW	00:04	00:29	
8/7/98	HD	2.258	88	20	2	BLS LOW	00:04	00:26	
8/7/98	HD	36	3	20	1	BLS LOW	00:05	01:10	
8/7/98	HD	36	3	20	2	BLS LOW	00:07	01:03	3
8/7/98	HD	34	3	20	1	BLS LOW	00:06	01:07	
8/7/98	HD	34	3	20	2	BLS LOW	00:02	00:57	
8/7/98	HD	52.917	3	20	1	BLS LOW	00:06	01:30	3
8/7/98	HD	52.917	3	20	2	BLS LOW	00:03	00:59	
8/8/98	VX	?	3	20	1	NRV LOW	01:27	00:11	4, 5
8/8/98	VX	?	3	20	2	NRV LOW	01:48	00:26	4, 5
8/8/98	VX	?	3	20	1	NO ALARM		00:00	4, 5
8/8/98	VX	0.058	3	20	2	NRV LOW	00:25	00:21	
8/8/98	VX	0.058	3	20	1	NRV LOW	00:55	00:26	
8/8/98	VX	0.15	3	20	1	NRV LOW	00:10	00:25	
8/8/98	VX	0.15	3	20	2	NRV LOW	00:13	00:23	
8/8/98	VX	0.29	90	20	1	NO ALARM		00:00	4, 5
8/8/98	VX	0.11	90	20	2	NRV LOW	01:16	00:20	
8/8/98	VX	0.1	90	20	1	NRV LOW	00:38	00:18	
8/8/98	VX	0.1	90	20	1	NRV LOW	00:09	00:25	
8/8/98	VX	0.31	90	20	2	NRV LOW	00:12	00:23	
8/8/98	VX	0.31	90	20	1	NRV LOW	00:02	00:30	
8/8/98	VX	0.31	90	20	1	NRV LOW	00:15	00:24	

TABLE 5. *Summary of Agent Vapor Testing, ERDEC, August 1998*

Date	Agent	Conc. (ug/L)	RH	Temp. (°C)	Det #	Response	Alarm Time (mm:ss)	Clear Time (mm:ss)	Notes
8/10/98	HD	2.06	25	52	1	NO ALARM			6
8/10/98	HD	2.06	25	52	2	NO ALARM			6
8/11/98	GB	0.112	0	-30	1	NO ALARM			7
8/11/98	GB	0.112	0	-30	2	NRV LOW	00:08	00:22	
8/11/98	GB	0.112	0	-30	1	NO ALARM			7, 8
8/11/98	GB	0.112	0	-30	2	NRV LOW	00:05	00:24	
8/11/98	GB	0.104	0	-30	1	NRV LOW	00:12	00:23	
8/11/98	GB	0.104	0	-30	2	NRV LOW	00:06	00:22	
8/11/98	GB	0.104	0	-30	1	NRV LOW	00:24	00:20	
8/11/98	GB	0.104	0	-30	2	NRV LOW	00:20	00:11	
8/12/98	GD	0.114	0	-30	1	NRV MED	00:16	00:25	
8/12/98	GD	0.114	0	-30	2	NRV MED	00:07	00:25	
8/12/98	GD	0.114	0	-30	1	NRV MED	00:12	00:33	
8/12/98	GD	0.114	0	-30	2	NRV MED	00:07	00:24	
8/12/98	GD	0.114	0	-30	1	NRV MED	00:14	00:25	
8/12/98	GD	0.114	0	-30	2	NRV MED	00:07	00:24	
8/13/98	GB	0.121	29	52	1	NRV LOW	00:20	00:20	
8/13/98	GB	0.121	29	52	2	NRV LOW	00:21	00:21	
8/13/98	GB	0.121	29	52	1	NRV LOW	00:19	00:20	
8/13/98	GB	0.121	29	52	2	NRV LOW	00:20	00:23	
8/13/98	GB	0.125	29	52	1	NRV LOW	00:20	00:20	
8/13/98	GB	0.125	29	52	2	NRV LOW	00:20	00:20	
8/13/98	GB	0.125	29	52	1	NRV LOW	00:16	00:20	
8/13/98	GB	0.125	29	52	2	NRV LOW	00:19	00:20	
8/13/98	GD	0.126	29	52	1	NRV LOW	01:20	00:20	
8/13/98	GD	0.126	29	52	2	NRV LOW	00:08	00:20	
8/13/98	GD	0.126	29	52	1	NRV LOW	00:07	00:20	
8/13/98	GD	0.126	29	52	2	NRV LOW	00:09	00:21	
8/13/98	GD	0.118	29	52	1	NO ALARM			1
8/13/98	GD	0.118	29	52	2	NRV LOW	00:08	00:20	
8/13/98	GD	0.118	29	52	1	NRV LOW	00:14	00:23	
8/13/98	GD	0.118	29	52	2	NRV LOW	00:08	00:21	
8/14/98	VX	0.055	26	52	1	NRV LOW	00:28	00:23	
8/14/98	VX	0.055	26	52	2	NRV LOW	00:08	00:23	
8/14/98	VX	0.055	26	52	1	NRV LOW	00:15	00:26	
8/14/98	VX	0.055	26	52	2	NRV LOW	00:06	00:26	
8/14/98	VX	0.055	26	52	1	NRV LOW	00:30	00:31	
8/14/98	VX	0.055	26	52	2	NRV LOW	00:19	00:26	
8/17/98	HD	2.63	0	0	1	BLS MED	00:07	00:50	
8/17/98	HD	1.93	0	0	2	BLS LOW	00:07	00:46	
8/17/98	HD	1.93	0	0	1	BLS MED	00:06	00:47	
8/17/98	HD	1.93	0	0	2	BLS LOW	00:05	00:33	
8/17/98	HD	1.93	0	0	1	BLS LOW	00:05	00:47	
8/17/98	HD	1.93	0	0	2	BLS LOW	00:04	00:44	

TABLE 5. *Summary of Agent Vapor Testing, ERDEC, August 1998*

Date	Agent	Conc. (ug/L)	RH	Temp. (°C)	Det #	Response	Alarm Time (mm:ss)	Clear Time (mm:ss)	Notes
8/18/98	VX	0.09	0	0	1	NRV LOW	01:27	00:22	
8/18/98	VX	0.09	0	0	2	NRV LOW	00:37	00:23	
8/18/98	VX	0.09	0	0	1	NRV LOW	01:38	00:23	9
8/18/98	VX	0.07	0	0	2	NRV LOW	00:48	00:22	
8/18/98	VX	0.07	0	0	1	NRV LOW	00:49	00:23	
8/18/98	VX	0.07	0	0	2	NRV LOW	00:14	00:28	

Notes

1. GD peaks are present, but just outside the alarm window established by the detection algorithm.
2. Cleardown time was not recorded.
3. Detector realarmed following cleardown.
4. VX concentration uncertain.
5. Residual HD peaks observed from previous tests.
6. Multiple peaks in the vicinity of the negative reactant ion shown that there is negative-mode contaminant at +52 °C which reduces the sensitivity to HD. Detector also did not respond to the H confidence sample.
7. GB peaks are present, but just outside the alarm window established by the detection algorithm.
8. Detector alarmed after the agent vapor was removed.
9. Detector recalibrated approximately 1 minute into the challenge, and then alarmed immediately afterward.

5. GOVERNMENT TESTING: INTERFERENCES

Two prototype M43-APD detectors were subjected to outdoor interference testing at the ERDEC M-Field test site from 31 Aug to 3 Sep 1998. ETG personnel were present to support testing, perform maintenance and capture detector digital data. Each detector was subjected to three trials of each interference challenge. Time was allowed between each trial for each detector to clear before the next trial. Between each different interference, confidence checks were performed to verify detector operation. On every occasion, both detectors alarmed properly to the confidence sample.

On the first day of testing, the detector operating software had to modified to make the prototype detectors compatible with the new battery box that ERDEC had developed as a replacement for the BA3517/U. The M43-APD has a built-in test feature which checks the remote terminals for a short in the field wire which connects to the M42 remote alarm. The Government's prototype battery box has a feature which sends voltage across the remote terminals when the battery voltage is low. This feature fools ETG's built-in test into thinking that there is a short across remote terminals.

The Government's prototype battery box has a diode-protected circuit which can be used by the M43-APD built-in test. It is a simple hardware fix which requires only that the positive and negative polarity of the M43-APD test signal be reversed to match the polarity of the Government's circuit.

Table 6 summarizes the interference test results. Most test trials resulted in no false alarms. The exceptions are described below.

JP8 fuel vapor caused false alarms in 3 of 6 trials. JP8 produced two peaks, both of which occurred in VX windows and displayed a false alarm. The peak second difference amplitudes (SECD) were not large, but were higher than the VX alarm threshold. The VX peak SECD criteria is quite low to accommodate the required low concentration (0.04 mg/m3) of purified VX. M56 turbine exhaust caused false alarms in 4 of 6 trials. All of these alarms occurred immediately after the turbine was shut off at the end of each trial. Also, M56 exhaust did not produce any peaks until shut down. It was learned that the M56 turbine purges residual JP8 fuel at shut down. Examination of IMS feature data revealed that the peaks produced by the assumed M56 exhaust were in the same positions as for JP8 fuel vapor and caused VX alarms. Thus, the M56 turbine exhaust did not cause false alarms, but the residual JP8 did.

DS2 caused a false alarm in 1 of 6 trials. Two peaks were observed in the positive mode. One had a large amplitude, but was not in any agent window. The second had a small amplitude and was in a GB window. The peak SECD was below the GB alarm criteria in most cases, but occasionally grew to a value slightly above the alarm threshold and caused an alarm.

Yellow smoke false alarmed in 6 of 6 trials HD, L, VX and GB; violet smoke alarmed 3 of 6 times as L; and green smoke alarmed 6 of 6 times as GB. All colored smokes created interference peaks in both the negative and positive detection polarities. Yellow smoke had large peaks in the HD and Lewisite windows as well as large peaks in the GB and VX windows. Violet smoke produced a large peak in the Lewisite window. Green smoke produced a large peak in a GB window. Green smoke had significant effect on the IMS spectrum, causing broad unresolved peaks and sometimes eliminating the positive reactant ion (Rx+) completely.

TABLE 6. *Battlefield interference testing of M43-APD, 31 Aug to 3 Sep 1998*

INTERFERENCE	DISTANCE (FEET)	FALSE ALARMS / TRIALS	TIME OF EXPOSURE (MIN.)	Notes
GAS EXHAUST	10	0/6	2	
DIESEL EXHAUST	10	0/6	2	
GAS VAPOR	5	0/6	2	
BURNING GAS	15	0/6	3	
DIESEL VAPOR	5	0/6	2	
BURNING DIESEL	15	0/6	2	
KEROSENE VAPOR	5	0/6	2	
BURNING KEROSENE	15	0/6	2	
JP8 FUEL VAPOR	5	3/6	2	VX
JP8 BURNING	15	0/6	2	
BURNING CARDBOARD	15	0/6	2	
BURNING WOOD	35	0/6	2	
DOUSED FIRE	22	0/6	2	
BURNING TIRE	22	0/6	2	
WHITE PHOSPHOROUS	50	0/6	2	
YELLOW SMOKE	50	6/6	2	HD, L, VX, GB
VIOLET SMOKE	50	3/6	2	L
RED SMOKE	50	0/6	2	
GREEN SMOKE	50	6/6	2	GB
HTH	5	0/6	2	
BLEACH	10	0/6	2	
SUPER TROPICAL BLEACH	10	0/6	2	
DS2	10	1/6	2	GB
AFFF	10	0/6	2	
BREAKFREE (CLP)	3	0/6	2	
RBC	3	0/6	2	
LSA OIL	3	0/6	2	
INSECT REPELLENT AEROSOL	3	0/6	2	

TABLE 6. *Battlefield interference testing of M43-APD, 31 Aug to 3 Sep 1998*

INTERFERENCE	DISTANCE (FEET)	FALSE ALARMS / TRIALS	TIME OF EXPOSURE (MIN.)	Notes
INSECT REPELLENT LOTION	3	0/6	2	
INSECTICIDE	3	0/6	2	
M56 TURBINE EXHAUST	25	4/6	2	VX, note 1
M56 FOG OIL SMOKE	50	0/6	2	
M76 GRENADE	20	0/6	5 (SECONDS)	
TOTALS				
ALARMS / TRIALS		23/198	11.6%	
MATERIALS CAUSING ALARMS		6/33	18.2%	

Notes:
1) Post alarm. False alarm occurred when turbine shut off and JP8 fuel is automatically purged from system. Since this is a false alarm to JP8 vapor, the materials causing alarm becomes 5/33 or 15.2%.

6. TEST INCIDENT REPORTS

During the testing, five test incident reports (TIR) were generated. Detailed discussions are given in the following pages. A summary is provided in Table 7, below.

TABLE 7. *Summary of Test Incident Reports.*

TIR No.	Description
1	Signal shows excessive peak-to-peak noise during low-temperature operation.
2	Detector did not start up within 30 minutes following hot storage.
3	Detectors do not alarm to GD vapor.
4	Detectors will not alarm to H confidence sample or HD vapor following hot storage.
5	Detectors display Remote Alarm Error when connected to prototype battery boxes.

Test Incident Report #1

Program: DAAM01-97-C-0033 M43A1 Upgrade and Feasibility Analysis

Reported by: Glenn Weaver

Equipment: 2428980 M43-APD Chemical Agent Detector

S/N: 980206-4

Date: March 25, 1998

Test Location: ETG Environmental Chamber No. EVC-001

Nature of Operation: Startup at -40°C, following 17 hours of storage at -40°C

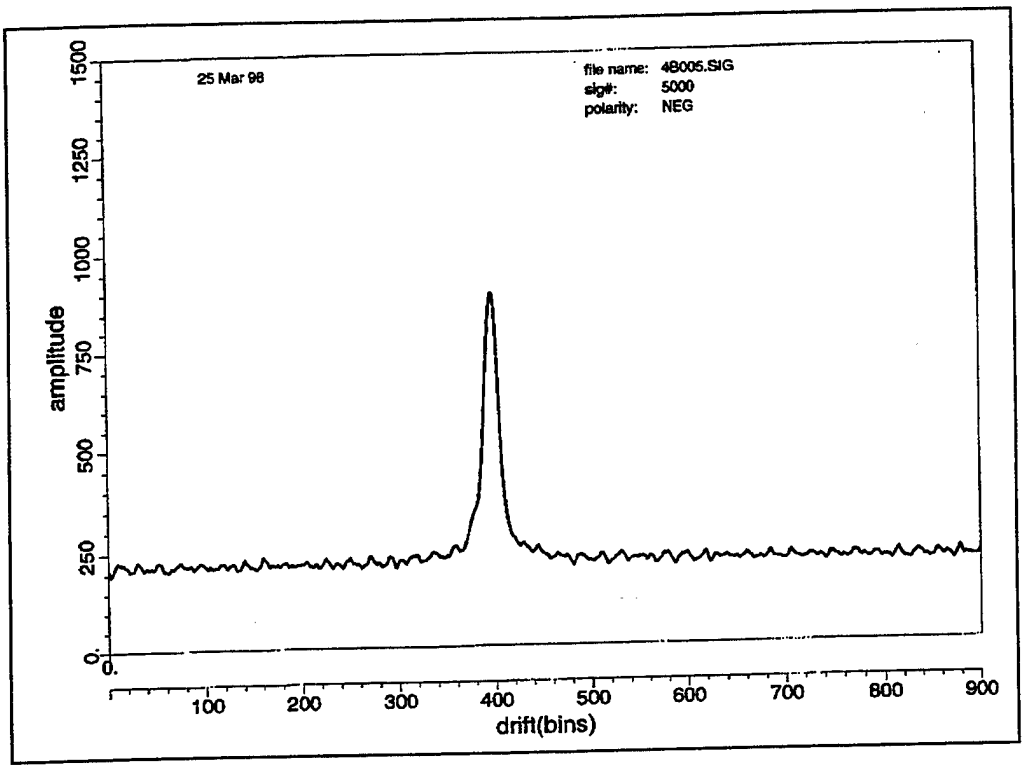
Problem: Signal shows excessive peak-to-peak noise during low-temperature operation.

Discussion: Following low-temperature storage, the detector was started up at -40 °C. The detector successfully started and alarmed to the confidence sample, but the oscilloscope showed a broadband noise which appeared to exceed the acceptance test criteria. The signature plots confirmed this.

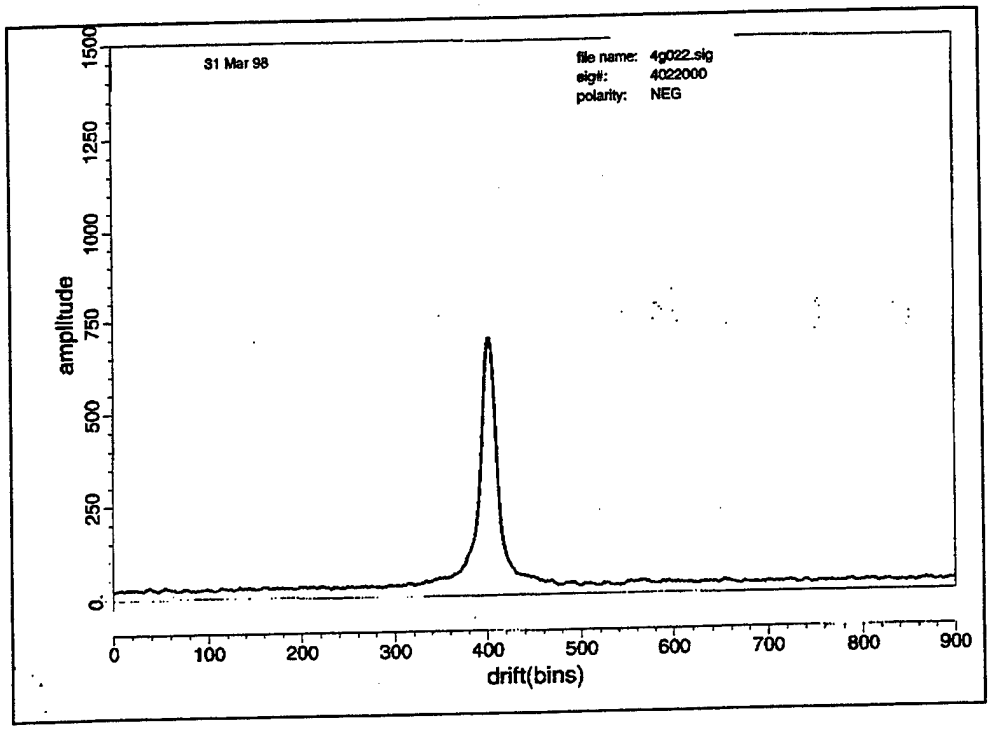
Repair Action: Removed the nickel plating from the inside surface of the casetop in the immediate vicinity of the hole in the casetop where the inlet assembly passes through.

Cause of Problem: The cause of noise was isolated to a ground loop created by contact between the IMS sensor module and the nickel plating of the M43A1 casetop. The contact was occurring at the point where the aluminum inlet housing goes through the case top.

Corrective Action: The short-term solution was to scrape away the nickel plating from around the hole in the casetop where the inlet passes through. Long-term design solutions are to isolate the sensor using an electrically-insulating gasket, or to improve the tolerance stackup so that there is no contact with the nickel plating.



Detector 980206-4, low-temperature storage/operation; signatures taken during operation at -40 °C show excessive broad-band noise.



Detector 980206-4, low-temperature storage/operation; signatures taken during operation at -40 °C following repair. Cause of the noise was isolated to a ground loop due to contact between the IMS sensor and the nickel plating in the casetop

Test Incident Report #2

Program: DAAM01-97-C-0033 M43A1 Upgrade and Feasibility Analysis

Reported by: Jeff Siebert

Equipment: 2428980 M43-APD Chemical Agent Detector

S/N: 980206-5

Date: March 31, 1998

Test Location: ETG Environmental Chamber Pool No. 0277

Nature of Operation: Startup at +52°C, following 16 hours of storage at +52°C

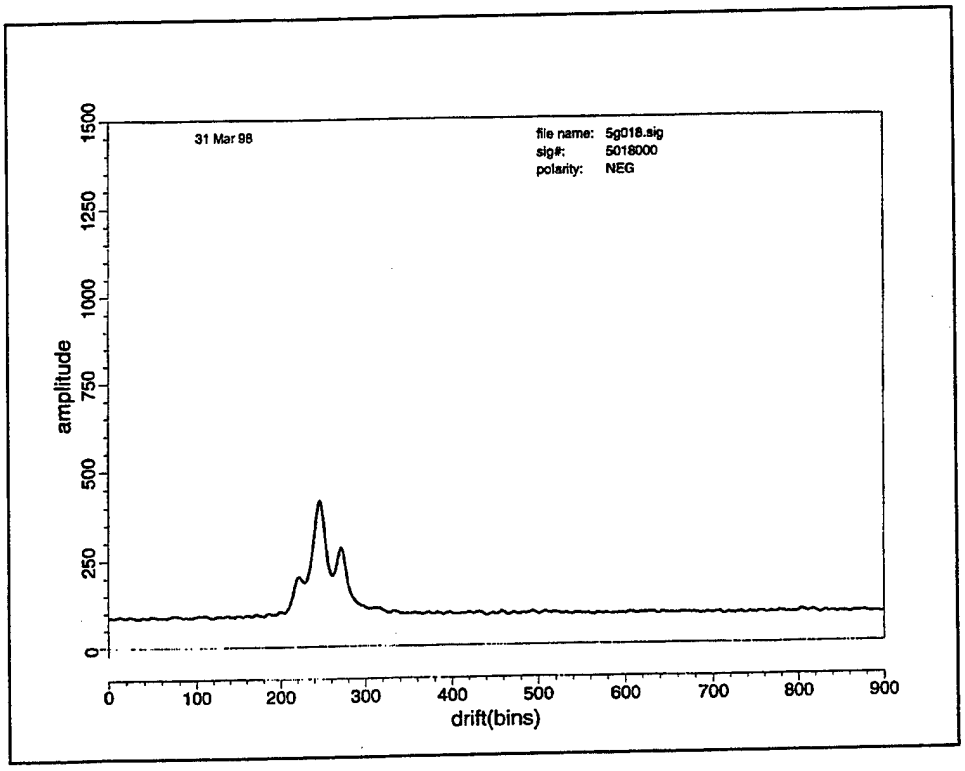
Problem: Detector did not start up within 30 minutes following hot storage.

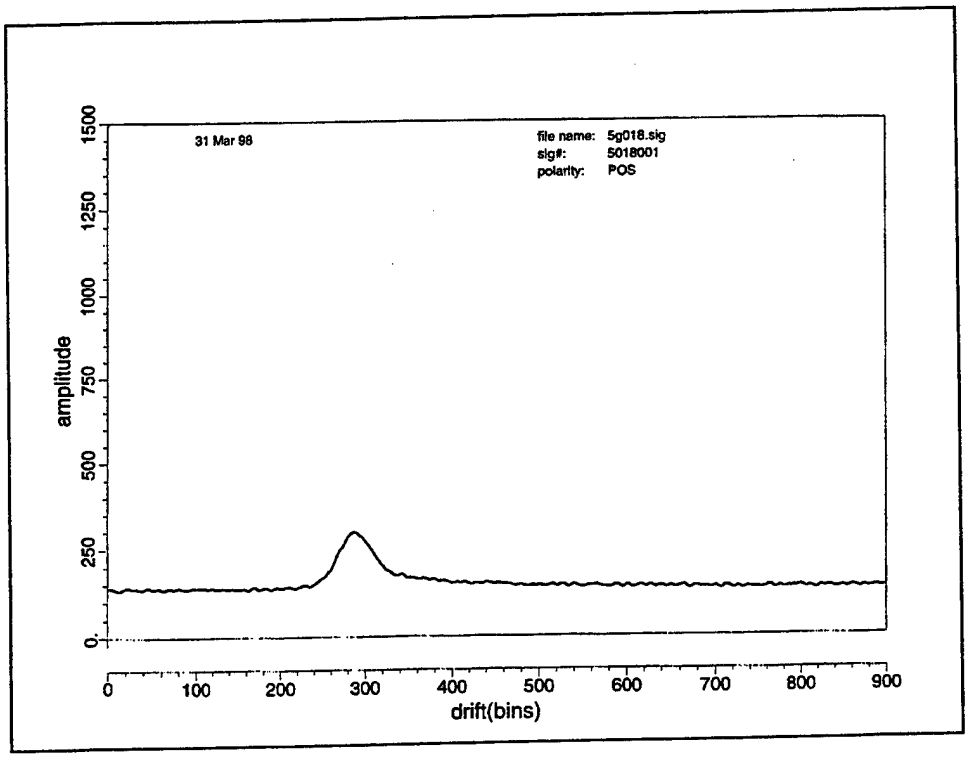
Discussion: Following non-operational storage at +52 °C, the detector was upcapped and power turned on. After 5 minutes in STANDBY, the detector had not normalized and displayed CAL ERR (failure to calibrate). After 30 minutes the detector still had not calibrated and the test was stopped.

Repair Action: Washed and baked all components, added activated charcoal to vents within the sieve pack assembly, replaced the sieve pack assembly due to suspected leak, redesigned the inlet assembly and inlet cap, and lowered the alarm threshold required for H alarm.

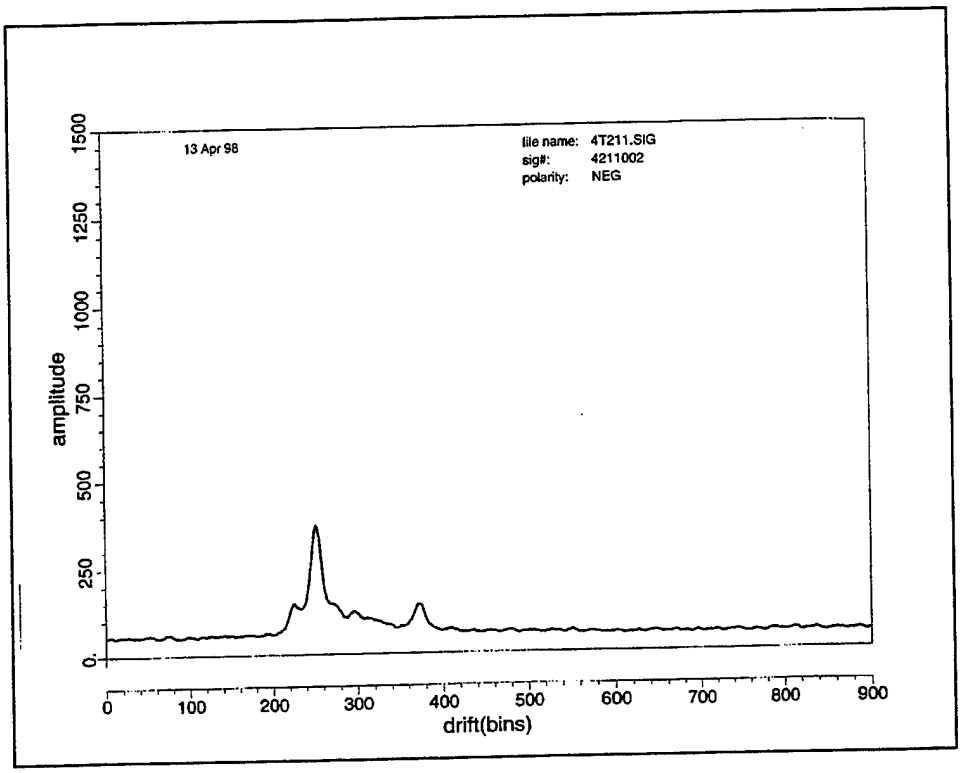
Cause of Problem: The cause of the failed startup was a contaminant in the positive mode which prevented the positive reference ion peak (NH_3) from forming. When a reference ion peak is not present, the detector will not calibrate. In addition, there was a contaminant in the negative mode signature which interferes with formation of both the negative reference peak and subsequently the ability of the H-simulant from forming a well-defined ion peak. As a result, the detector will not alarm to the H confidence sample because the second difference amplitude of the H-simulant peak is below the alarm threshold. The source of the contamination appears to be a material within the M43A1 case assembly which is outgassing at high temperatures. The contaminant probably enters the sensor module through the sieve pack assembly, which uses the vent to equalize pressure between the interior volume of the cell and the case interior.

Corrective Action: The precise source of the contamination has not yet been isolated, and it is unlikely that a single component will be found which is the sole contributor. Regardless of whether the source of contamination is found, there is one design approach to minimize its impact. The current sieve pack vents to the inside of the case, therefore the sieve breather effect is pulling case air into the sensor. The pneumatics can be modified to vent to the outside of the case, probably through the inlet assembly.

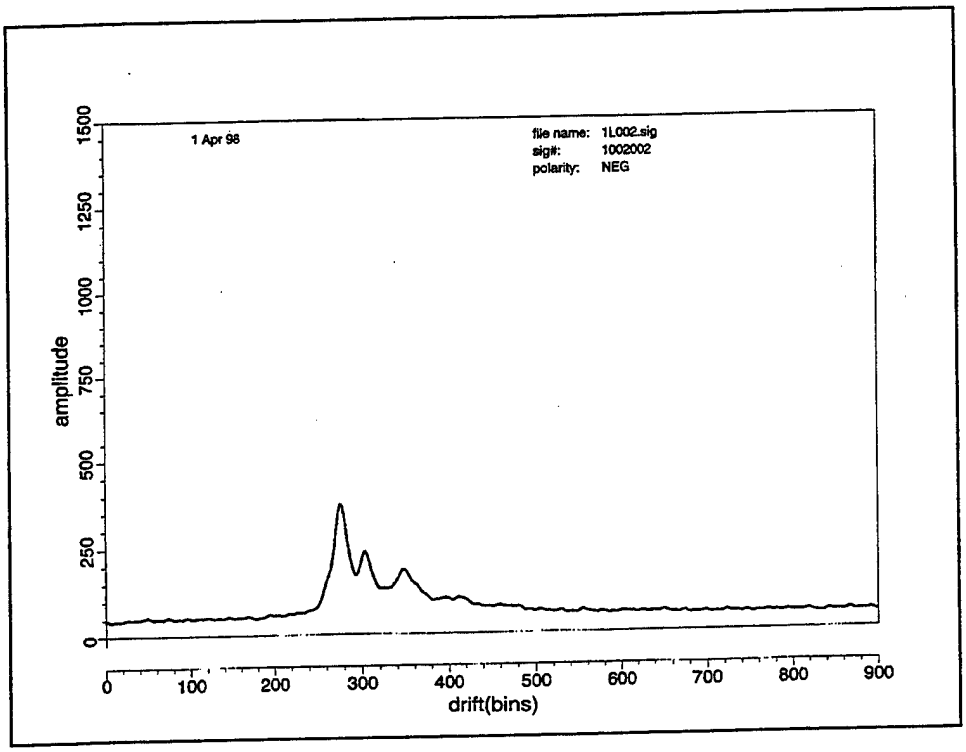


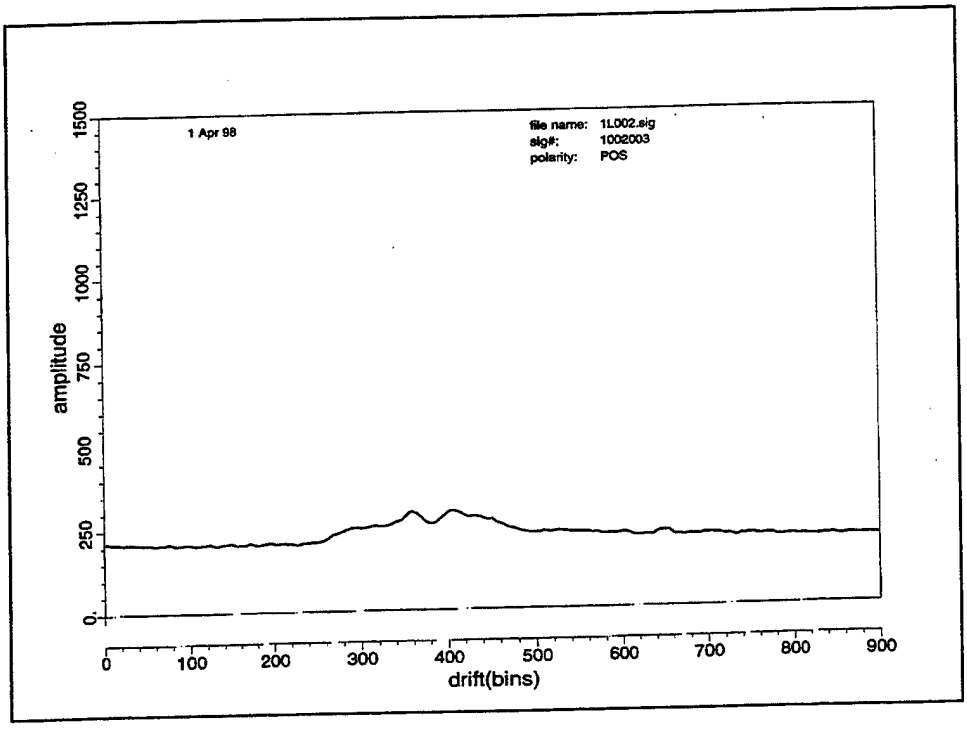


Detector 980206-5, high-temperature storage/operation; signatures taken during backflush at +52 °C, approximately 30 minutes after initial power. Detector was unable to calibrate following storage at +52 °C for 20 hours; the cause is a contaminant in the positive mode which is preventing the NH_3 ion peak from forming.



Detector 980206-4, high-temperature storage/operation; signature of an H confidence sample taken during operation at + 52 °C, 15 minutes after initial power on following 90 hours of storage at +52 °C. Detector does not alarm to the H confidence sample because the second difference amplitude of the H-simulant ion peak is SECD=266, which is below the alarm threshold of SECD=500.





Signatures of an air sample drawn from the interior of detector 980206-5 after the detector had been stored at +52 °C for 16 hours. Sample was acquired by attaching a 1-ft Viton tube to the inlet of detector 980206-1, just cracking open detector case, and inserting the Viton tube inside the case. Long startup times are being caused by contaminants which build up inside the M43A1 cases at high temperatures and are working their way inside the IMS closed loop system.

Test Incident Report #3

Program: DAAM01-97-C-0033 M43A1 Upgrade and Feasibility Analysis

Reported by: George Lozos

Equipment: 2428980 M43-APD Chemical Agent Detector

S/N(s): 980206-4 and 980206-5

Date: Aug 3, 1998

Test Location: ERDEC Surety Lab Building E3510

Nature of Operation: Agent vapor testing at room temperature

Problem:. Detectors do not alarm to GD vapor

Discussion: On the first day of agent vapor testing, the detectors did not alarm to GD at ambient lab temperature (+20 °C).

Repair Action: No repairs were made.

Cause of Problem: GD agent vapor produced strong peaks in the IMS signature, indicating good sensitivity. However, the position of the peak was not within the alarm criteria for GD as defined by the agent detection algorithm. The positions for all IMS peaks (reactant ion reference and agent) were at longer drift times than normal (to the right). This caused the peak location ratios (PLRs) to be smaller than normal (to the left).

Corrective Action: These no-alarm conditions could be improved by modifying the GD peak position criteria, but the improved agent detection may come at the expense of increased false alarms. Evaluation of interference materials with peaks in this region showed a potential for false alarms. One possibility is that replacing the sieve pack with newly charged one would restore the peak drift times and ratios to their normal values. Any hardware evaluation would require additional effort to isolate the cause of this observation.

Test Incident Report #4

Program: DAAM01-97-C-0033 M43A1 Upgrade and Feasibility Analysis

Reported by: Glenn Weaver

Equipment: 2428980 M43-APD Chemical Agent Detector

S/N(s): 980206-4 and 980206-5

Date: Aug 10, 1998

Test Location: ERDEC Surety Lab Building E3510

Nature of Operation: Hot-temperature startup following storage at +52 °C

Problem:. Detectors will not alarm to H confidence sample or HD vapor following hot storage.

Discussion: Detectors had been shutdown at ambient room temperature for 40 hours following VX vapor testing, also at ambient room temperature. At 7:30 am the test crew ramped the environmental chamber to +52 °C with detectors in shutdown state. Detectors were powered on after 2 hours of storage. Detectors were able to calibrate and successfully alarm to the G confidence sample, but did not alarm to the H-confidence sample or the HD vapor at 2.0 ug/L.

Repair Action: None. When detectors were removed from the chamber, the signatures immediately cleaned up and the detectors alarmed to the H confidence sample.

Cause of Problem: This problem was first observed during design verification testing at ETG (see TIR #2), but the symptoms were not as pronounced during DVT as they were during agent testing. At ETG, the detectors were stored for 96 hours at +52 °C and were able to alarm to confidence sample. There is a contaminant in the negative mode signature which interferes with formation of both the negative reference peak and subsequently the ability of the H-simulant and HD vapor from forming a well-defined ion peak. As a result, the detector will not alarm to either sample because the second difference amplitude of the H-simulant peak is below the alarm threshold. The source of the contamination appears to be a material within the M43A1 case assembly which is outgassing at high temperatures. The contaminant probably enters the sensor module through the sieve pack assembly, which uses a vent to equalize pressure between the interior volume of the cell and the case interior.

Corrective Action: The precise source of the contamination has not yet been isolated, and it is unlikely that a single component will be found which is the sole contributor. Regardless of whether the source of contamination is found, there is one design approach to minimize its impact. The current sieve pack vents to the inside of the case, therefore the sieve breather effect is pulling case air into the sensor. The pneumatics can be modified to vent to the outside of the case, probably through the inlet assembly

Test Incident Report #5

Program: DAAM01-97-C-0033 M43A1 Upgrade and Feasibility Analysis

Reported by: Glenn Weaver

Equipment: 2428980 M43-APD Chemical Agent Detector

S/N(s): 980206-4 and 980206-5

Date: Aug 3, 1998

Test Location: ERDEC M-Field

Nature of Operation: Operation with Government prototype battery boxes

Problem:. Detectors display Remote Alarm Error when connected to prototype battery boxes.

Discussion: ERDEC has developed a new battery box as a replacement for the BA3517/U. When the detectors were connected to the new batteries, the built-in test detected a short across the remote terminals and subsequently displayed the error message. When connected to the original BA3517/U, the detectors do not display this error.

Repair Action: Downloaded new software version M502d, which disables the built-in test for a short across the remote terminals.

Cause of Problem: The Government's new battery has a feature which sends voltage across the remote terminals when the battery voltage is low. This feature fools ETG's built-in test into thinking that there is a short across the remote terminals.

Corrective Action: The Government's new battery box has a diode-protected circuit which can be used by the M43-APD built-in test. It is a simple hardware fix which requires only that the positive and negative polarity of the M43-APD test signal be reversed to match the polarity of the Government's circuit.

7. CONCLUSIONS

Over a six-month period of testing the prototype M43-APD Chemical Agent Detector, the results have been very favorable. The main objective in this feasibility study was to demonstrate that ETG's IMS-based sensor module and agent-detection algorithm can be successfully integrated into the M43A1 detector. This objective has been met. The ICAM cell, APD electronics, power supplies, display, sieve pack, manifold, and communication ports were each successfully repackaged to fit within the M43A1 case assembly. The design is essentially complete and is ready for transition to production; M43A1 detectors can be refurbished economically and in large quantities. The M43-APD operator interface has been simplified to require only two steps; plug in the power and perform a confidence test.

There were no hardware (pumps, cell, electronics) failures reported for any components during either the design verification testing or the Government evaluation testing. On each day during the Government's testing, the M43-APD detectors were ready to go, which is a reflection of the maturity of ETG's APD sensor technology. From this aspect the M43-APD design should be considered a low risk.

Testing also showed that our agent-detection algorithm, which has been tested on numerous occasions by the Government, is directly transferable from the ICAM-APD to the M43-APD. Again this is a reflection of the maturity of the proposed upgrade.

Despite the overall success of the detectors during this test program, there were two problems encountered during agent-vapor testing which require some discussion. First, the detectors did not alarm to GD vapor at ambient lab temperature (+20 °C). ETG's analysis of this problem showed that the GD agent vapor was producing strong peaks in the IMS signature, indicating good sensitivity. The position of the peaks, however, was outside of the alarm windows that are defined by the agent detection algorithm. These no-alarm conditions can be improved with modification to the detection algorithm, but the improved agent detection may come at the expense of increased false alarms.

From our past experience, we know that insect repellents produce IMS peaks in the vicinity of the GD peaks, and that expanding the alarm windows for GD may produce false alarms to insect repellents. With this in mind, ETG used laptop computers during M-Field testing to collect IMS signatures of the various materials, including insect repellents, in order to make a quantitative evaluation of the impact of widening the GD alarm windows. The data showed that the insect repellents produce peaks close to the GD windows, but none had amplitudes which would have produced an alarm, even if the GD windows are widened to the point where GD would have produced alarms in the agent vapor tests.

Also during agent-vapor testing, the M43-APD detectors did not alarm to HD at an elevated temperature of +52 °C. The signature data taken during these tests shows that there is a contaminant in the negative-mode signature that is impeding the formation of a

strong reactant ion, with a corresponding reduction in the sensitivity to HD. ETG can not be sure, but we believe that this contaminant is a material which is outgassing from the M43A1 case assemblies. The contaminant peaks disappeared almost immediately after the detectors were removed from the environmental chambers and returned to room temperature. It is important to note that the contaminant does not affect blister-agent detection at lower temperatures and that nerve-agent detection is not affected.

During the first day of M-Field testing, the air temperature was 90 °F and the detectors were operated in the full sun. The internal temperature of the detector is continuously monitored by the operating software; the test data from M-Field measured the internal temperature at +48 °C, which is only 6 °C lower than the internal temperature measured during the HD testing. The M-Field test signatures do not show the negative-mode contaminant and they responded to the confidence samples 100% of the time. In other words, the contaminant is only affecting operation in the extreme high-temperature conditions.

The contamination is an important failure which ETG has taken very seriously. The precise source of the contamination has not yet been isolated, and it is unlikely that a single component will be found which is the sole contributor. Regardless of whether the source of contamination is found, there is one design approach to minimize its impact. The current sieve pack vents to the inside of the case, therefore the sieve-breather effect pulls case air into the sensor. The pneumatics can be modified to vent to the outside of the case, probably through the inlet assembly.

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APPENDIX A. ETG DESIGN VERIFICATION TEST DATA

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Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 3-24-98

Software Ver. 502-1 Time: 18:00

Location: CAM CLEANROOM

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. 4A001.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:39		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: _____ Date 3-24-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 3-24-96

Software Ver. 502-1 Time: 18:05

Location: CAM CLEANROOM

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4A001.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional) 4A002.SIG F-AIR

2. "H" Simulant Test

   Z H 1 s
   G 1 s

C. Alarm response		Pass	Fail
Challenge Time	1 sec	N/A	
Time to Alarm	4 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Blister (Note 1)		✓	
Record response(s)	BLST MED NERV MED		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	50 SEC		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response		Pass	Fail
Challenge Time	1 sec	N/A	
Time to Alarm	5 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Nerve (Note 2)		✓	
Record response(s)	NERV LOW BLST LOW		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	37 SEC		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: _____ Date 3-24-98

H/G Simulant Test Data Sheet

Detector S/N 980206-4 Date: 3-24-98

Software Ver. 502-1 Time: ~~18:05~~ 18:15 3-24-98

Location: CAM CLEANROOM

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4A001.DAT
   (Attach copy of data with test records) 4A003.SIG F-AIR H 10 s G 10 s

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

   C. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

D. Alarm response		Pass	Fail
Challenge Time	3 sec	N/A	
Time to Alarm	~~25~~ 3 sec 3-24-98	N/A	
Horn Sounds		✓	
Display correctly identifies Blister (Note 1)		✓	
Record response(s)	BLST LOW		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	25		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

   E. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

F. Alarm response		Pass	Fail
Challenge Time	4 sec	N/A	
Time to Alarm	4 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Nerve (Note 2)		✓	
Record response(s)	NERV MED		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	36		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-24-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206 - 4 Date: 3-25-98

Software Ver. 5.02A-1 Time: 12:10:19

Location: EVC - 001 STARTUP @ -40°C

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. 4B004.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 18:35		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: Glen Wean Date 3-25-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 3-25-98

Software Ver. 5.02A-1 Time: _____

Location: EVC-001 STARTUP @ -40°C

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4B004.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 6 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time _____		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time _____ sec	N/A	
Time to Alarm 7 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:25		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-25-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 3-25-98

Software Ver. 5.02A-1 Time: 17:28

Location: EVC-001

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4C007.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

DETECTOR IS ALARMING NERVE LOW - INTERMITTENT W/ FILTER ON.

SIGS
1C008.SIG
F-AIR
H
G

2. "H" Simulant Test

C. Alarm response		Pass	Fail
Challenge Time	5 sec	N/A	
Time to Alarm	5 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Blister (Note 1)		✓	
Record response(s)	BLS MED		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	1'30"		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response		Pass	Fail
Challenge Time	2 sec	N/A	
Time to Alarm	5 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Nerve (Note 2)		✓	
Record response(s)	NRV LOW 50 sec		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	0:50		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-25-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 3-26-98

Software Ver. 5.02A-1 Time: 13:15

Location: EVC-001

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4D013.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 2 sec	N/A	
Time to Alarm 4 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 2:15		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 1 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV LOW		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 1:30		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-26-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 3-27-98

Software Ver. 5.02A-1 Time: 9:15 AM

Location: CAM CLEAN ROOM

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. 4E00015.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:39		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 3-27-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 3-27-98

Software Ver. ~~2.~~ 5.02A-1 Time: 9:18

Location: CAM CleanRoom

1. Connect communications cable and begin "Logall"

   A. Record datafile name ~~4E0015~~ 4E015.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 5 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) NRV LOW BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 28 sec		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 4 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV HI		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 21 sec		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-27-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 3-30-98

Software Ver. 5.02A-1 Time: 15:15

Location: CAM Clean Room

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. 4F017.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:38"		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: M Weaver Date 3/30/98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 3-30-98

Software Ver. 5.02A-1 Time: 15:20

Location: CAM Clean Room

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4F017.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 3 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) NRV LOW BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 41"		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 3 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV MED BLS LOW		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 50"		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3/30/98

H/G Simulant Test Data Sheet

Detector S/N 980206-4 Date: 3-30-98

Software Ver. 5.02A-1 Time: ~~3~~ 15:30

Location: CAM CLEAN ROOM

1. Connect communications cable and begin "Logall" 5165.

   A. Record datafile name 4F01B.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

   C. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

D. Alarm response		Pass	Fail
Challenge Time	4 sec	N/A	
Time to Alarm	4 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Blister (Note 1)		✓	
Record response(s)	BLS MED		
Cleardown less than 5 minutes after alarm		✓	

Record cleardown time 11 SEC.

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

   E. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

F. Alarm response		Pass	Fail
Challenge Time	5 sec	N/A	
Time to Alarm	5 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Nerve (Note 2)		✓	
Record response(s)	NRV LOW		
Cleardown less than 5 minutes after alarm		✓	

Record cleardown time 0:41

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-30-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 3/31/98

Software Ver. 5.02A-1 Time: 8:38

Location: EVC-001 −40°C

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. 4G021.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 13:50		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 3/31/98

Confidence Test Data Sheet

Detector S/N 980206 -4 Date: 3/31/98

Software Ver. 5.02A-1 Time: 8:58

Location: EVC-001 -40°C

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4602H.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 2 sec	N/A	
Time to Alarm 6 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 2:54		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 6 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:47		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3/31/98

Confidence Test Data Sheet

Detector S/N 980206-04 Date: 3-31-98

Software Ver. 5.02A-1 Time: 16:30

Location: EVC-001

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4H024.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 5 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:35		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 4 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:32		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: M E Weaver Date 3-31-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 4-1-98

Software Ver. 5.02A-1 Time: 8:35

Location: EVC-001

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4K027.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 4 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) NRV LOW BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:36		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 3 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV LOW		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:23		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: M Weaver Date 4-1-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 4-1-98

Software Ver. 5.02A-1 Time: 15:00

Location: CAM CLEAN ROOM FOLLOWING LOW-TEMP TESTING.

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4M029.DAT (Attach copy of data with test records) SIGS 15:10

   B. Use menu to turn on display (optional) R-AIR H G

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 7 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) BLS LOW		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:40		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 3 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time ~~0:20~~ 0:25 ΔW		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: M Weaver Date 4-1-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 5-22-98

Software Ver. 5.02B-1 Time: 16:17

Location: CAM CLEAN

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name 4_0522A.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2'38"		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: J Weaver Date 5-22-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 5-22-98

Software Ver. 5.02A-1 Time: 16:22

Location: CAM CLEAN

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4_0522A.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	5		
Challenge time (sec)	1		
Time to alarm (sec)	4		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	NRV L M H (BLS) L (M) H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail 0:49	Pass / Fail	Pass / Fail
Record cleardown time			

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	7		
Challenge time (sec)	1		
Time to alarm (sec)	8		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies ~~Blister~~ NERVE (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) (L) M H BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:35		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 5-22-98

H/G Simulant Test Data Sheet

Detector S/N 980206-4 Date: 5-22-98

Software Ver. 5.02B-1 Time: 16:28

Location: CAM CLEAN

1. Connect communications cable and begin "Logall"

   A. Record datafile name _____
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

   C. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

D. Alarm response		Pass	Fail
Challenge Time	3 sec	N/A	
Time to Alarm	3 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Blister (Note 1)		✓	
Record response(s)	BLS MED		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	0:23		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

   E. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

F. Alarm response		Pass	Fail
Challenge Time	3 sec	N/A	
Time to Alarm	3 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Nerve (Note 2)		✓	
Record response(s)	BLS LOW NRV MED		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	0:37		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: Glen Weaver Date 5-22-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 5-26-98

Software Ver. 5,02B-1 Time: 8:57

Location: EVC Pool 0277

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name 4_0526A.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	____
Display shows the Software Version	✓	____
Display shows LED TEST followed by test patterns	✓	____
Display shows HORNTEST and horn beeps twice	✓	____
Display shows SELFTEST	✓	____
Display shows STANDBY and backflush begins	✓	____
Display shows READY within 30 minutes after startup	✓	____
Record Time 2'37		
Display goes blank approx. 15 seconds after READY	✓	____

Tested by: [signature] Date 5-26-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 5-26-98

Software Ver. 5.02B-1 Time: 8:57

Location: EVC Pool 0277

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4_0526A.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	5'	12'.	20'
Challenge time (sec)	4"	4"	4"
Time to alarm (sec)	—	—	4"
Horn sounds	Pass / Fail	Pass / Fail	(Pass) / Fail
Display correctly identifies Blister (Note 1)	Pass / Fail	Pass / Fail	(Pass) / Fail
Record response(s)	NRV L M H BLS L M H	NRV L M H BLS L M H	NRV L M H (BLS) L M H
Cleardown less than 5 minutes after alarm (mm:ss)	Pass / Fail	Pass / Fail	(Pass) / Fail
Record cleardown time			20"

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	9'		
Challenge time (sec)	1"		
Time to alarm (sec)	6"		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L (M) H BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:19"		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 5-26-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 5-26-98

Software Ver. 5.028-1 Time: 13:16

Location: EVC Pool 0277

1. Connect communications cable and begin "Logall"

   A. Record datafile name 4_0526D.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	N/A		
Challenge time (sec)	1		
Time to alarm (sec)	3		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	NRV L M H (BLS) (L) M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:21		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	N/A		
Challenge time (sec)	1		
Time to alarm (sec)	5		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L (M) H BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:24		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 5-26-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 3-24-98

Software Ver. 502-1 Time: 18:20

Location: CAM Clean Room

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. 5A001.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:39		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 3-24-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 3-24-98

Software Ver. 502-1 Time: 18:25

Location: CAM CLEANROOM

1. Connect communications cable and begin "Logall"

   A. Record datafile name SA001.DAT
   (Attach copy of data with test records) SA002.SIG F-AIR

   B. Use menu to turn on display (optional) H 1 SEC
   G 1 SEC

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 4 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) ~~BLST~~ BLST MED NRV LOW		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 42 SEC		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 17 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NERV LOW		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 17		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-24-98

H/G Simulant Test Data Sheet

Detector S/N 980206-5 Date: 3-24-98

Software Ver. 502-1 Time: 18:28

Location: CAM CLEAN ROOM

1. Connect communications cable and begin "Logall"

   A. Record datafile name 5A001.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

5A003,SIG ~~F-AIR~~ R-AIR
(MONITOR MODE) H 10 SEC
G 10 SEC

2. "H" Simulant Test

   C. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

D. Alarm response		Pass	Fail
Challenge Time	7 sec	N/A	
Time to Alarm	7 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Blister (Note 1)		✓	
Record response(s)	BLST MED		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	29		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

   E. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

F. Alarm response		Pass	Fail
Challenge Time	7 sec	N/A	
Time to Alarm	7 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Nerve (Note 2)		✓	
Record response(s)	NERVMED		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	29		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: _____ Date 3-24-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 3-25-98

Software Ver. 5.02A-1 Time: 1209:37

Location: EVC-001 STARTUP @ -40°C

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. 5B004.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:46		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: Glen E Weaver Date 3-25-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 3-25-98

Software Ver. 5.02A-1 Time: _____

Location: EVC-001 STARTUP @ -40°C

1. Connect communications cable and begin "Logall"

   A. Record datafile name ~~5B005~~ 5B004.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional) SIGS: F-AIR H G

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 6 sec	N/A	
Horn Sounds	✓	____
Display correctly identifies Blister (Note 1)	✓	____
Record response(s) BLS LOW		
Cleardown less than 5 minutes after alarm	✓	____
Record cleardown time 2:16		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 5 sec	N/A	
Horn Sounds	✓	____
Display correctly identifies Nerve (Note 2)	✓	____
Record response(s) NRV LOW		
Cleardown less than 5 minutes after alarm	✓	____
Record cleardown time 0:27		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: _____ Date 3-25-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 3-25-98

Software Ver. 5.02A-1 Time: 17:37

Location: EVC-001 RUNNING 4 HRS @ -30°C

1. Connect communications cable and begin "Logall"

   A. Record datafile name 5C007.DAT SIGS
   (Attach copy of data with test records) SIGS 5C008.SIG F-AIR H G

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 4 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:30		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 5 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV LOW		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 1:05		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-25-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 3-26-98

Software Ver. 5.02A-1 Time: 13:32

Location: EVC-001

1. Connect communications cable and begin "Logall"

   A. Record datafile name 5D010.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 2 sec	N/A	
Time to Alarm 7 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) BLS MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 1:00		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 7 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV Low BLS Low		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 1:00		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: _____ Date 3-6-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 3-27-98

Software Ver. 5.02A-1 Time: 9:30

Location: CAM Clean Room

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. SE015.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:29		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 3-27-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 3-27-98

Software Ver. 5.02A-1 Time: 9:40

Location: CAM Clean Room

1. Connect communications cable and begin "Logall"

   A. Record datafile name 5E015.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

C. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 3 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Blister (Note 1)	✓	
Record response(s) BLS LOW		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:46		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

D. Alarm response	Pass	Fail
Challenge Time 1 sec	N/A	
Time to Alarm 8 sec	N/A	
Horn Sounds	✓	
Display correctly identifies Nerve (Note 2)	✓	
Record response(s) NRV MED		
Cleardown less than 5 minutes after alarm	✓	
Record cleardown time 0:33		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 3-27-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 3/31/98

Software Ver. 5.02A-1 Time: 9:00

Location: Thermotron-257

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file. SG017.DAT

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup		X
Record Time _____		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: _____ Date 3-31-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 5-22-98

Software Ver. 5.02B-1 Time: 17:30

Location: CAM CLEAN

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name 5_0522A.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 3:22		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: Glen Weaver Date 5-22-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 5-22-98

Software Ver. 5.02B-1 Time: 17:35

Location: CAM CLEAN

1. Connect communications cable and begin "Logall"

   A. Record datafile name 5_0522A.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	5		
Challenge time (sec)	1		
Time to alarm (sec)	3		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	NRV L M H (BLS) L (M) H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:35		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	7		
Challenge time (sec)	1		
Time to alarm (sec)	5		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L M (H) BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	2:41 *		

Note 2 -- Detector must alarm either NRV or NRV/BLS

* DETECTOR RE-ALARMED AFTER APPROX 30 SECONDS

Tested by: Glen W Weaver Date 5-22-98

H/G Simulant Test Data Sheet

Detector S/N 980206-5 Date: 5-22-98

Software Ver. 5.02B-1 Time: 5:42 PM

Location: CAM CLEAN

1. Connect communications cable and begin "Logall"

   A. Record datafile name 5-0522A.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

   C. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

D. Alarm response		Pass	Fail
Challenge Time	4 sec	N/A	
Time to Alarm	4 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Blister (Note 1)		✓	
Record response(s)	BLS MED		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	0:23		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

   E. Challenge detector for 10 seconds using CAM "H" Simulant generator (7 bars)

F. Alarm response		Pass	Fail
Challenge Time	6 sec	N/A	
Time to Alarm	6 sec	N/A	
Horn Sounds		✓	
Display correctly identifies Nerve (Note 2)		✓	
Record response(s)	NRV MED BLS LOW		
Cleardown less than 5 minutes after alarm		✓	
Record cleardown time	0:40		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 5-22-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 5-26-98

Software Ver. 5.02B-1 Time: 8:40

Location: EVC Pool 0277

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name MW 5_0526A.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 4:50		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 5-26-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 5-26-98

Software Ver. 5.02B-1 Time: 8:47

Location: EVC Pool 0277

1. Connect communications cable and begin "Logall"

   A. Record datafile name 5_0526A.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	7'	12'	
Challenge time (sec)	4"	1"	
Time to alarm (sec)	—	3"	
Horn sounds	Pass / Fail	(Pass) / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	Pass / Fail	(Pass) / Fail	Pass / Fail
Record response(s)	NRV L M H BLS L M H	NRV L M H (BLS) (L) M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	Pass / Fail	(Pass) / Fail	Pass / Fail
Record cleardown time		20"	

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	10'		
Challenge time (sec)	1		
Time to alarm (sec)	7		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) (L) M H BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	41"		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 5-26-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 5-26-98

Software Ver. 5.02B-1 Time: 13:28

Location: EVC Pool 0277

1. Connect communications cable and begin "Logall"

   A. Record datafile name 5_0526D.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	N/A		
Challenge time (sec)	1		
Time to alarm (sec)	4		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	NRV L M H (BLS) (L) M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:28		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	N/A		
Challenge time (sec)	1		
Time to alarm (sec)	7		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L (M) H BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass / Fail)	Pass / Fail	Pass / Fail
Record cleardown time	1:04		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 5-26-98

Blank

APPENDIX B. GOVERNMENT EVALUATION TEST DATA: AGENT VAPOR

Blank

Date	Agent	Conc (ug/l)	RH	Temp	Det #	On Cond	On Agent	Alarm	Clear	Resp	Cond Time	Alarm Time	Clear Time	Notes
8/3/98	GD	0.091	0%	20	1	14:45:51	14:50:51				00:05:00	########	00:00:00	
8/3/98	GD	0.091	0%	20	1		14:55:05				14:55:05	########	00:00:00	
8/3/98	GD	0.091	0%	20	1	14:56:14	14:57:12				00:00:57	########	00:00:00	
8/3/98	GD	0.091	0%	20	2	15:14:25	15:16:16				00:01:51	########	00:00:00	
8/3/98	GD	0.091	0%	20	2	15:17:23	15:18:52				00:01:29	########	00:00:00	
8/3/98	GD	0.091	0%	20	2	15:20:00	15:21:38				00:01:38	########	00:00:00	
8/4/98	GD	0.122	90	20	1	09:33:21	09:34:38			No alarm	00:01:17	########	00:00:00	
8/4/98	GD	0.122	90	20	2	09:46:06	09:47:06			No alarm	00:01:00	########	00:00:00	
8/4/98	GD	0.13	90	20	1	10:14:12	10:15:35			No alarm	00:01:23	########	00:00:00	
8/4/98	GD	0.13	90	20	2	10:27:36	10:28:42			No alarm	00:01:06	########	00:00:00	
8/4/98	GD	0.122	90	20	1	10:52:26	10:54:35			No alarm	00:02:09	########	00:00:00	
8/4/98	GD	0.122	90	20	2	11:06:18	11:08:02			No alarm	00:01:45	########	00:00:00	
8/4/98	GD	1.017	90	20	1	14:37:15	14:38:23	14:39:35	14:41:29	Alarm	00:01:07	00:01:13	00:01:54	
8/4/98	GD	1.017	90	20	2	14:42:20	14:44:05	no alarm			00:01:45	#VALUE!	#VALUE!	
8/4/98	GD	1	90	20	1	15:05:01	15:07:07	15:07:17	15:07:54	Alarm	00:02:06	00:00:10	00:00:37	
8/4/98	GD	1	90	20	2	15:24:39	15:25:54			No Alarm	00:01:15	########	00:00:00	
8/4/98	GD	1	90	20	1	15:28:36	15:31:00	15:31:21	15:32:07	Alarm	00:02:24	00:00:20	00:00:47	
8/4/98	GD	1	90	20	1	15:32:55	15:33:05	15:33:45			00:00:10	00:00:40	########	
8/4/98	GD	1	90	20	2	15:34:57	15:38:00			No Alarm	00:03:04	########	00:00:00	
8/4/98	GD	1	90	20	2	15:42:21	15:44:01			No Alarm	00:01:40	########	00:00:00	
8/5/98	GA	0.104	2	20	1	09:15:21	09:17:08	09:17:40	09:18:10	Alarm	00:01:47	00:00:32	00:00:30	
8/5/98	GA	0.104	2	20	2	09:32:35	09:33:57	09:34:10	09:34:43	Alarm	00:01:22	00:00:13	00:00:33	
8/5/98	GA	0.115	2	20	1	09:59:40	10:00:23	10:00:42	10:01:10	Alarm	00:00:43	00:00:19	00:00:29	
8/5/98	GA	0.115	2	20	2	10:14:09	10:15:22	10:15:37	10:16:07	Alarm	00:01:13	00:00:15	00:00:30	
8/5/98	GA	0.116	2	20	1	10:29:53	10:31:01	10:31:20	10:31:50	Nerve low	00:01:08	00:00:20	00:00:30	
8/5/98	GA	0.116	2	20	2	10:42:36	10:43:59	10:44:10	10:44:40	Nerve low	00:01:24	00:00:10	00:00:30	
8/5/98	GA	0.14	92	20	1	13:18:21	13:20:03	13:20:26	13:20:45	Nerve low	00:01:41	00:00:23	00:00:18	
8/5/98	GA	0.14	92	20	2	13:43:49	13:45:59	13:46:14	13:46:44	Nerve low	00:02:10	00:00:15	00:00:30	
8/5/98	GA	0.111	92	20	1	14:16:38	14:18:52	14:19:17	14:19:47	Nerve low	00:02:15	00:00:25	00:00:30	
8/5/98	GA	0.111	92	20	2	14:31:45	14:32:51	14:33:04	14:33:33	Nerve low	00:01:06	00:00:13	00:00:29	
8/5/98	GA	0.119	92	20	1	14:50:22	14:51:58	14:52:31	14:53:00	Nerve low	00:01:35	00:00:34	00:00:29	
8/5/98	GA	0.119	92	20	2	15:03:23	15:05:02	15:05:15	15:05:47	Nerve low	00:01:39	00:00:14	00:00:31	
8/6/98	GB	0.099	3	20	1	09:15:55	09:16:53	09:17:13	09:17:32	Nerve low	00:00:58	00:00:20	00:00:19	
8/6/98	GB	0.099	3	20	2	09:30:13	09:31:00	09:31:18	09:31:41	Nerve low	00:00:47	00:00:18	00:00:22	
8/6/98	GB	0.113	3	20	1	09:53:51	09:54:02	09:54:19	09:54:39	Nerve low	00:00:11	00:00:17	00:00:20	
8/6/98	GB	0.113	3	20	2	10:06:10	10:07:00	10:07:20	10:07:44	Nerve low	00:00:50	00:00:20	00:00:24	
8/6/98	GB	0.117	3	20	1	10:25:17	10:25:29	10:25:46	10:26:05	Nerve low	00:00:12	00:00:17	00:00:19	

Date	Agent	Conc (ug/l)	RH	Temp	Det #	On Cond	On Agent	Alarm	Clear	Resp	Cond Time	Alarm Time	Clear Time	Notes
8/6/98	GB	0.117	3	20	2	10:37:47	10:37:59	10:38:17	10:38:36	Nerve low	00:00:11	00:00:18	00:00:19	
8/6/98	GB	0.108	90	20	1	13:24:00	13:24:57	13:25:13	13:25:32	Nerve low	00:00:57	00:00:16	00:00:20	
8/6/98	GB	0.108	90	20	2	13:35:11	13:35:56	13:36:13	13:36:33	Nerve low	00:00:45	00:00:18	00:00:19	
8/6/98	GB	0.109	90	20	1	13:59:09	13:59:58	14:00:18	14:00:38	Nerve low	00:00:49	00:00:20	00:00:20	
8/6/98	GB	0.109	90	20	2	14:11:02	14:11:59	14:12:17	14:12:36	Nerve low	00:00:57	00:00:18	00:00:19	
8/6/98	GB	0.114	90	20	1	14:23:13	14:23:17	14:23:32	14:23:52	Nerve low	00:00:04	00:00:15	00:00:19	
8/6/98	GB	0.114	90	20	2	14:34:02	14:34:21	14:34:38	14:34:57	Nerve low	00:00:19	00:00:17	00:00:19	
8/7/98	HD	1.933	3	20	1	08:50:19	08:50:51	08:50:57	08:51:27	BLS LOW	00:00:32	00:00:06	00:00:30	
8/7/98	HD	1.933	3	20	2	08:58:06	08:59:53	08:59:56	09:00:25	BLS LOW	00:01:47	00:00:03	00:00:29	
8/7/98	HD	2.12	3	20	1	09:18:09	09:19:07	09:19:11	09:19:40	BLS LOW	00:00:58	00:00:04	00:00:29	
8/7/98	HD	2.12	3	20	2	09:36:18	09:37:23	09:37:26	09:37:52	BLS LOW	00:01:05	00:00:03	00:00:26	
8/7/98	HD	2.047	3	20	1	09:53:49	09:54:50	09:54:56	09:55:25	BLS LOW	00:01:01	00:00:06	00:00:29	
8/7/98	HD	2.047	3	20	2	10:05:07	10:05:50	10:05:59	10:06:26	BLS LOW	00:00:43	00:00:09	00:00:27	
8/7/98	HD	2.197	88	20	1	10:49:32	10:50:49	10:50:56	10:51:25	BLS LOW	00:01:16	00:00:07	00:00:29	
8/7/98	HD	2.197	88	20	2	11:06:42	11:07:48	11:07:55	11:08:24	BLS LOW	00:01:05	00:00:07	00:00:30	
8/7/98	HD	2.154	88	20	1	11:29:47	11:30:17	11:30:21	11:30:50	BLS LOW	00:00:31	00:00:03	00:00:29	
8/7/98	HD	2.154	88	20	2	11:43:27	11:44:01	11:44:09	11:44:38	BLS LOW	00:00:34	00:00:08	00:00:29	
8/7/98	HD	2.258	88	20	1	11:59:36	12:00:49	12:00:54	12:01:22	BLS LOW	00:01:13	00:00:04	00:00:29	
8/7/98	HD	2.258	88	20	2	12:11:48	12:12:48	12:12:52	12:13:18	BLS LOW	00:00:59	00:00:04	00:00:26	
8/7/98	HD	36	3	20	1	14:02:05	14:02:47	14:02:52	14:04:02	BLS LOW	00:00:42	00:00:05	00:01:10	
8/7/98	HD	36	3	20	2	14:16:04	14:16:46	14:16:54	14:17:57	BLS LOW	00:00:42	00:00:07	00:01:03	Realrmed
8/7/98	HD	34	3	20	1	14:39:56	14:40:30	14:40:36	14:41:43	BLS LOW	00:00:34	00:00:06	00:01:07	
8/7/98	HD	34	3	20	2	14:54:25	14:55:00	14:55:03	14:56:00	BLS LOW	00:00:35	00:00:02	00:00:57	
8/7/98	HD	52.917	3	20	1	15:12:49	15:13:48	15:13:53	15:15:24	BLS LOW	00:00:59	00:00:06	00:01:30	Realrmed
8/7/98	HD	52.917	3	20	2	15:22:42	15:23:47	15:23:51	15:24:49	BLS LOW	00:01:06	00:00:03	00:00:59	
8/8/98	VX	?	3	20	1		08:39:54	08:41:21	08:41:32	Nerve low	08:39:54	00:01:27	00:00:11	
8/8/98	VX	?	3	20	2	08:58:21	08:59:23	09:01:12	09:01:38	Nerve low	00:01:02	00:01:48	00:00:26	
8/8/98	VX	?	3	20	1	09:46:53	09:47:46				00:00:53	########	00:00:00	
8/8/98	VX	0.058	3	20	2	10:14:15	10:15:17	10:15:42	10:16:03	Nerve low	00:01:02	00:00:25	00:00:21	
8/8/98	VX	0.058	3	20	1	10:25:49	10:26:22	10:27:17	10:27:42	VX L*	00:00:32	00:00:55	00:00:26	
8/8/98	VX	0.15	3	20	1	10:51:22	10:52:18	10:52:27	10:52:52	VX L*7	00:00:56	00:00:10	00:00:25	
8/8/98	VX	0.15	3	20	2	11:16:11	11:16:46	11:16:59	11:17:22	Nerve low	00:00:35	00:00:13	00:00:23	
8/8/98	VX	0.29	90	20	1	12:31:40	12:32:41			no alarm	00:01:01	########	00:00:00	
8/8/98	VX	0.11	90	20	2	12:51:55	12:52:47	12:54:03	12:54:24	Nerve low	00:00:53	00:01:16	00:00:20	
8/8/98	VX	0.1	90	20	1	13:26:17	13:27:14	13:27:52	13:28:10		00:00:57	00:00:38	00:00:18	
8/8/98	VX	0.1	90	20	1	14:26:23	14:26:46	14:26:55	14:27:19	Nerve low	00:00:23	00:00:09	00:00:25	
8/8/98	VX	0.31	90	20	2	14:40:50	14:41:48	14:42:00	14:42:23	Nerve low	00:00:57	00:00:12	00:00:23	
8/8/98	VX	0.31	90	20	1	15:03:19	15:04:28	15:04:30	15:05:00		00:01:10	00:00:02	00:00:30	

Date	Agent	Conc (ug/l)	RH	Temp	Det #	On Cond	On Agent	Alarm	Clear	Resp	Cond Time	Alarm Time	Clear Time	Notes
8/8/98	VX	0.31	90	20	1	15:24:01	15:24:58	15:25:12	15:25:36	Nerve low	00:00:57	00:00:15	00:00:24	
8/10/98	HD	2.06	25	52	1	14:19:28	14:20:10			No Alarm	00:00:42	########	00:00:00	
8/10/98	HD	2.06	25	52	2	14:28:49	14:29:09			No Alarm	00:00:20	########	00:00:00	
8/11/98	GB	0.112	0	-30	1	13:17:03	13:18:34			No Alarm	00:01:31	########	00:00:00	peak below edge
8/11/98	GB	0.112	0	-30	2	13:21:04	13:22:10	13:22:18	13:22:40	Nerve low	00:01:05	00:00:08	00:00:22	
8/11/98	GB	0.112	0	-30	1	13:23:39	13:23:52			NO alarm	00:00:13	########	00:00:00	detector alarmed
8/11/98	GB	0.112	0	-30	2	13:26:02	13:27:06	13:27:11	13:27:35	Nerve low	00:01:03	00:00:05	00:00:24	
8/11/98	GB	0.104	0	-30	1	14:00:30	14:00:45	14:00:57	14:01:20	Nerve low	00:00:15	00:00:12	00:00:23	
8/11/98	GB	0.104	0	-30	2	14:01:49	14:02:58	14:03:04	14:03:25	Nerve low	00:01:08	00:00:06	00:00:22	
8/11/98	GB	0.104	0	-30	1	14:04:09	14:04:40	14:05:04	14:05:24	Nerve low	00:00:31	00:00:24	00:00:20	
8/11/98	GB	0.104	0	-30	2	14:10:42	14:11:19	14:11:39	14:11:50	Nerve low	00:00:37	00:00:20	00:00:11	
8/12/98	GD	0.114	0	-30	1	10:02:31	10:03:09	10:03:24	10:03:50	Nerve med	00:00:38	00:00:16	00:00:25	
8/12/98	GD	0.114	0	-30	2	10:04:38	10:06:08	10:06:15	10:06:40	Nerve med	00:01:30	00:00:07	00:00:25	
8/12/98	GD	0.114	0	-30	1	10:07:29	10:10:37	10:10:49	10:11:22	Nerve med	00:03:08	00:00:12	00:00:33	
8/12/98	GD	0.114	0	-30	2	10:11:49	10:12:47	10:12:54	10:13:17	Nerve med	00:00:57	00:00:07	00:00:24	
8/12/98	GD	0.114	0	-30	1	10:13:39	10:17:08	10:17:22	10:17:47	Nerve med	00:03:29	00:00:14	00:00:25	
8/12/98	GD	0.114	0	-30	2	10:18:12	10:19:08	10:19:15	10:19:39	Nerve med	00:00:57	00:00:07	00:00:24	
8/13/98	GB	0.121	29	52	1	10:44:50	10:47:04	10:47:24	10:47:45	Nerve low	00:02:14	00:00:20	00:00:20	
8/13/98	GB	0.121	29	52	2	10:48:08	10:50:06	10:50:27	10:50:48	Nerve low	00:01:58	00:00:21	00:00:21	
8/13/98	GB	0.121	29	52	1	10:52:36	10:53:44	10:54:03	10:54:23	Nerve low	00:01:07	00:00:19	00:00:20	
8/13/98	GB	0.121	29	52	2	10:55:06	10:56:06	10:56:25	10:56:48	Nerve low	00:01:00	00:00:20	00:00:23	
8/13/98	GB	0.125	29	52	1	11:09:09	11:10:34	11:10:55	11:11:15	Nerve low	00:01:25	00:00:20	00:00:20	
8/13/98	GB	0.125	29	52	2	11:11:33	11:13:03	11:13:23	11:13:43	Nerve low	00:01:29	00:00:20	00:00:20	
8/13/98	GB	0.125	29	52	1	11:15:23	11:16:31	11:16:47	11:17:07	Nerve low	00:01:08	00:00:16	00:00:20	
8/13/98	GB	0.125	29	52	2	11:17:23	11:18:34	11:18:52	11:19:12	Nerve low	00:01:10	00:00:19	00:00:20	
8/13/98	GD	0.126	29	52	1	13:49:38	13:51:02	13:52:23	13:52:43	Nerve low	00:01:25	00:01:20	00:00:20	
8/13/98	GD	0.126	29	52	2	13:53:05	13:55:04	13:55:12	13:55:32	Nerve low	00:01:59	00:00:08	00:00:20	
8/13/98	GD	0.126	29	52	1	14:03:27	14:04:01	14:04:08	14:04:28	Nerve low	00:00:34	00:00:07	00:00:20	
8/13/98	GD	0.126	29	52	2	14:05:13	14:05:56	14:06:06	14:06:26	Nerve low	00:00:44	00:00:09	00:00:21	
8/13/98	GD	0.118	29	52	1	14:28:16	14:29:11			no alarm	00:00:55	#########	00:00:00	
8/13/98	GD	0.118	29	52	2	14:32:20	14:33:10	14:33:18	14:33:38	Nerve low	00:00:50	00:00:08	00:00:20	
8/13/98	GD	0.118	29	52	1	14:39:30	14:40:38	14:40:53	14:41:16	Nerve low	00:01:08	00:00:14	00:00:23	
8/13/98	GD	0.118	29	52	2	14:41:38	14:42:43	14:42:51	14:43:12	Nerve low	00:01:05	00:00:08	00:00:21	
8/14/98	VX	0.055	26	52	1	10:00:28	10:01:12	10:01:40	10:02:03	Nerve low	00:00:43	00:00:28	00:00:23	
8/14/98	VX	0.055	26	52	2	10:08:44	10:09:15	10:09:23	10:09:46	Nerve low	00:00:31	00:00:08	00:00:23	

Date	Agent	Conc (ug/l)	RH	Temp	Det #	On Cond	On Agent	Alarm	Clear	Resp	Cond Time	Alarm Time	Clear Time	Notes
8/14/98	VX	0.055	26	52	1	10:24:07	10:24:58	10:25:13	10:25:39	Nerve low	00:00:51	00:00:15	00:00:26	
8/14/98	VX	0.055	26	52	2	10:39:11	10:39:55	10:40:00	10:40:26	Nerve low	00:00:44	00:00:06	00:00:26	
8/14/98	VX	0.055	26	52	1	10:43:32	10:44:13	10:44:43	10:45:14	Nerve low	00:00:41	00:00:30	00:00:31	
8/14/98	VX	0.055	26	52	2	11:02:43	11:03:14	11:03:33	11:03:59	Nerve low	00:00:31	00:00:19	00:00:26	
8/17/98	HD	2.63	0	0	1	13:56:06	13:57:06	13:57:13	13:58:03	BLS MED	00:01:00	00:00:07	00:00:50	
8/17/98	HD	1.93	0	0	2	14:05:46	14:07:03	14:07:10	14:07:56	Bls Low	00:01:17	00:00:07	00:00:46	
8/17/98	HD	1.93	0	0	1	14:11:42	14:13:03	14:13:09	14:13:55	Bls Med	00:01:21	00:00:06	00:00:47	
8/17/98	HD	1.93	0	0	2	14:27:27	14:28:35	14:28:40	14:29:13	Bls Low	00:01:08	00:00:05	00:00:33	
8/17/98	HD	1.93	0	0	1	14:36:19	14:37:28	14:37:34	14:38:21	Bls Low	00:01:09	00:00:05	00:00:47	
8/17/98	HD	1.93	0	0	2	14:48:21	14:49:05	14:49:09	14:49:53	Bls Low	00:00:44	00:00:04	00:00:44	
8/18/98	VX	0.09	0	0	1	09:31:57	09:33:06	09:34:34	09:34:56	Ner low	00:01:09	00:01:27	00:00:22	
8/18/98	VX	0.09	0	0	2	10:08:59	10:10:02	10:10:38	10:11:02	Ner low	00:01:03	00:00:37	00:00:23	
8/18/98	VX	0.09	0	0	1	10:26:42	10:28:06	10:29:44	10:30:07	Ner low	00:01:24	00:01:38	00:00:23	autocal @ 1min
8/18/98	VX	0.07	0	0	2	10:58:04	10:58:48	10:59:36	10:59:59	Ner low	00:00:44	00:00:48	00:00:22	
8/18/98	VX	0.07	0	0	1	11:13:04	11:15:45	11:16:34	11:16:57	Ner low	00:02:41	00:00:49	00:00:23	
8/18/98	VX	0.07	0	0	2	11:36:04	11:37:06	11:37:20	11:37:48	Ner low	00:01:01	00:00:14	00:00:28	

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 8-3-98
= ETG-1
Software Ver. 5.02B-1 Time: 9:33

Location: ERDEC E3510

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.
Record datafile name T0400.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:38		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: G. Lozos / G. Weaver Date 8/3/98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 8-3-98

Software Ver. 5.02B - Time: 9:33

Location: ERDEC E3510

1. Connect communications cable and begin "Logall"
   - A. Record datafile name T04100.DAT
     (Attach copy of data with test records)
   - B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	~~H~~ 6:00		
Challenge time (sec)	1		
Time to alarm (sec)	3		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV L) M H (BLS L) M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	00:24 ~~sec~~		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	7:00		
Challenge time (sec)	1		
Time to alarm (sec)	2		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L M (H) (BLS) (L) M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	Pass / Fail	Pass / Fail	Pass / Fail
Record cleardown time	01:05		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: G Weaver / G Jozo Date 8/3/98

Form M43-DVT-002 Rev B (June 9, 1998)

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 (= ETG-2) Date: 8-3-98

Software Ver. 5.02B-1 Time: 9:45:56

Location: ERDEC E3510

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T05100.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:38		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: G. Luzu / E. Weaver Date 8/3/98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 8-3-98

Software Ver. 5.02B-1 Time: 9:45:56

Location: ERDEC E3510

1. Connect communications cable and begin "Logall"

   A. Record datafile name T05100.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	6:00		
Challenge time (sec)	1		
Time to alarm (sec)	3		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	Pass / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L M H (BLS) L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	00:32		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	7:00		
Challenge time (sec)	1		
Time to alarm (sec)	3		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L (M) H BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	00:35		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: M Weaver / M Jozwiak Date 8/3/98

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				496-
Start-up			ERDEC	8/3/98		LOZO				MYJ 496-X4502
Det#: ~~980206-04~~ ~~496602-04~~			SWver#: S02B				Temp:			496-X8560
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04100	DAT	9:33:28	Start-up							Ready 2:38 980206-04
		9:34	AutoCal							(= E76①)
			H cnt sample			3	NRV/L RLS/L	1	00:24	
		9:40	G cnt sample			3	NRV/H RLS/L	1	01:05	
T05100	DAT	9:48:36	Start-up							Ready 2:38 980206-05
		9:51:20	AutoCal							(= E76②)
		9:51:57	H cnt sample			3	NRV/L RLS/L	1	00:12	
			G cnt sample			3	NRV/H	1	00:35	
T05M	DAT	M:21								
		M:31:22	GO	20.1						Check out agent generation
T04M	DAT	M:40								
		M:46:16	G1							
T04M2	DAT	11:17								
		11:17:22	G1							

Data Entry Form

Purpose of test: GD

Test Location: ERDEC

Date: 8/7/98

Operator: Lozus

Det#: M43

SWver#: 502B

Temp:

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
704103	SIG	14:46	Rum Air							M43- 980806-04
704104	DAT	14:46	Rum Air							Cure Setting off OFF
		14:47:28	H Conf				DLS/med			
		14:48:00	G Conf				DLS/low NRV/med			
		14:50	Clean Air							
		14:51	GD	~~0.1~~ 0.91			None			
			Clean Air							
		14:55	GD	0.91			None	60		
			clean Air							
		14:57:11	GD					60		~~WRONG DATA CABLE~~
~~704104A~~										~~wrong Data Cable~~
705102	SIG	14:58 ~~15:00~~	~~Rum~~ ~~GD~~ Air							M41 ~~980806-05~~ -04 (21.8°C)
~~704103~~	DAT	14:55	Rum Air							Cure ~~Setting off~~ OFF
704104B		15:01	~~H~~ Cart sample			7	H/m/6	1	26-7 25.?	
		15:02	~~G~~ Conf			5	GD/4/3	1	25-5 ≈20	~~Put Cure Setting~~ back on
		15:04	Clean Air							
		15:06	~~GD~~							Put CASE Buttons back ON

end

Data Entry Form

Purpose of test:			Test Location:	Date: 8/2/98		Operator:				
Det#:			SWver#:				Temp:			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T05104	SIG	15:07	Clean Air							M4J- 580200-05
T05105	DAT	15:08	Clean Air							core bottom - ON
		15:09:37	H Cnt Sgl			7	NES/mol N/mol		46-7 = 39	
		15:12:00	G Cnt Sgl			5	Nev/mol Res/mol		1:25-5 = 1:20	
			Clean Air							
		15:15:30	GD	0.051		—	None	60		
			Clean Air							
		15:18	GD				None	60		
			Clean Air							
T05106	SIG		1) GD				None	70		
			2) GD					60		

end

Data Entry Form

Purpose of test: Movel ~ Chamber E7L-1

Purpose of test:			Test Location:	Date:		Operator:				
			ERDEC	5/3/98		Lozos				Movel ~ Chamber
Det#: M43			SWver#: 502B				Temp:			E7L-1
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04105	DAT	15:32	Chamb Air							M43-980206-04
		15:35	Clean Air							CASE BOTTOM-ON
		15:37:17	GB	0.093 ~~0.1~~		~30	Nrv/Low	~40		
			Clean Air							
		15:39:14	GB	0.093		20	Nrv/Low		40-20 =20	
			Clean Air							
T04106	SIG		GB	0.093		16	Nrv/Low	16	35-16 =19	
end										

M43 Upgrade

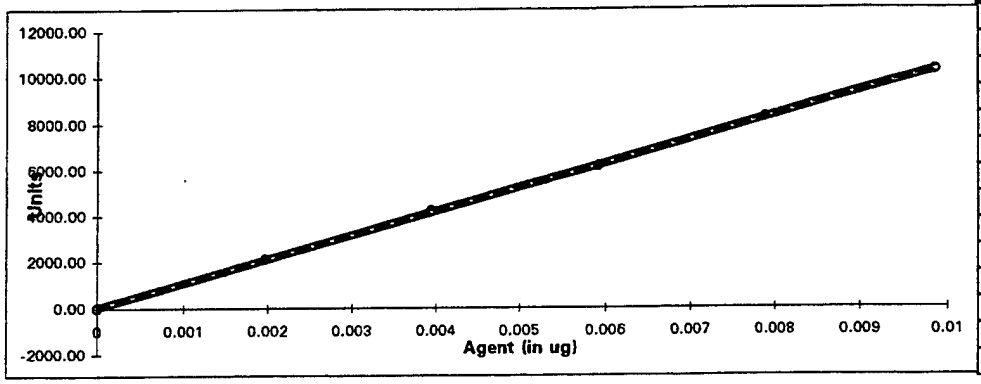
8/3/98
Monday

Targets:

Agent =	GD	
Conc. =		µg/l
Temp =	20	°C
RH =	0	%
Std #1 =	1.9720	ng/µl
Std #2 =		ng/µl

MINICAMS:

Flow =	100	cc/m
Time =	30	sec.



Factor:	1	0.0002
	(µl)	(units)
	0	0
	1	2119
	2	4215
	3	6177
	4	8278
	5	10280

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows
Operators: Juan & Sonny
NOTES:

1 Set agent generator for GD.
2 Run Standard Curve using GD @ 1.972 ng/ul

	GD	Log File
1	2245	0609
2	4698	0614
3	6926	0618
4	9138	0623
5	10280	0641

GD Generator Settings			
agent =	1.5 cc/m	gen temp =	20.0 C
dry air =	3.0 l/m	gen RH =	0 %
wet air =	0.0 l/m	amb temp =	
agt temp =	5 C	amb RH =	

3 Sample # 1 (30 sec @ 100 cc/min) = 2941 nA = .056 mg/m3 Log file = 0833
4 Increase Agent concentration.
5 Sample # 2 (30 sec @ 100 cc/min) = 7432 nA = .142 mg/m3 Log file = 0856
6 Decrease Agent concentration.
7 Sample # 4 (30 sec @ 100 cc/min) = 3922 nA = .074 mg/m3
8 Sample # 5 (30 sec @ 100 cc/min) = 6308 nA = .12 mg/m3 Log file = 1026
9 Sample # 6 (30 sec @ 100 cc/min) = 6142 nA = .117 mg/m3 Log file = 1142
10 Start test - MSS & Intellitec
11 Sample # 7 (30 sec @ 100 cc/min) = 5534 nA = .105 mg/m3 Log file = 1250
12 Continue testing
13 Sample # 8 (30 sec @ 100 cc/min) = 4793 nA = .091 mg/m3 Log file = 1344
14 Start test - ETG

Operator_____

Operator_____

Confidence Test Data Sheet

Detector S/N 980206-X4 MJ Date: 8-4-98

Software Ver. 5.02B-1 Time: 08:35

Location: ERDEC E3510

1. Connect communications cable and begin "Logall"

   A. Record datafile name T04107.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	—		
Challenge time (sec)	1		
Time to alarm (sec)	2		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	NRV L M H (BLS) L (M) H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:25		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)			
Challenge time (sec)	1		
Time to alarm (sec)	3		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) (L) M H (BLS) (L) M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:40		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 8-4-98

Confidence Test Data Sheet

Detector S/N 980206-*5 DW Date: 8-4-98

Software Ver. 5.02B-1 Time: 08:30

Location: ERDEC E3510

1. Connect communications cable and begin "Logall"

   A. Record datafile name T05107.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)	—		
Challenge time (sec)	1		
Time to alarm (sec)	5		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	NRV L M H (BLS) L (M) H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:34		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)	—		
Challenge time (sec)	1		
Time to alarm (sec)	2		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L M H (BLS) L (M) H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	1:27		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 8-4-98

Data Entry Form #1

Purpose of test:			Test Location:	Date:		Operator:				
Hout. evaluation			ERDEC E3510	8-4-98		HEJ / MS				
Det#: 980206-04			SWver#: 5.02B-1				Temp: +70F MEASURED		Clean	
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	down time	Comment
										Detector has been running overnight, sampling clean air room
T04107	DAT	0829	R-AIR							
		0830	H CONF			2 ~~X~~ HEJ	BLS MED	1	0.25 ~~0:34~~	
		0832	G CONF			3 ~~X~~	NRV LOW BLS ~~MED~~ LOW	1	0:40 ~~1:27~~	
T04108	SIG	0852	R-AIR							
T04109	DAT	0836	GD	.12	90%		NO ALARM	1:00		PPLR 335 SECD APPROX 285
		0835	COND. AIR.							
T04110	SIG	1015	GD	.13	90%		NO ALARM	1:10		SIG. CAPTURED @ t = 45"
T04111 end	DAT	10:53 10:54:30	AIR GD	.12	90%		No Alarm	1:00		

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
			ERDEC	8/4/98		Logs				
Det#: 980206-04			SWver#: M 5025				Temp:			
									Clean	
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	down time	Comment
T04112	DAT	1440	Clean down GD	1.017	9%	1:13	NRv/Low	1:13		challenge before data log
T04113	SUM	15:06	1) GD	1.00	9%	10sec	NRv/Low			
			2) clean dwn							
T04114	DAT	15:17	:00 GD	1.0	9%	20sec	NRv/Low		:47	
		15:33:07	GD	1.0	9%	52	NRv/Low			

end

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Govt. evaluation			ERDEC E3510	8-4-98		MW / ML				
Det#: 980206-05			SWver#: 5.02B-1				Temp: 70F MEASURED			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T05107	DAT									Detector has been running overnight, sampling clean air.
		0835	R-AIR							
		0836	H-CONF			5	BLS MED	1	0:34	
		0837	G-CONF			2	NRV LOW BLS MED	1	1:27	
T05108	SIG	0851 ~~0848~~	R-AIR							
T05109	DAT	0947	COND AIR				—			
		0948	GD	.12	90%		NO ALARM	1:00	~~1:00~~	PPLR 335 SECD APPROX 270
			ROOM AIR.							
T05110	SIG ~~DAT~~		GD	.13	90%		NO ALARM	1:18		SIG TAKEN @ 45" PLR 336 SEC 278
T05111 end	DAT	11:06 11:08	ROOM AIR GD	.12	90%		NO ALARM	1:00		

11:32 0.13 GD 1h 17m

Data Entry Form

Purpose of test:			Test Location: ERDEC 8/4	Date: 8/4/98		Operator:				
Det#: 98020605			SWver#: SO2II				Temp:			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
TOS 112	DA7	14:44:	GD	1.017	90%	—	No Alarm	1:00	—	
TOS 113	SIV	15:21	1) GD	1.0	90%		No Alarm	10	—	
			2) GD				No Alarm	35	—	
			3) GD				No Alarm	60	—	
TOS 114	DA7	15:38:	GD	1.0	90%		No Alarm	60	—	
		15:39	Clean Air							alarm in clean down NNV/Low
		15:44	GD	1.0	90%		No Alarm	30		
		15:44:20	Clean Air						2:44-30 2:14	alarm in clean down NNV/Low 29.4°C
end										

Data Entry Form

Purpose of test:	Test Location:	Date:	Operator:	
	ERDEC	8/4/98		Check out
Det#:	SWver#:		Temp:	

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
TA050A	DAT		AIR							
		12:38.72	GD	1.0	30%		None			
		12:58:55								
TA05W2	DAT		GD cleandown							
end										

M43 Upgrade

8/4/98

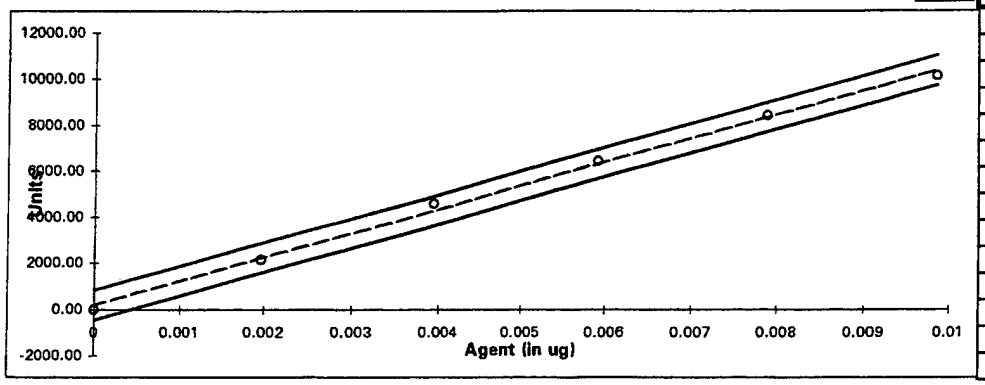
Tuesday

Targets:

Agent =	GD	
Conc. =		µg/l
Temp =	20	°C
RH =	90	%
Std #1 =	1.9720	ng/µl
Std #2 =		ng/µl

MINICAMS:

Flow =	25	cc/m
Time =	15	sec.



Factor:	1	0.0012
	(µl)	(units)
	0	0
	1	2150
	2	4606
	3	6442
	4	8437
	5	10157

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows
Operators: Juan & Sonny
NOTES:

1 Set agent generator for GD @ 90 % RH.
2 Run Standard Curve using GD @ 1.972 ng/ul

	GD	Log File
1	2150	0618
2	4606	0648
3	6442	0627
4	8437	0633
5	10157	0638

GD Generator Settings			
agent =	1.5 cc/m	gen temp =	20.0 C
dry air =	0.0 l/m	gen RH =	90 %
wet air =	3.0 l/m	amb temp =	
agt temp =	5 C	amb RH =	

3 Sample # 1 (30 sec @ 100 cc/min) = 3054 nA = .055 mg/m3. Log file = 0712
4 Increase Agent concentration
5 Sample # 2 (30 sec @ 100 cc/min) = 542 nA = .007 mg/m3. Log file = 0738
6 Sample # 3 (30 sec @ 100 cc/min) = 5425 nA = .101 mg/m3. Log file = 0813
7 Sample # 4 (30 sec @ 100 cc/min) = 6509 nA = .122 mg/m3. Log file = 0823
8 Begin testing ETG, MSS, Intellitec
9 Sample # 5 (30 sec @ 100 cc/min) = 6975 nA = .13 mg/m3. Log file = 0907
10 Begin second trial.
11 Sample # 6 (30 sec @ 100 cc/min) = 6530 nA = .12 mg/m3.
12 Begin third trial.
13 Sample # 7 (30 sec @ 100 cc/min) = 6995 nA = .13 mg/m3.
14 Set agent generator for GD 1.649 mg/m3
15 Sample # 8 (15 sec @ 25 cc/min) = 10867 nA = 1.513 mg/m3.
16 Decrease agent concentration.
17 Sample # 9 (20 sec @ 25 cc/min) = 9705 nA = 1.102 mg/m3.
18 Sample # 10 (15 sec @ 25 cc/min) = 6811 nA = 1.022 mg/m3.
19 Start first trial @ 1.022 mg/m3
20 Sample # 11 (15 sec @ 25 cc/min) = 6775 nA = 1.017 mg/m3.
21 Start second trial @ 1.017 mg/m3
22 Sample # 12 (15 sec @ 25 cc/min) = 6666 nA = 1.017 mg/m3.
23 Start third trial @ 1.00 mg/m3

Operator_____

Operator_____

Data Entry Form

page 1 of ___

Purpose of test:			Test Location:	Date:		Operator:				
			ERDEC	8/5/98		Lopez				
ETG1 Det#: 980206-04			SWver#: S02B				Temp:			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04115	SIV	8:24	1) Room Air							
			2) H Cont Sample				Alarm			monitor mode
			3) G-Cont Sample				NRV Low			"
T04116	DAT	8:29	Room Air							
		8:32	H cont Sample				TLS MED			Detect
		8:34	G-cont Sample				None			
		8:35	"				NRV MED TLS Low			
		8:36	clean							PST put in backflush
~~opt 117~~ T04116	SIV		Backflush							
980206-05	ETG2									
T05115	SIV	8:40	1) BACKFLUSH							
			2) Room Air							
			3) H Cont Sample				TLS			monitor
			4) G Cont Sample				NRV			monitor
T05116	DAT	9:00	Clean down							
			Room Air							draft mode
		9:04	H cont				TLS MED			
		9:05	G cont				NRV Med			
		9:07:10	Backflush/ Room Air							

end

Purpose of test:			Test Location:	Date:		Operator:				
(ETG 1) GA			ERDEC	8/5/98		LOZOS				
Det#: 980206-04			SWver#: SW13				Temp:			9:10 GA 0.104
									Clean	
DataFile#	Type	Time	Sample	Conc(mg	%Rh	Alarm	Alarm	Chalng	down	Comment
	dat/sig					time	class/id/conc	time	time	
T04117	DAT	9:10	Run Air		Low					
		9:15	Clean Air							
		9:17:17	GA	0.1		12	NRV Low	12	30	
T04118	SIV	~~9:18~~ 9:35	GA	0.1		19	NRV	19	29	
T04119	DAT	10:17	Air			~~15~~		~~15~~	~~30~~	
		10:25:50	clean Air							
		10:31	GA	0.1		20	NRV Low	20	30	
T04120	DAT	13:01	Run Air		~~High~~					GA Analysis suspect,
			Clean Air		9% High					excess peak
		13:20	GA	0.14?		23	NRV Low	23	18	
T04121	SIV	14:19	1) GA	0.111		15	NRV Low	15	30	
			2) clean dem							
T04122	DAT	14:34	Run Air							
		14:50	Clean Air		High					
		14:52	GA	0.119	High	34	NRV Low	34	39	re-run clean dem

end

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
GA (E76-2)			ERDEC	8/5/98		Lotus				
Det#: 980206-05			SWver#:				Temp: 19°C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T0511 7	DAT	9:10	Room Air		28%					
		9:12:30	Clean Air							
		9:34	GA	0.1	28%	12	NRV Low	13	33	
T0511 8	S/C	1)	GA	0.1	28%	15	NRV	15	30	
		2)	Clean down							
T0511 9	DAT	10:33	Air							
		10:42	Clean Air							
		10:44	GA	0.1		10	NRV Low	10	30	
T0512 0	DAT	13:22	Room Air		91% High					GA conc suspect Xtra peak
		13:35	Clean Air							
		~~13:41~~	~~GA~~	~~0.1~~		~~27~~	~~NRV Low~~	~~23~~	~~30~~	(Det -04 mistake)
		13:46	GA	0.147		15	NRV Low	15	30	
T0512 1	S/C	14:31	1) GA	0.111	↓	13	NRV Low	13	29	
			2) Clean		High					
T0512 2	DAT	14:58	Room Air							
end		15:03 15:05	Clean Air GA	0.119	High	14	NRV Low	14	31	

M43 Upgrade

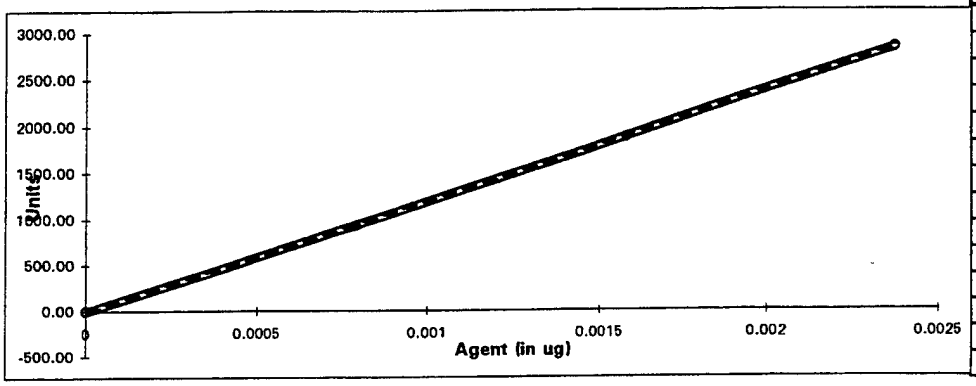
8/5/98
Wednesday

Targets:

Agent =	GA	
Conc. =		µg/l
Temp =	20	°C
RH =	10	%
Std #1 =	0.7910	ng/µl
Std #2 =		ng/µl

MINICAMS:

Flow =	50	cc/m
Time =	20	sec.



Factor:	1	0.0001
	(µl)	(units)
	0	0
	1	933
	2	1877
	3	2836

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows
Operators: Juan & Sonny
NOTES:

1 Set agent generator for GA low RH.
2 Run Standard curve using GA @ .791 ng/ul.

0	0	Log File
1	933	0712
2	1877	0716
3	2836	0721

GA Generator Settings			
agent =	.19 cc/m	gen temp =	20.0 C
dry air =	3.0 l/m	gen RH =	0 %
wet air =	0.0 l/m	amb temp =	
agt temp =	5 C	amb RH =	

3 Sample # 1, (20 sec @ 50 cc/min) = 987 nA = .05 mg/m3.
4 Raise agent concentration
5 Sample # 2, (20 sec @ 50 cc/min) = 2072 nA = .104 mg/m3.
6 Start first trial.
7 Sample # 3, (20 sec @ 50 cc/min) = 2290 nA = .115 mg/m3.
8 Start second trial.
9 Sample # 4, (20 sec @ 50 cc/min) = 2298 nA = .116 mg/m3.
10 Start third trial.
11 Increase humidity, RH = 90%
12 Sample # 5, (20 sec @ 50 cc/min) = 2298 nA = .116 mg/m3.
13 Begin first trial.
14 Sample # 6, (20 sec @ 50 cc/min) = 2209 nA = .111 mg/m3.
15 Begin second trial.
16 Sample # 7, (20 sec @ 50 cc/min) = 2356 nA = .119 mg/m3.
17 Begin third trial.

Operator_____

Operator_____

Startup Test Checklist and Test Data Sheet

Detector S/N 980208-4 Date: 8-6-98

Software Ver. 5.02B-1 Time: 8:25

Location: ERDEC E3510 Detector has running overnight in flume board.

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T04123.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:28		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 8-6-98

Confidence Test Data Sheet

Detector S/N 980206-4 Date: 8-6-98

Software Ver. 5.02B-1 Time: 8:25

Location: CBDCOM E3510

1. Connect communications cable and begin "Logall"

   A. Record datafile name T04123.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)			
Challenge time (sec)	1		
Time to alarm (sec)	2		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	NRV L M H (BLS) L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:28		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)			
Challenge time (sec)	1		
Time to alarm (sec)	5		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L (M) H BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:35		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: [signature] Date 8-6-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 8-6-98

Software Ver. 5.02B-1 Time: ~~8~~ 08:34

Location: ERDEC E3510

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T05123.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:38		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 8-6-98

Confidence Test Data Sheet

Detector S/N 980206-5 Date: 8-6-98

Software Ver. 5.02B-1 Time: 08:34

Location: E3510 ERDEC

1. Connect communications cable and begin "Logall"

   A. Record datafile name T05123.DAT
   (Attach copy of data with test records)

   B. Use menu to turn on display (optional)

2. "H" Simulant Test

Startup testing only: elapsed time since power on (min)			
Challenge time (sec)	1		
Time to alarm (sec)	5		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Blister (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	NRV L M H (BLS) L (M) H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	0:37		

Note 1 -- Detector must alarm either BLS or BLS/NRV

3. "G" Simulant Test

Startup testing only: elapsed time since power on (min)			
Challenge time (sec)	1		
Time to alarm (sec)	10		
Horn sounds	(Pass) / Fail	Pass / Fail	Pass / Fail
Display correctly identifies Nerve (Note 1)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record response(s)	(NRV) L (M) H BLS L M H	NRV L M H BLS L M H	NRV L M H BLS L M H
Cleardown less than 5 minutes after alarm (mm:ss)	(Pass) / Fail	Pass / Fail	Pass / Fail
Record cleardown time	1:45		

Note 2 -- Detector must alarm either NRV or NRV/BLS

Tested by: L Weaver Date 8-6-98

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Dont. evaluation			E3510	8-6-98		HWW				
Det#: 980206-04 & 05			SWver#: 5.02B-1				Temp: +70F APPROX		Clean	
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	down time	Comment
T04123	DAT	0825	STARTUP							
			H CONF			2	BLS LOW	1	0:28	
			G CONF			5	NRV MED	1	0:35	
T05123	DAT	0834	STARTUP							
			H CONF			5	BLS MED	1	0:37	
			G CONF			10	NRV MED	1	1:45	
T04124	DAT	0917	GB	.099	4%	20	NRV LOW	20	19	PPLR 299 SECD 247
T05124	DAT	0931	GB	.099	4%	18	NRV LOW	18	22	PPLR 298-299 SECD 279
T04125	DAT	0954	GB	.113	4%	17	NRV LOW	17	20	
T05125	DAT	1007	GB	.113	4%	20	NRV LOW	20	24	
T04126	SIG	1025	GB	.117	4%	17	NRV LOW	17	19	
T05126	SIG	1040	GB	.117	4%	18	NRV LOW	18	19	

end

Data Entry Form

Purpose of test:	Test Location:	Date:	Operator:	Temp:	Comment
Govt. evaluation	E3510	8-6-98	[illegible]	+70F APPROX	PRE-TEST: BOTH DETECTORS ALARM TO H/E Sim HMG/GB-L-7[illegible] VX-M-11

Det#: 980206-4 #5

SWver#: 5.02B-1

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04127	DAT	13:25	GB	0.108	90	16	NRV LOW	16	20	
T05127	DAT	13:36	GB	0.108	90	18	NRV LOW	18	19	
T04128	DAT	14:00	GB	0.109	90	20	NRV LOW	20	20	
T05128	DAT	14:12	GB	0.109	90	18	NRV LOW	18	19	
T04129	SIG	14:23	GB	0.114	90	18	NRV LOW	18	19	
T05129	SIG	14:35	GB	0.114	90	17	NRV LOW	17	19	
end										

M43 Upgrade

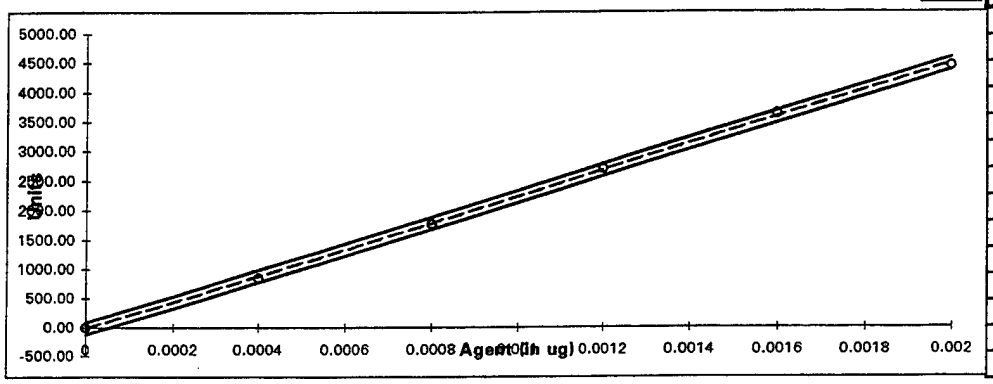
8/6/98
Thursday

Targets:

Agent =	GB	
Conc. =		µg/l
Temp =	20	°C
RH =	10	%
Std #1 =	0.3998	ng/µl
Std #2 =		ng/µl

MINICAMS:

Flow =	50	cc/m
Time =	15	sec.



Factor:	1	0.0001
	(µl)	(units)
	0	0
	1	846
	2	1768
	3	2705
	4	3636
	5	4450

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows
Operators: Juan & Sonny
NOTES:

1 Set agent generator for GB low RH.
2 Run Standard curve using GB @ .3998 ng/ul.

0	0	Log File
1	846	0631
2	1768	0636
3	2705	0641
4	3636	0646
5	4450	0651

GB Generator Settings			
agent =	.25 cc/m	gen temp =	20.0 C
dry air =	3.0 l/m	gen RH =	0 %
wet air =	0.0 l/m	amb temp =	
agt temp =	5 C	amb RH =	

3 Sample # 1, (15 sec @ 50 cc/min) = 1383 nA = .05 mg/m3.
4 Increase agent concentraation
5 Sample # 2, (15 sec @ 50 cc/min) = 1787 nA = .064 mg/m3.
6 Increase agent concentration
7 Sample # 3, (15 sec @ 50 cc/min) = 2531 nA = .09 mg/m3. Log File = 0742
8 Increase agent concentration
9 Sample # 4, (15 sec @ 50 cc/min) = 2760 nA = .099 mg/m3.
10 Begin trail #1
11 Sample # 5, (15 sec @ 50 cc/min) = 3278 nA = .113 mg/m3.
12 Begin trail #2
13 Sample # 6, (15 sec @ 50 cc/min) = 3158 nA = .113 mg/m3. Log File = 0917
14 Begin trail #3
15 **Raise humidity. RH = 90%**
16 Sample # 7, (15 sec @ 50 cc/min) = 3160 nA = .113 mg/m3. Log File = 0952
17 Sample # 8, (15 sec @ 50 cc/min) = 2459 nA = .088 mg/m3. Log File = 1209
18 Increase agent concentration
19 Sample # 9, (15 sec @ 50 cc/min) = 3021 nA = .108 mg/m3. LogFile = 1224
20 Begin trail #1 @ 90% RH
21 Sample # 10, (15 sec @ 50 cc/min) = 3545 nA = .126 mg/m3. LogFile = 1249
22 Sample # 11, (15 sec @ 50 cc/min) = 3039 nA = .109 mg/m3. LogFile = 1309
23 Begin trail #2 @ 90% RH
24 Sample # 12, (15 sec @ 50 cc/min) = 3200 nA = .114 mg/m3. LogFile = 1334
25 Begin trail #3 @ 90% RH

Operator_____

Operator_____

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Conf Check,			ERDEC	8/7/97		Lotz				MJ
ETG1 Det#: 980206-04			SWver#: 302B				Temp:			
									Clean	
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	down time	Comment
T04130 ~~127~~	DAT	14:57	Run Air							
		1458	H Conf Sample				HLS Low			
		1459	G Conf				NRV Low			change from Det ~~SAT~~ 8/6 → 8/7
reset date/time 8:12 =		1500	Back flush							15:00 = 8:12 AM Reset Compute Det/Gr
T04124	SIG	8:15	1) Back flush							
131			2) Run Air							Monitor mode
			3) H Conf Sample				HLS HIGH			3 tries
			4) G Conf Sample				NRV Low			
										Detect mode
ETG2 980206-05										
T05127	SIG	8:24 ~~8:25~~	1) Back flush							
130			2) Run Air							Monitor mode
			3) H Conf Sample				HLS HIGH			
			4) G Conf Sample				NRV Hi			
T05124	DAT	8:26	Clear down							
131		8:27	Back Flush							→ BF
		8:28	Run Air							Detect mode
		8:29	H conf Sample				HLS HIGH			
		8:30	G conf Sample				NRV HIGH			

end

Data Entry Form

Purpose of test: HD E7-1		Test Location: ERDEC	Date: 8/7/98		Operator: Lozos				M43
Det#: 980206-04		SWver#: 502B				Temp: 20°C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04~~125~~ 132	DAT	8:33	Rm Air							
		8:47	~~HD~~ Clean Air	1.9	~~Low~~					
		8:49	HD	1.9	Low	6	BLS Low	6	30	
										9:10 HD Cm 2.12
T04133	SIG	9:20	1) HD	2.12 ~~2.1~~	Low	4	BLS Low	4	29	
			2) Clean down			~~t~~				
										2.407
T04134	DAT	9:36	Room Air							
		9:51	Clean Air							
		9:53	HD	2.4	Low	6	BLS Low	6	29	
										add humidity to HD | HD cm 10:44 2.187
T04135	DAT	10:20	Room Air							
		10:47	Clean Air		88% High					
		10:49	HD	2.197	High	7	BLS Low	7	29	
T04136	SIG	11:24	HD	2.154	High	3	BLS Low	3	29	
T04137	DAT	11:43	Room Air							
		11:58	Clean Air		88%					
		11:59	HD	2.258	88%	4	BLS Low	4	29	(30.7°C)

end

Data Entry Form

Purpose of test: HD			Test Location: ERDEC	Date: 8/7/98		Operator: Lozcs				1447
ER 2 Det#: CRU 206-05			SWver#:				Temp:			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
TOS 129 132	DAT	8:57	Clean Air							
		8:58	HD	1.9	Low	3	BLS Low	3	25	
TOS 133	SIG	9:57	HD	2.12	Low	3	BLS Low	3	26	
TOS 134	DAT	9:54	Run Air							
		10:02	Clean Air							
		10:04	HD	2.4	Low	9	BLS Low	9	27	
										add humidity to HD / 10:44 HD conc 2.197
TOS 135	DAT	10:50	Run Air							
		11:04	Clean Air		88%					
		11:06	HD	2.2	88%	7	BLS Low	7	30	
TOS 136	SIG		HD	2.154	86%	8	BLS Low	8	29	
TOS 137	DAT	12:00	Run Air							
		12:10	Clean Air		88%					
		12:11	HD	2.2	88%	4	BLS Low	4	26	(30.0°C)
end										

Data Entry Form

Purpose of test: HD ETLI

Det#: 980 206-04

Test Location: ERDEC

SWver#: 502B

Date: 8/7/98

Operator: Lutz

Temp: 20°C

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04138	DAT	13:51	Room Air							
		14:00	Clean		DRY Low					
		14:01	HD	36.0	Low	5	BLS Low	5	1:10	
T04139	SIG	14:40	1) HD	74	Low	6	BLS Low	6	1:07	remove sample line after alarm
			2) Clean down							
			3) "							
										raised HD line → 52.9 (HD)
T04140	DAT	14:55	Room Air							
		15:10	Clean Air		Low					
		15:12	HD	52.9	Low	6	BLS Low	6	1:30	re-alarm

end

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
HD			ERDEC	8/7/98		Lutz				
Det#: 970206-04			SWver#: 5028				Temp: 20C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T05138		14:03	Room Air							
		14:14	Clean Air							
		14:15	HD	360	Low	7	Blis Low	7	1:00	re-alarm 7 min, Re-run Sample Curve
T05139	SIM	14:55	1) HD	74	Low	2	Blis Low	2	0:57	rerun Sample curve
			2) clean dry							
			3) Clean bag							
										ruined HD Curve → HD 52.9
T05140	DAT	15:18	Room Air							
		15:21	Clean Air		Low					repeated HD
		15:22	HD	52.9	Low	3	Blis Low	3	0:59	

end

M43 Upgrade

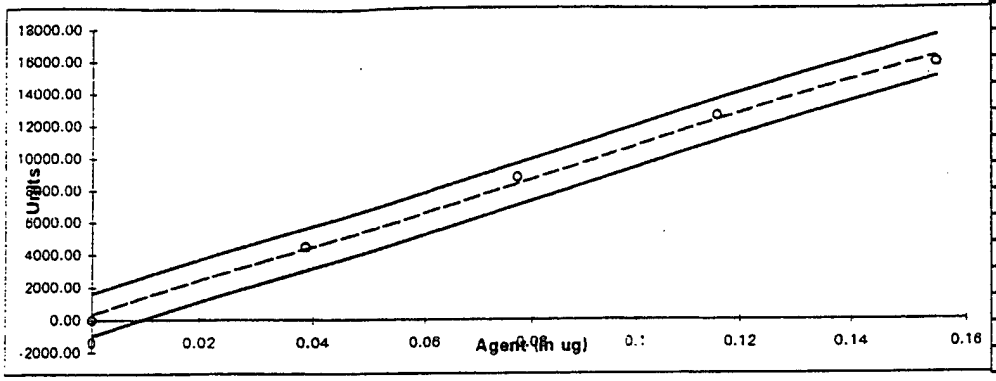
8/7/98
Friday

Targets:

Agent =	HD	
Conc. =		µg/l
Temp =	20	°C
RH =	10	%
Std #1 =	38.60	ng/µl
Std #2 =		ng/µl

MINICAMS:

Flow =	20	cc/m
Time =	8	sec.



Factor:	1	0.0251
	(µl)	(units)
	0	0
	1	4482
	2	8783.9
	3	12646.9
	4	15949.1

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows
Operators: Juan & Sonny
NOTES:

1 Set agent generator for HD low RH.
2 Run Standard curve using HD @ 38.60 ng/ul.

0	0
1	4482
2	8783.9
3	12646.9
4	15949.1

HD Generator Settings			
agent =	.25 cc/m	gen temp =	20.0 C
dry air =	3.0 l/m	gen RH =	0 %
wet air =	0.0 l/m	amb temp =	
agt temp =	20 C	amb RH =	3 %

3 Sample # 1, (50 sec @ 50 cc/min) = 13812 nA = 3.11 mg/m3.
4 Increase agent concentration
5 Sample # 2, (50 sec @ 50 cc/min) = 8911.5 nA = 1.9771 mg/m3.
6 Sample # 3, (50 sec @ 50 cc/min) = 8720 nA = 1.933 mg/m3.
7 Begin Trial # 1 @ 1.933 mg/m3
8 Sample # 4, (50 sec @ 50 cc/min) = 9528 nA = 2.12 mg/m3.
9 Begin Trial # 2 @ 2.12 mg/m3
10 Sample # 5, (50 sec @ 50 cc/min) = 9214 nA = 2.047 mg/m3.
11 Begin Trial # 3 @ 2.047 mg/m3
12 Raise Humidity. RH = 90%
13 Sample # 6, (50 sec @ 50 cc/min) = 10804 nA = 2.415 mg/m3.
14 Lower concentration
15 Sample # 7, (50 sec @ 50 cc/min) = 9859 nA = 2.197 mg/m3.
16 Begin Trial # 1 @ 1.933 mg/m3 and 90% RH
17 Sample # 8, (50 sec @ 50 cc/min) = 9677 nA = 2.154 mg/m3.
18 Begin Trial # 1 @ 2.154 mg/m3 and 90% RH
19 Sample # 9, (50 sec @ 50 cc/min) = 10126nA = 2.258 mg/m3.
20 Begin Trial # 1 @ 2.258 mg/m3 and 90% RH
21 Sample # 10, (8 sec @ 20 cc/min) = 3238 nA = 10.39 mg/m3.
22 Sample # 11, (8 sec @ 20 cc/min) = 8126 nA = 2860 mg/m3.

HD Generator Settings			
agent =	.25 cc/m	gen temp =	20.0 C
dry air =	0.0 l/m	gen RH =	0 %
wet air =	3.0 l/m	amb temp =	
agt temp =	20 C	amb RH =	90 %

23 Sample # 12, (8 sec @ 20 cc/min) = 10349 nA = 36 mg/m3.
24 Begin Trial # 1 @ 36 mg/m3
25 Sample # 13, (8 sec @ 20 cc/min) = 9892 nA = 34 mg/m3.
26 Begin Trial # 2 @ 34 mg/m3
27 Sample # 14, (8 sec @ 20 cc/min) = 15006 nA =52.917 mg/m3.
28 Begin Trial # 3 @ 52.917 mg/m3

Operator_____

Operator_____

Data Entry :m

Purpose of test:			Test Location:	Date:		Operator:				
Conf Check			ERDEC	8/8/98		Lo Zu				
Det#: M47			SWver#: 5025				Temp: 20°C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04141	DAT	7:20	Run Air							M47 980206-04
		7:21	Hcnt Sample				BLS MED			
		7:22	Gcnt Sample				NRV MED			
T05141	DAT	7:23	Run Air							M47 980206-05
		7:25	Hcnt Sample				BLS MED			
		7:26	Gcnt Sample				NRV MED			

end

Purpose of test:			Test Location:	Date:		Operator:				
			ERDEC	8/8/98		Luzos				
ETG1 Det#: 980206-04			SWver#: SU2B				Temp: 20°C → 18°C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04142	DAT	9:45	Clean Air							
		9:46	VX		39%		None	2:30		
		9:57	Clean Air							
		9:58	VX	0.058	39%	1:03	Nerve	1:03	1:24 1:21	10:06 VX con 0.058 mg/m3
		10:23	Clean Air							
		10:24:38	VX	0.05	39%	55	VX L# 7	55	26	10:29 VX conc 0.05
										raised conc about 4 X
T04143	DAT	10:49	Clean Air							
		10:50:30	VX	0.15	39%	10	VX L#7	10	25	reading in clean air
										10:59 Am VX conc 0.15
		12:29:50	Clean Air							11:40 Am add humidity
		12:30:52	VX	? 0.11	88%	—	None	2:30	—	2 conc anal 0.29, 0.11
		13:24	Clean Air							1 conc anal 0.1
		13:25:30	VX	0.1	88%	38	VX	38	18	
										13:45 raise VX conc
										13:53 VX conc 0.1
T04144	DAT	14:04	Room Air							(30°C /
		14:24	Clean		88%					raise conc again con anal 0.31 mg/m3
		14:25	VX	0.31	88%	9	Nrv Low	9	25	
T04145 end	SIG	15:03	1) VX	0.31	88%	2	Nrv Low	2	30	
			2) VX ...			1	N...	-	24	... Alarm to Sample Conc

LOG1.WR1 update 11 Jun 97

Data Entr rm

Purpose of test:			Test Location:	Date:		Operator:				
			ERDEC	8/8/98		LOZOJ				
E752 Det#: GEO206-05			SWver#: SU2B				Temp: 20°C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T05142	DAT	10:12	Clean Air							
		10:17:30	VX	0.058	75%	25	NRV Low	25	22	
T05143	DAT	10:57	Room Air							
		11:14	Clean Air							
		11:15	VX	0.15	3%	13	NRV Low	13	23	11:40 add humidity
		12:49	Clean air							
		12:51	VX	? 0.11	88%	1:16	NRV Low	1:16	20	2 conc gas 0.29, 0.1
										1 conc and 0.1
T05144	DAT	14:26	~~Room Air~~							
		14:39	Clean Air							
		14:40	VX	0.31	88%	12	NRV Low	12	23	
end										

Data Entry Form

(A) page 2 of ___

Purpose of Test:	Test Location:	Date:	Operator:				
Check Out - Agent Gen	ERDEC	8/8/98					
Det#:	SWver#:		Temp:				
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
TA04002	DAT	7:43	LX?	?			NLS			Residual H1 from 8/7/98
		7:46:40	LX?	?			NLS			municion Residual H0
		8:26:28			~30		NAV			
TA04003	SIM	0	LX	0.1?			LX LX?			municion
		4								
TA04004	DAT		LX							municion
		8:49	LX							D-Lot
		8:55:40	LX	~0.1	3%	1:27 1:48	LX LX?	1:27 1:48	1:48 1:18 27	
TA05004	DAT	8:44	Run Air							
		8:56	Clean Air							9:10A LX Conc 0.047 mg/m³
		8:57:30	LX	~0.1	3%	1:48	LX L	1:48	26	7:40A 0.026
end										

TA04.WB1 pdate 11 Jun 97

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Conf Check			ERDEC	8/8/98		Lo Zu				
Det#: M43			SWver#: 5025				Temp: 20°C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04141	DAT	7:20	Run Air							M43 980206-04
		7:21	Hcnt Sample				BLS MED			
		7:22	Gcnt Sample				NRV MED			
T05141	DAT	7:23	Run Air							M43 980206-05
		7:25	Hcnt Sample				BLS MED			
		7:26	Gcnt Sample				NRV MED			

end

Data Entry Form

Purpose of test:	Test Location:	Date:	Operator:			
Hood Evaluation	ERDEC 3510	8-10-98	MJW			
Det#: 980206-4/5	SWver#: 5.02B-1		Temp: +52 °C		Clean	

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	down time	Comment
T04147	DAT	1040	STARTUP							Detectors have been off since 1600 8/8/98, w/ inlet & exhaust caps not replaced. Began ramp to +52 °C @ approx. 0730 this morning
T05147	DAT	1047	STARTUP							
T04148	DAT	1059	C-AIR							
		1102	H-CONF				NO ALARM			
		1103	G-CONF				NRV LOW			
		1107	H-CONF				NO ALARM			
TA04149	DAT	1118	HD	1.95			NO ALARM	30"		
T05148	DAT	1104	H-CONF				NO ALARM	5		
		1110	G-CONF				NRV HI			
TA04150	SIG	1125	C-AIR							
TA05150	SIG	1135	C-AIR							
										*** 1145: Removed case bottom from both detectors.

end

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Host Evaluation			3510	8-10-98		YWW				
Det#: #4 & #5			SWver#:				Temp: +52 °C			
			#502B-1						Clean	
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	down time	Comment
T04151	SIG	1148	C-AIR							
T04152	SIG	1252 ~~1255~~	F-AIR							
T04153	DAT	1254	F-AIR							
		1255	H CONF				NO ALARM	2		
			H CONF				NO ALARM	10		
		1258	HD	1.95			NO ALARM	30		
T05152	SIG	1300	F-AIR							
T05153	DAT	1302	F-AIR							
T04154	DAT	1402	F-AIR							
		1403	H CONF				NO ALARM	5		
		1404	G CONF				NRV HI	1		
		1415	HD	1.95			NO ALARM	60		
T05154	DAT	1418	F-AIR							
			H-CONF				NO ALARM	5		
			G CONF				NRV MED	1		
			HD				NO ALARM	60		

end

Data Entry Form

Purpose of test:	Test Location:	Date:	Operator:			
Host. Evaluation	ERDEC 3510	8-10-98	JEW			
Det#: 980206 - #4 & #5	SWver#: 5.02B-1			Temp: +52 °C		

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04155	DAT	1510	R-AIR							Detectors removed from
		1512	H Conf			4	HM 7	2	—	chamber and Turned on
						5	GA M 5 GB L 7	1	—	w/ case bottoms off on a
							VX M 9			hood bench, room temperature
T04156	SIG	1517	R-AIR							
T05155	DAT	1518	R-AIR							
		1519	H-Conf			—	BLS HI	2	—	Case HM6 observed later
		1521	G-Conf			—	NRV MED	1	—	" GB M 7 " "
T05156	SIG	1525	R-AIR							
end										

M43 Upgrade

8/10/98

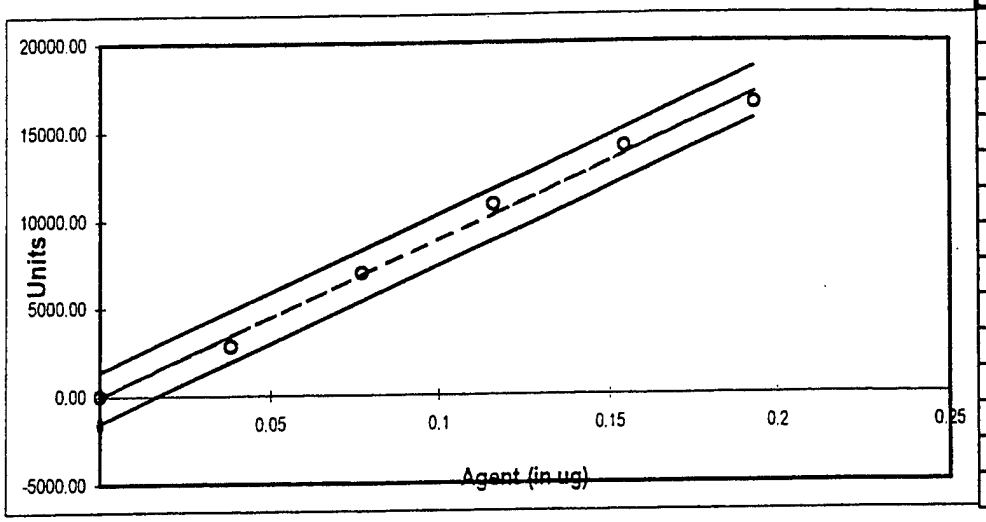
Monday

Targets:

Agent =	HD	
Conc. =		µg/l
Temp =	20	°C
RH =	10	%
Std #1=	38.60	ng/µl
Std #2=		ng/µl

MINICAMS:

Flow =	100	cc/m
Time =	30	sec.



Factor: 1 | 0.0328

(µl)	(units)
0	0
1	2780.5
2	6942.2
3	10808
4	14063
5	16490.7

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows

Oper 1

NOTES:

1 Set agent generator for HD @ 52 C and ~25% RH.

2 Run Standard curve using HD @ 38.6 ng/ul.

1	2780.5
2	6942.2
3	10808
4	14063
5	16490.7

HD Generator Settings			
agent =	200 cc/m	gen temp =	20 C
dry air =	2.25 l/m	gen RH =	25 %
wet air =	0.75 l/m	mb temp =	18 C
agt temp =	20 C	amb RH =	0 %

3 Sample # 1, 30 sec @ 100 cc/min = 14949.7 nA = 3.38 mg/m3.

4 Decrease agent concentration.

5 Sample # 2, 30 sec @ 100 cc/min = 8589.1 nA = 1.95 mg/m3.

6 Sample # 2, 30 sec @ 100 cc/min = 8759.5 nA = 1.99 mg/m3.

7 Sample # 3, 30 sec @ 100 cc/min = 9092.5 nA = 2.06 mg/m3.

8 Begin trail # 1 @ 2.06 mg/m3

Operator_____

Operator_____

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Cont Check,		-30°C	ERDEC	8/11/98		Lozos				Temp Chamber -30°C
ETVL Det#: 980206-04			SWver#: S02B				Temp:		both detectors	running overnight
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04157	DAT	9:59	Chamber Air							-12.7°C
		9:59:57	H cnt				BLIS MED			
		10:02:09	G cnt				Nerv Low			
ETVL 980206-05										
T05157		10:03	Chamber Air							
		10:03:	H cnt				BLIS Low			-12.7°C
		10:04:38	G cnt				Nerv Low			

end ... TWE ... data ... ing ...

Data Entry Form

Purpose of test: GB (-30°C)	Test Location: ERDEC	Date: 8/11/98	Operator:
ETV-1 Det#: 980206-04	SWver#: 502B		Temp:

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04158	DAT	~~13:15~~ 13:12:27								ok
		~~13:12:27~~	GB	0.112			None	60		below low end at vendor alarm after remove agent
(13:17	Data	~~13:16~~ from	Det-05	wrong det for	file)					
		13:18:45	GB				None	~~70~~ 60		NRV Low alarm clean to after remove agent
T04159	S/L	13:56	1) GB	0.104		12	NRV Low	12	25	
		14:00	2) GB			24	NRV Low		20	
										14:35 shut down / cap off

end

Data Entry Form

Purpose of test: ET-2 GB (-304)

Test Location: ERDEC

Date: 8/1/98

Operator: Lozes

Det#: 970206-05

SWver#: 5U2B

Temp:

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T05158	DAT	13:16								
(T04158)		13:17 / 13:21	GB	0.112		~~8~~ 8	NRV Low		22	data in wrong file T04158.dat by mistake
(T05158)		13:22	GB			5	NRV Low		24	data in right file
										13:55 Conc GB 0.104
T05159	SIG	13:59	1) GB	0.104		6	NRV Low		22	
			2)			20	NRV Low		11	
										14:35 shut down / Cap off

end

LOG1.WB1 update 11 Jun 97

Data Entry Form

Purpose of test: Check-out / test

Test Location:

Date: 8/11/98

Operator:

Det#:

SWver#:

Temp:

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
~~7AU7U~~	~~DAT~~	~~11:~~	~~GD~~							
		11:								
7AUS	DAT	11:05	Chamber air							-30°C
		11:05	GB				NAL Low			
		11:10:52	GB			18 sec	NAL Low	18	18	Chamber -30°C (-11.9°C /
		11:11:10	Clean							
		11:11:28	Clean							
		12:59:[illegible] 12					NAL			
7AU	DAT	11:22	~~Air~~							Error Click — deleted -05 by mistake
		11:22:[illegible]	~~GB~~							wrong ~~Wrong~~ ~~[illegible]~~ detector
		11:24:15	GB	?	80	NAL Low				
		11:25:[illegible]	GB Alarm	?	~~50~~	~~Alarm low~~ ~~GB~~				
		12:30	Air							
		12:32:[illegible]	GB	?	—	None	60	—		
		12:37	GB	?		Alarm				
		12:48:45								
		12:51:21								
end										

M43 Upgrade

8/11/98

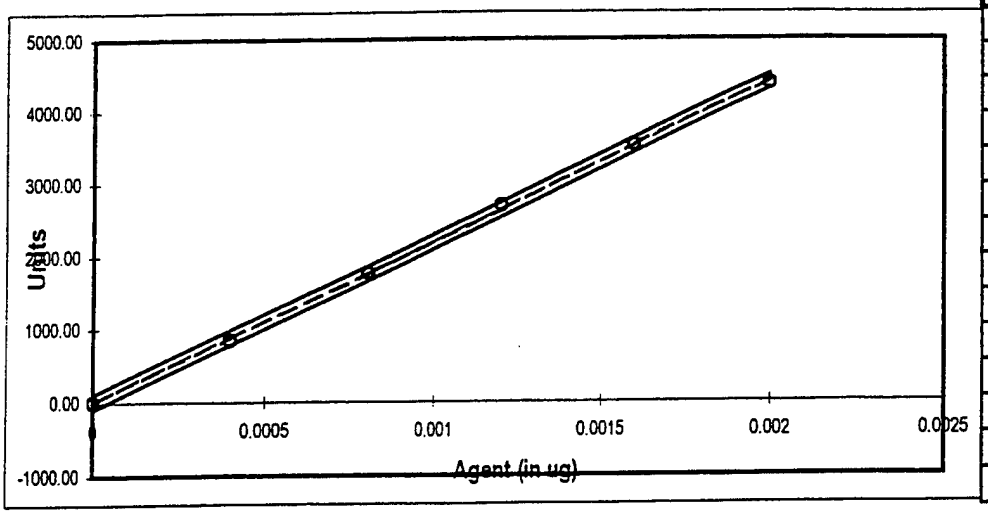
Tuesday

Targets:

Agent =	GB	
Conc. =		µg/l
Temp =	20	°C
RH =	10	%
Std #1=	0.3998	ng/µl
Std #2=		ng/µl

MINICAMS:

Flow =	50	cc/m
Time =	15	sec.



Factor: 1 | 0.0001

(µl)	(units)
0	0
1	841
2	1767
3	2697
4	3526
5	4367

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows

Oper 1

NOTES:

1 Set agent generator for GB @ -30 C.
2 Run Standard curve using GB @ .3998 ng/ul.

		log file
1	841	0633
2	1767	638
3	2697	642
4	3526	647
5	4367	652

GB Generator Settings			
agent =	cc/m	gen temp =	C
dry air =	3.00 l/m	gen RH =	25 %
wet air =	0.00 l/m	mb temp =	18 C
agt temp =	20 C	amb RH =	0 %

3 Intellitec and MSS detectors were taken out of hood for repairment
4 Sample # 1, 15 sec @ 50 cc/min = 3094 nA = .112 mg/m3 Logfile = 1204
5 Start test on ETG Detectors @ .112 mg/m3
6 Sample # 2, 15 sec @ 50 cc/min = 3559 nA = .129 mg/m3 Logfile = 1232
7 Lower agent concentration
8 Sample # 3, 15 sec @ 50 cc/min = 2857 nA = .104 mg/m3 Logfile = 1250
9 Trail # 2, @ .104 mg/m3.
10 Start test on Intellitec Detectors @ .104 mg/m3

Operator_____

Operator_____

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 8-12-98

Software Ver. 5.02B-1 Time: 08:40

Location: ERDEC E3510

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T04160.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail	
Display shows M43-APD	✓		
Display shows the Software Version	✓		
Display shows LED TEST followed by test patterns	✓		
Display shows HORNTEST and horn beeps twice	✓		
Display shows SELFTEST	✓		
Display shows STANDBY and backflush begins	✓		
Display shows READY within 30 minutes after startup	✓		8:42:42
Record Time 2:38			8:40:12
			2:30
Display goes blank approx. 15 seconds after READY	✓		

Tested by: [signature] Date 8-12-98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 8-12-98

Software Ver. 5.028-1 Time: 08:50

Location: ERDEC 3510

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T05160.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail	
Display shows M43-APD	✓		
Display shows the Software Version	✓		
Display shows LED TEST followed by test patterns	✓		
Display shows HORNTEST and horn beeps twice	✓		
Display shows SELFTEST	✓		
Display shows STANDBY and backflush begins	✓		
Display shows READY within 30 minutes after startup	✓		8:51:13
Record Time 2:38			8:49:04
			2:09
Display goes blank approx. 15 seconds after READY	✓		

Tested by: [signature] Date 8-12-98

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Govt. Evaluation			ERDEC 3510	8-12-98		KWW				
Det#: 980206 - #4 & #5			SWver#: 5.02B-1				Temp: -30 °C		Clean	
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	down time	Comment
T04160	DAT	8:40	STARTUP							Detectors have been
T05160	DAT	8:50	STARTUP							shut down & capped off
										for 18 hours.
T04161	DAT	9:11	C-AIR							Confidence tests
		9:12	H CONF			—	BLS MED NRV LOW	2	—	
		9:15	G CONF			—	NRV LOW	2	—	
T05161	DAT	9:18	C-AIR				~~BLS MED NRV LOW~~	~~2~~		
		9:19	H-CONF			—	BLS MED NRV LOW	2	—	
		9:22	G-CONF			—	NRV LOW	2	—	
T04162	DAT	9:58	GD	.114	0	16	NRV LOW	16	25	
T05162	DAT	10:01	GD	.114	0	7	NRV LOW	7	25	
T04163	SIG	10:07	Ø-AIR							
		10:08	GD	.114	0	12	NRV LOW	12	33	
T05163	SIG	10:09	Ø-AIR	.						
		10:10	GD	.114	0 ~~14~~	7 ~~14~~	NRV LOW	7 ~~14~~	24 ~~25~~	
T04164	DAT	10:12	GD	.114	0	14	NRV LOW	14	25	
end										

M43 Upgrade

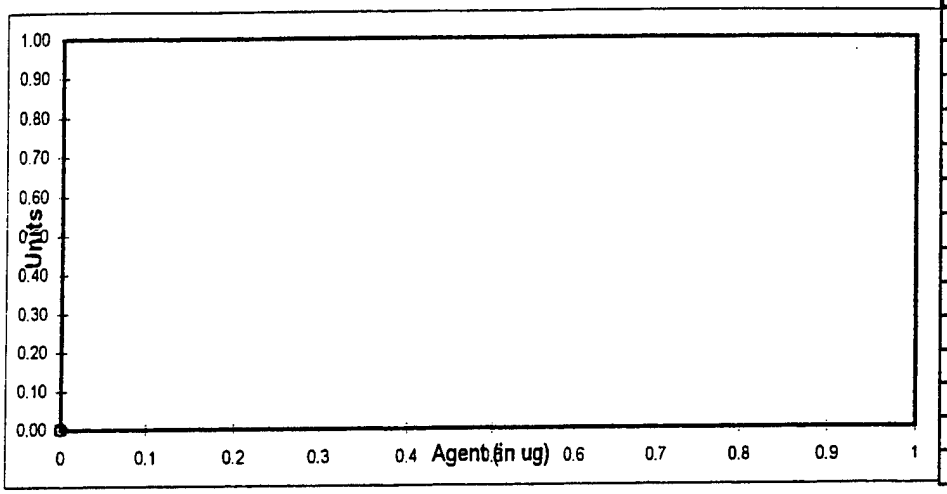
8/12/98
Wednesday

Targets:

Agent =	GD	
Conc. =		µg/l
Temp =	-30	°C
RH =	0	%
Std #1=	1.972	ng/µl
Std #2=		ng/µl

MINICAMS:

Flow =	50	cc/m
Time =	20	sec.



Factor: 1 #NUM!

(µl)	(units)
0	0
1	2145
2	4189
3	6276
4	8064
5	10284

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows
Operators: Juan & Sonny
NOTES:

1 Set agent generator for GD @ -30 C.
2 Run Standard curve using GD @ 1.972 ng/ul.

		LogFile
1	2145	0623
2	4189	0628
3	6276	0632
4	8064	0637
5	10284	0641

GD Generator Settings			
agent =	.03 cc/m	gen temp =	-30 C
dry air =	3.00 l/m	gen RH =	0 %
wet air =	0.00 l/m	mb temp =	20 C
agt temp =	0 C	amb RH =	0 %

3 Sample # 1, 20 sec @ 100 cc/min= 1053 nA = .029 mg/m3 Log File = 0728
4 Increase agent concentration
5 Sample # 2, 20 sec @ 100 cc/min= 3599 nA = .103 mg/m3 Log File = 0759
6 Sample # 3, 20 sec @ 100 cc/min= 3983 nA = .114 mg/m3 Log File = 0958
7 Begin Trail # 1 @ .114 mg/m3 for ETG detectors.
8 Sample # 4, 20 sec @ 100 cc/min= 4428 nA = .127 mg/m3 Log File = 1027
9 Lower agent flow: agent = .08 cc/m
10 Begin Trail # 1 for MSS & Intellitec.
11 Sample # 5, 20 sec @ 100 cc/min= 4493 nA = .129 mg/m3 Log File = 1027
12 Sample # 6, 20 sec @ 100 cc/min= 9991 nA = .288 mg/m3 Log File = 1439
13 Set agent generator for GB @ -30C.
14

1	841
2	1767
3	2697
4	3526
5	4367

15 Sample #7, 20 sec @ 100 cc/min= 5857 nA = .160 mg/m3
16 Test Intellitec and MSS detectors.

Operator_____

Operator_____

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-04 Date: 8/13/98

Software Ver. M5025 Time: 8:25

Location: EMDEC - BLDG 3510 +52°C

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T0416S.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 5:40		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: G. Lozoya Date 8/13/98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-05 Date: 8/13/98

Software Ver. M5025 Time: ~~8:35~~ 8:52

Location: ERDEC – BLG 3510 +52K

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T0516S.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 3:50		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: G. Lozo Date 8/13/98 ~~8:52~~

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Start-up +52°C			ERDEC	8/13/98		Lotus				
Det#:			SWver#: 502B				Temp:			Chamber +52°C
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04165	DAT	8:24	Start-up							+52°C
		8:35	H Cont Sample				None	3		
		8:37	H				None	5		
		8:39	H				None	10		
		8:39	G Cont Sample				NRV Low			
T04166	SIV		1) Chamber Air							
			2) Chamber Air							
			3) H Cont				—			
			4 G Sample				NRV Low	2		Low Count — Re-Xmit
			5) "				NRV Low	2		
T05165	DAT	8:52	Start-up							Read 3:50 (8:55:50 - 8:52)
		8:58	H Cont Sample				None	3		
		8:59	H Cont Sample				None	10		
		9:01	G Cont				None	2		
		9:02	G Cont				~~NRV Low~~ None	5		
		9:03	G Cont				NRV Low	10		
T05166 end	SIV		1) Chamber Air 2) H 3) G				None NRV Low	10		

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
GB/GD +52°C E-64			ERDEC	8/13/98		LOZOS				
Det#: 980206-04			SWver#: M S02B				Temp:			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04167	DAT	10:30	Clean Chamber Air	+52°C						
		10:42 ~~10:44~~	GB	0.121	28%	20	NRV Low	20	20	
T04168	SIL	10:50	GB	0.125		19	NRV Low	19	20	11:01 GB mc 0.125
T04169	DAT									
		11:05:30	GB	0.125		20	NRV Low	20	20	
		11:10:20 28	GB	0.125		16	NRV Low	16	20	
T04170	DAT	13:44	Clean Air							
		13:46	GD	0.126		1:20	NRV Low	1:20	20	
T04171	SIL	14:00	GD	0.129		7	NRV Low	7	20	
T04172	DAT	14:02 14:12								
		14:24	GD	0.118		—	—	2:36	—	
T04173	DAT	14:34	air							
		14:35:28	GD	0.118		14	NRV Low	14	23	
end										

Purpose of test: GB / GD E7&2		+52°C	Test Location: ERDEC	Date: 8/13/98		Operator: Lozos				
Det#: 980 200-5			SWver#:				Temp:			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T05167	DAT	10:44	Clean Air	+52C						
		10:45	GB	0.121	29%	21	NRV Low	21	21	
T05168	SIG	10:52	GB	0.125		20	NRV Low	20	23	11:01 GB Cm 0.125
T05169	DAT	11:06	Clean Air							
		07:37 11:08	GB	0.125		20	NRV Low	20	20	
		11:18:28	GB	0.125		19	NRV Low	19	20	
T05170	DAT	13:48	Clean Air							
		13:50	GD	0.126		8	NRV Low	8	20	
T05171	SIG	14:02	GD	0.129		9	NRV Low	9	21	
T05172	DAT	14:27	Clean Air							
		14:28	GD	0.118		8	NRV Low	8	20	
~~T05173~~	DAT	14:36	Air							
		14:37:37	GD	0.118		8	NRV Lo	8	21	(on wrong detector)
end										

Data Entry Form (A)

Purpose of test: GB ET61 +52°	Test Location: ERDEC	Date: 8/13/98	Operator: Lozos				Check air
Det#: 980206-04	SWver#:		Temp:				

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
~~TA04006~~										
~~T04167~~	DAT	9:21	~~GB~~							Check at agent
		9:29:77	G-D	?						
		9:31	G-D	?			NRC Lo			raising conc
		9:35	G-D	?						
		9:43	G-D	?						
TA04007	DAT	12:52								
			Hcut				None			
TA05006	DAT	13:05								
		13:0?	GD							

end

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 8-14-98

Software Ver. 5.02B-1 Time: 08:26

Location: ERDEC E3510 TEMP +52°C FOLLOWING 17-HR SHUTDOWN

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T04174.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:52		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 8/14/98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 8-14-98

Software Ver. 5.02B-1 Time: 08:34

Location: ERDEC E3510

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T05174.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 3:58		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: [signature] Date 8/14/98

Purpose of test:			Test Location:	Date:		Operator:				
Govt. evaluation			ERDEC 3510	8-14-98		MWW				CHAMBER HUMIDITY APPROX ____
Det#: #5 & #4			SWver#: 5.02B-1				Temp: +52 °C		Clean	
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	down time	Comment
T04174	DAT	0826	STARTUP							
T04175	SIG	0830	C-AIR							4 MIN. AFTER STARTUP
T05174	DAT	0834	STARTUP							
T05175	SIG	0840	C-AIR							6 MIN. AFTER STARTUP
T04176	DAT	0846	C-AIR							~~COOR. TESTS~~
		0850	C-AIR							
T05176	DAT	0859	C-AIR							
		090022	B-AIR							AUTO CAL
T04177	DAT	9:31:40	H-CONF				NO ALARM	2		
		932:18	H-CONF				NO ALARM	5		
		9:33:36	G-CONF				~~NO ALARM NRV LOW~~	1		
							NO ALARM	2		
T05177	DAT	9:36:33	H-CONF				NRV LOW	5		
						3	>BL>LOW	3		
		9:37:23	G-CONF			5	NRV LOW	2		

end

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Govt. evaluation				8-14-98		MEW				
Det#: 4 & 5			SWver#: 5.02B-1				Temp: +52 °C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04178	DAT	9:56	VX	.055	26%	32	NRV LOW	32	19	
T05178	DAT	10:04	VX	.055	26%	8	NRV LOW	8	23	
T04179	SIG	10:20	CLEAN AIR							
		10:21	VX	.055	26	15	NRV LOW	15	26	
T05179	SIG	10:37	CLEAN AIR							
		10:38	VX	.055	26	6	NRV LOW	6	26	
T04180	DAT	10:39	VX	.055	26	30	NRV LOW	30	31	
T05180	DAT	10:58	VX	.055	26	19	NRV LOW	19	26	
end										

M43 Upgrade

8/14/98

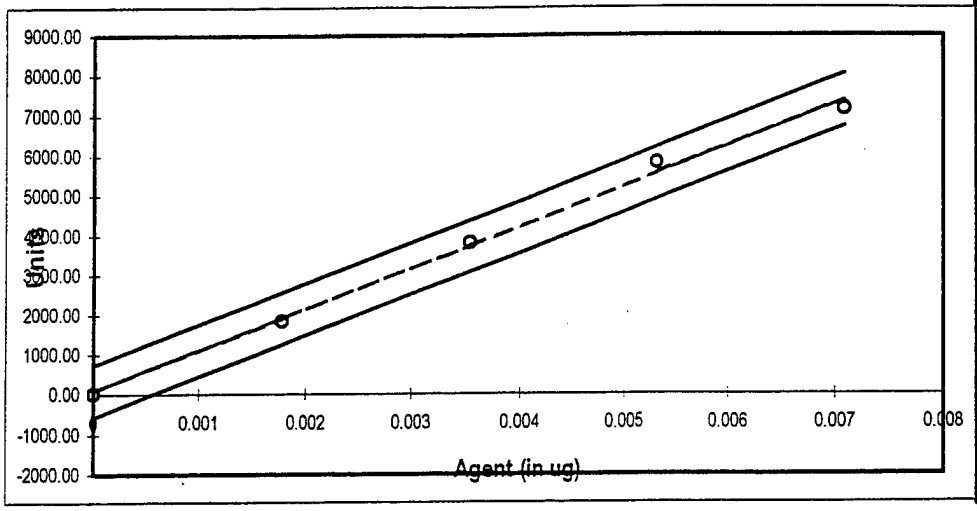
Friday

Targets:

Agent =	VX	
Conc. =		µg/l
Temp =	52	°C
RH =	25	%
Std #1=	3.5468	ng/µl
Std #2=		ng/µl

MINICAMS:

Flow =	100	cc/m
Time =	40	sec.



Factor: 1.1 | 0.0013

(µl)	(units)
0	0
0.5	927
1	1806
1.5	2650
2	3195

Project: Provide GD, GB, GA, VX, and HD to contractor to set windows

Operators: Terri, Juan, Sonny & Kwok

NOTES:

1. Set agent generator for VX @ 52C and 25 % RH.
2. Run standard curve with VX @ 3.5468 ng/ul.

		Log file
0.5	927	815
1	1806	822
1.5	2650	829
2	3195	835

3. Sample # 1, 40 sec @ 100 cc/min = 1056 = .030 ug/l ???
4. Sample # 2, 40 sec @ 100 cc/min = 1817 = .055 ug/l log = 0955
5. Testing detectors
6. Sample # 3, 40 sec @ 100 cc/min = 1833 = .055 ug/l log = 1115

VX Generator Settings			
agent =	110 cc/m	gen temp =	52.0 C
dry air =	2.10 l/m	gen RH =	26 %
wet air =	1.00 l/m	mb temp =	20 C
agt temp =	35 C	amb RH =	82 %

Operator_____

Operator_____

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-4 Date: 8-17-98

Software Ver. 5.02B-1 Time: 13:05

Location: ERDEC E3510 TEMP: 0 °C @ STARTUP.

POWER OFF @ 8-14 11:30 +52°C
STORED FOR 3 DAYS AT +25 °C
FOLLOWED BY 5.5 HR COLD SOAK

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T04181.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 2:50		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: G. Lozo Date 8/17/98

Startup Test Checklist and Test Data Sheet

Detector S/N 980206-5 Date: 8-17-98

Software Ver. 5.02B-1 Time: 10:10

Location: ERDEC E3510 TEMP: 0 °C @ STARTUP

POWER OFF 8-14 11:30 +52 °C
STORED FOR 3 DAYS AT +25 °C
FOLLOWED BY 5.5 HR COLD SOAK.

1. Initial Power On

A. Uncap the air inlet and air exhaust. Place charcoal filter over the inlet.

B. Connect communication cable and begin "Logall" file.

Record datafile name T05181.DAT
(Attach copy of data with test records)

C. Turn horn volume to full (clockwise)

D. Connect power and begin stopwatch.

E. Verify startup sequence.

	Pass	Fail
Display shows M43-APD	✓	
Display shows the Software Version	✓	
Display shows LED TEST followed by test patterns	✓	
Display shows HORNTEST and horn beeps twice	✓	
Display shows SELFTEST	✓	
Display shows STANDBY and backflush begins	✓	
Display shows READY within 30 minutes after startup	✓	
Record Time 3:06		
Display goes blank approx. 15 seconds after READY	✓	

Tested by: G. Lozu Date 8/17/98

Data Entry Form

Purpose of test:		Test Location:	Date:		Operator:				
Start-up 0°C		ER	8/17/98		Lozos				
Det#:		SWver#: M502B				Temp:			

DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T05181	DA7			0°C	0%					E762 980206-05
		13:15:23	H cut. sample				BLU MED		~2:00	
		13:18:1	G cut				NRV MED			357/375 190 ~~+6°C~~ +5.8°C
T04181	DA7			0°C	0%					E761 980206-04
		13:19	H cut				BLS Hi		1:30	
		13:24:47	G cut			20	NRV Med		0:42	349/367 190 +6°C

end

Data Entry Form

Purpose of test:		Test Location:	Date:	Operator:				
HD 0°C		ERDEC	8/17/98	Lozos				
Det#:		SWver#: IMS0253			Temp:			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04182	DAT	13:50		0°C	0%					9.2°C
		13:51	Clean Air							
		13:52	HD	2.6		7	BLS Med	7	50	
		14:06 14:08	Clean Air HD	2.6		6	BLS Med	6	47	10°C
T05182	DAT	13:54								
		14:00	Clean Air							9.7°C
		14:02	HD	2.6		7	BLS Low	7	46	
T05183	SIR	14:20	HD	1.93		5	BLS Low	5	33	
T04183	SIR	14:37	HD	1.93		5	BLS Low	5	47	
T05184	DAT	14:43	Clean Air							
		14:44:4	HD	1.93		11	BLS Low	11	28	HD Con 14:50 1.93 mg/m³
end										

LOG1:WB1 update 11 Jun 97

Data Entry Form

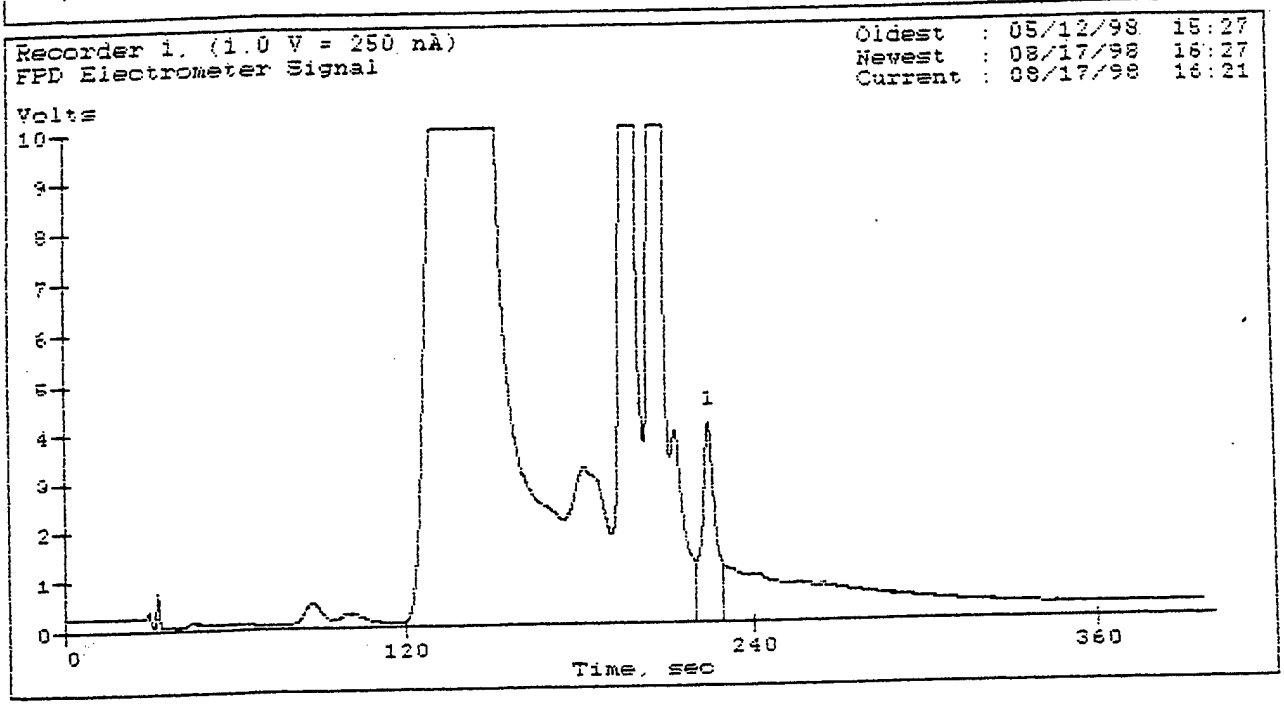
Purpose of test:			Test Location:	Date:		Operator:				
VX 0°C			ERDEC	8/17/98		L Bos				Unpurged
Det#:			SWver#: M 5028				Temp:			
									Clean	
DataFile#	Type	Time	Sample	Conc(mg	%Rh	Alarm	Alarm	Chalng	down	Comment
	dat/sig					time	class/id/conc	time	time	
T04185	DAT	16:10	clean air							
		16:00:30	VX	0.026			HRV			Unpurged VX
T05185	DAT	16:12	clean Air							
		16:12:24	VX	0.026			HRV Low			Unpurged VX
end										

S/N 3043 08/17/98 16:21 STATION 1

61 VX(FPD)

TWAG	0.00
PEAK #	1
HEIGHT	720
R.TIME	224.7
WIDTH	3.4

H = Help



Monitor Serial Number 3043 Date 08/17/98 Sampling Station 1

Time VX TWAG

Data Entry Form

Purpose of test:			Test Location:	Date:		Operator:				
Dust evaluation			ERDEC E3510	8-18-98		MEW				
Det#: 980206 - #4 & #5			SWver#: 5.02B-1				Temp: 0°C			
DataFile#	Type dat/sig	Time	Sample	Conc(mg	%Rh	Alarm time	Alarm class/id/conc	Chalng time	Clean down time	Comment
T04186	DAT	0835	CHAMBER AIR		71					Detectors have been running overnight in environmental chamber @ 0°C. Ambient chamber humidity is 71 63%
T04187	SIG	0838	CHAMBER AIR		71					
T05186	DAT	0839	CHAMBER AIR		71					
T05187	SIG	0841	CHAMBER AIR		71					
T04188	DAT	0844	H CONF		71	—	BLSMED	2	—	
		0845	G CONF		71	—	NRV LOW	2	—	
T05188	DAT	0848	H CONF		71	—	BLSMED	2	—	
		0852	G CONF		71	—	NRV LOW	2	—	
T04189	DAT	0927	COND. AIR		0%					
		0928	VX	~~0.09 .014~~	0	1:27	NRV LOW	1:27	2.2	~~CONCENTRATION UNKNOWN~~
T05189	DAT	1004	COND AIR		—					
		1005	VX	0.09	0	0:37	NRV LOW	0:37	0:23	
T04190	SIG	10:25	VX	0.09	0	1:23	NRV LOW	1:38	0:23	AUTOCAL @ t = 1 MIN INTO CHALLANGE
T05190	SIG	10:54	VX	0.07	0	0:48	NRV LOW	0:48	0:22	
T04191	DAT	11:10								AUTOCAL - Pos R_x^+ SHIFTS WHEN
		11:10:43	VX	0.07	0	0:49	NRV LOW	0:49	0:23	CONDITIONED AIR IS PUT ON.
T05191	DAT	11:31	COND AIR		—					
end		11:32	VX	0.07	0	0:14	NRV LOW	0:14	0:28	

APPENDIX C. GOVERNMENT EVALUATION TEST DATA: INTERFERENCES

Blank

Test Location: M-FIELD

Interference Material: UNLEADED GAS EXHAUST

Date: 8-31-98

Operator: GWJ / GL

Temperature: 90°F

Weather: 55 RH 6 MPH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-4	5.02B-1	980206-5	5.02B-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☑ No ☐	BLS MED		Yes ☑ No ☐	BLS LOW	
G	Yes ☑ No ☐	NRV HI		Yes ☑ No ☐	NRV MED	

Trial No. 1 — Time 1356

Distance 10' Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments T04202.DAT T05202.DAT

Trial No. 2 — Time 1403

Distance 10' Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments

Trial No. 3 — Time 1407

Distance 10' Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

SEE PRE-TEST DIESEL EXHAUST

Test Location: M-FIELD

Interference Material: DIESEL EXHAUST

Date: 8-31-98

Operator: GW / GL

Temperature: 90 F

Weather: 2-5 MPH 50% RH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-4	5.02B-1 ~~980206-5~~	980206-4	5.02B-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☑ No ☐	BLS LOW		Yes ☑ No ☐	BLS LOW	
G	Yes ☑ No ☐	NRV LOW		Yes ☑ No ☐	NRV HI	

Trial No. 1 — Time 2:41

Distance 10' Chall. Time 2'00"

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments: T04204.DAT — T05204.DAT

Trial No. 2 — Time 2:55

Distance 10' Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments:

Trial No. 3 — Time 3:01

Distance 10' Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments: T04205.SIG — T05205.SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

SEE PRETEST – GAS VAPOR

Test Location: ERDEC M-FIELD

Interference Material: GAS VAPOR

Date: 8-31-98

Operator: GW / GL

Temperature: +93 F

Weather: 46% 5 MPH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-4	5.02B-1	980206-5	5.02B-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☑ No ☐	BLS LOW		Yes ☑ No ☐	BLS LOW	
G	Yes ☑ No ☐	NRV HI		Yes ☑ No ☐	NRV MED	

Trial No. 1 — Time 3:25

Distance 5' Chall. Time 2'00"

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments: T04206.DAT — T05206.DAT

Trial No. 2 — Time 3:31

Distance 5' Chall. Time 2'00"

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments:

Trial No. 3 — Time 3:39

Distance 5' Chall. Time 2'0" / 2'00"

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments: T04207.SIG — T05207.SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

SEE PRE-TEST BURNING GAS

Test Location: M-FIELD

Interference Material: BURNING GAS

Date: 8-31-98

Operator: GW / GL

Temperature: + 93

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-4	5.02B-1	980206-5 ~~5.02B-4~~	5.02B-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☑ No ☐	BLS LOW		Yes ☑ No ☐	BLS LOW	
G	Yes ☑ No ☐	NRV MED		Yes ☑ No ☐	NRV HI	

Trial No. 1 — Time 3:58

Distance 15' Chall. Time 3'00"

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments T04208.DAT T05208.DAT

Trial No. 2 — Time 4:10

Distance 15' Chall. Time 3:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments

Trial No. 3 — Time 4:21

Distance 15 Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☑			Yes ☐ No ☑		

Comments T04209.SIG T05209.SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

SEE PRE-TEST DIESEL VAPOR

Test Location: M-FIELD

Interference Material: DIESEL VAPOR

Date: 8-31-98

Operator: GW / GL

Temperature: +93 F

Weather: 48% 5 MPH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-4	5.02B-1	980206-5	5.02B-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☑ No ☐	BLS LOW		Yes ☑ No ☐	BLS LOW	
G	Yes ☑ No ☐	NRV LOW		Yes ☑ No ☐	NRV LOW	

Trial No. 1 — Time 16:50

Distance 5' Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments: T04210.DAT — T05210.DAT

Trial No. 2 — Time 16:56

Distance 5' Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments:

Trial No. 3 — Time 17:02

Distance 5' Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments: T04211.SLV — T05211.SLV

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Interference Material: Diesel Running

Date: 8-31-98

Operator: G-L

Temperature: +73°F

Weather: 48%RH 5 MPH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	5.02B-1	980206-05	5.02B-1

Pre-test

	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	INRV Low	

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS Low	
Yes ☒ No ☐	INRV Low	

Trial No. 1

Time: 17:13

Distance 15ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 15ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: T04212.DAT T05212.DAT

Trial No. 2

Time: 17:21

Distance 15ft Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 15ft Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments:

Trial No. 3

Time: 17:26

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: T04213.SIT T05213.SIT

Post-test

	Alarm	Response	Clear Time
H	Yes ☐ No ☐		
G	Yes ☐ No ☐		

Alarm	Response	Clear Time
Yes ☐ No ☐		
Yes ☐ No ☐		

Test Location: M-Field

Interference Material: Kerosene Vapor

Date: 8-31-98

Operator: G.L.

Temperature: +95°F

Weather: 45% RH 5MPH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	5025-1	980206-05	5026-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV Low		Yes ☒ No ☐	NRV Hi	

Trial No. 1 — Time 17:39

Distance 5ft	Chall. Time 2:00		Distance 5ft	Chall. Time 2:00	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04214.DAT T05214.DAT

Trial No. 2 — Time 17:44

Distance 5ft	Chall. Time 2:00		Distance 5ft	Chall. Time 2:00	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments:

Trial No. 3 — Time 17:49

Distance 5 ft	Chall. Time 2:00		Distance 5 ft	Chall. Time 2:00	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04 25.SIL T05 25.SIL

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Date: 8-31-98

Temperature: 90°F

Interference Material: Kevolane Bunny

Operator: Lotoj

Weather:

Det S/N	S/W Ver
980206-04	5028-1

Det S/N	S/W Ver
980206-05	5028-1

Pre-test

	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV MED	

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS Low	
Yes ☒ No ☐	NRV MED	

Trial No. 1

Time 18:02

Distance 15ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 15ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04216.DAT T05216.DAT

Trial No. 2

Time ~~18:07~~ 18:09

Distance 15ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 15ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments

Trial No. 3

Time 18:14

Distance 15ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 15ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04217.SIG T05217.SIG

put on A/C -> D/C power over night

Post-test

	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV MED	

18:20 T04218.DAT

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS MED	
Yes ☒ No ☐	NRV Hi	

T05218.DAT

Test Location: MField

Interference Material: JP8 Vapor

Date: 9/1/98

Operator: LOZOS

Temperature: 71°F

Weather: 68% RH 7MPH

Det S/N	S/W Ver
980206-04	M5020-1

Det S/N	S/W Ver
980206-05	M5020-1

Pre-test

H

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS MED	
Yes ☒ No ☐	NRV MED	

G

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS MED	
Yes ☒ No ☐	NRV LOW	

Trial No. 1

Time 8:20

Distance 5ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV Low	

Distance 5ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV Low	

Comments T04219.DAT T05219.DAT

Trial No. 2

Time 8:25

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV Low	

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments

Trial No. 3

Time 8:36

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04220.SIG T05220.SIG

Post-test

H

Alarm	Response	Clear Time
Yes ☐ No ☐		
Yes ☐ No ☐		

G

Alarm	Response	Clear Time
Yes ☐ No ☐		
Yes ☐ No ☐		

Test Location: M-Field

Date: 9/1/98

Temperature: 74°F

Interference Material: JP8 Burning

Operator: Lozos

Weather: 65% RH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	MS02D-1	98206-05	MS02D-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS MED	
G	Yes ☒ No ☐	NRV MED		Yes ☒ No ☐	NRV Low	

Trial No. 1 — **Time** 8:49

Distance 15 ft	Chall. Time 2:00		Distance 15 ft	Chall. Time	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04 221. DAT — T05 221. DAT

Trial No. 2 — **Time** ~~8:56~~ 8:58

Distance	Chall. Time		Distance	Chall. Time	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments:

Trial No. 3 — **Time** 9:10

Distance	Chall. Time		Distance	Chall. Time	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04 222. SIL — T05 222. SIL

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M Field

Interference Material: Cardboard, burning

Date: 9/1/98

Operator: LOZOS

Temperature:

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test

	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS HI	
G	Yes ☒ No ☐	NRV HI BLS LOW	

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS LOW	
Yes ☒ No ☐	NRV LOW	

Trial No. 1

Time: 9:26 / 9:26

Distance	Chall. Time		
Alarm	Response	Clear Time	
Yes ☐ No ☒			

Distance	Chall. Time	
Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: T04223.DAT — T05223.DAT

Trial No. 2

Time: 9:41

Distance	Chall. Time	
Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance	Chall. Time	
Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: 9:44 auto cal

Trial No. 3

Time: 9:57

Distance	Chall. Time	
Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance	Chall. Time	
Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: T04224.SIG — T05224.SIG / voice comm

Post-test

	Alarm	Response	Clear Time
H	Yes ☐ No ☐		
G	Yes ☐ No ☐		

Alarm	Response	Clear Time
Yes ☐ No ☐		
Yes ☐ No ☐		

Test Location: M-Field

Interference Material: Wood, buildings

Date: 5/1/98

Operator: Low

Temperature: 78°F

Weather: 59% RH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLST MEM		Yes ☒ No ☐	BLST MEM	
G	Yes ☒ No ☐	NRV LOW		Yes ☒ No ☐	NRV ~~LOW~~ MEM	

Trial No. 1 — Time: 10:15

Distance 35ft Chall. Time			Distance 35ft Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04225.DAT — T05225.DAT

Trial No. 2 — Time: 10:20

Distance Chall. Time			Distance Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments:

Trial No. 3 — Time: 10:24

Distance Chall. Time			Distance Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04226.SIL — T05226.SIL

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Date: 9/1/98

Temperature:

Interference Material: Dowsed fire

Operator: Lotus

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M5020-1	980206-05	M5020-1

Pre-test

	Alarm (Det 1)	Response	Clear Time	Alarm (Det 2)	Response	Clear Time
H	Yes ☒ No ☐	BLS MED		Yes ☒ No ☐	BLS MED	
G	Yes ☒ No ☐	NRV HI		Yes ☒ No ☐	NRV MED	

Trial No. 1 — Time 10:36

	Det 1	Det 2
Distance	22 ft	22 ft
Chall. Time	2:00	2:00
Alarm	Yes ☐ No ☒	Yes ☐ No ☒
Response		
Clear Time		

Comments: T04 227.DAT 10:38 Annual lost Rx lines Frequently | T05 227.DAT lost Rx lines frequently

Trial No. 2 — Time 10:47

	Det 1	Det 2
Distance	22 ft	
Chall. Time	2:00	
Alarm	Yes ☐ No ☒	Yes ☐ No ☒
Response		
Clear Time		

Comments: 10:49 Annual 10:50 Ready

Trial No. 3 — Time 10:58

	Det 1	Det 2
Distance	22 ft	22 ft
Chall. Time		
Alarm	Yes ☐ No ☒	Yes ☐ No ☒
Response		
Clear Time		

Comments: T04 228.SIC | T05 228.SIC

Post-test

	Alarm (Det 1)	Response	Clear Time	Alarm (Det 2)	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M - Field

Date: 9/2/98

Temperature: 83°F

Interference Material: Tires Burning

Operator: Lozos

Weather: 57% RH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test 11:10

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Maj		Yes ☒ No ☐	BLS MED	
G	Yes ☐ No ☐	NRV Hi		Yes ☒ No ☐	NRV LOW	

Trial No. 1 | Time 12:40

Distance 22 ft | Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04229.DAT | T05229.DAT

Trial No. 2 | Time 12:45

Distance | Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments:

Trial No. 3 | Time 12:50

Distance | Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04 230.SLK | T05 230.SLK

Lost Comm

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Interference Material: White Phosphorus

Date: 9/1/98

Operator: Lozo

Temperature: 81°F

Weather: 55% RH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Mcl		Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV MED		Yes ☒ No ☐	NRV MED	

Trial No. 1 — Time 13:07

Distance 50 ft — Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04231.DAT — T05231.DAT

Trial No. 2 — Time 13:10

Distance — Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments:

Trial No. 3 — Time 13:14

Distance — Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04232.SIG — T05 232.SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Interference Material: Yellow Smoke

Date: 9/15T

Operator: LOZO

Temperature: 83°F

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M5020-1	980206-05	M5020-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS MED		Yes ☒ No ☐	BLS MED	
G	Yes ☒ No ☐	NRV HI		Yes ☒ No ☐	NRV MED	

Trial No. 1

Time: 13:52

Distance 50 ft Chall. Time			Distance 50 ft Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☒ No ☐	GB Low		Yes ☒ No ☐	GD Low/Med 2 Low	

Comments: T04 233. DAT w/ Rain/Dust filter

T05 233. DAT w/ Rain/Dust filter

Trial No. 2

Time: ~~13:57~~ 14:00

Distance Chall. Time			Distance Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS Low	

Comments:

Trial No. 3

Time: 14:15

Distance Chall. Time			Distance Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☒ No ☐	BLS		Yes ☒ No ☐	BLS	

Comments: T04 234. SIL

T05 234. SIL

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Interference Material: Violet Smoke

Date: 9/1/98

Operator: LOZOI

Temperature:

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	ISLS Low		Yes ☒ No ☐	ISLS Med	
G	Yes ☒ No ☐	NRV Hi		Yes ☒ No ☐	NRV MED	

Trial No. 1 — Time: 14:36

Distance 50 ft	Chall. Time		Distance 50 ft	Chall. Time	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☒ No ☐	H Low	

Comments: T04235.DAT — T05225.DAT

charged Rain/Dust filters for both

Trial No. 2 — Time: 14:43

Distance	Chall. Time		Distance	Chall. Time	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☒ No ☐	H Low	

Comments:

Trial No. 3 — Time: 14:50

Distance	Chall. Time		Distance	Chall. Time	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☒ No ☐	ISLS	

Comments: T04236.SIG — T05236.SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Interference Material: Red Smoke

Date: 9/1/98

Operator: Lozo

Temperature: 86°F

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
98 0206-04	M502D-1	980 206-05	M502D-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Mal		Yes ☒ No ☐	BLS Mal	
G	Yes ☒ No ☐	INRV Hi		Yes ☒ No ☐	INRV Mal	

Trial No. 1 — Time 15:07

Distance 50 ft Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments T04237.DAT — T05237.DAT

Changed Rain/Dust filters for both

Trial No. 2 — Time 15:16

Distance Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments ~~LOST~~

Trial No. 3 — Time 15:30

Distance Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments T04238.SIG — Lost Cam

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Interference Material: Green Smoke

Date: 9/1/98

Operator: LOZ

Temperature:

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M5020-1	980206-04	M5020-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS LOW		Yes ☒ No ☐	BLS LOW	
G	Yes ☒ No ☐	NRV Hi		Yes ☒ No ☐	NRV HI	

Trial No. 1

Time 15:50

Distance 50ft Chall. Time			Distance 50ft Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☒ No ☐	GS Low		Yes ☒ No ☐	GS Low	

Comments T04239.DAT T05215.DAT

Trial No. 2

Time 15:57

Distance 10ft Chall. Time			Distance 10ft Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☒ No ☐	GS Low		Yes ☒ No ☐	GS Low	

Comments

Trial No. 3

Time 16:13

Distance 2-5ft Chall. Time			Distance 2-5ft Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☒ No ☐	NRV		Yes ☒ No ☐	NRV	

Comments T04240.SLV T05240.SLV

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Date: 9/1/98

Temperature: 87°F

Interference Material: HTH

Operator: Lozoi

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M5020-1	980206-05	M5020-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV Hi		Yes ☒ No ☐	NRV MED	

Trial No. 1

Time 16:52

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: T04241.DAT (H/Low) w/o Rain/Dust filter

T05241.DAT (H/Low) w/o Rain/Dust filter

Trial No. 2

Time 17:21

Distance 10 ft Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 10 ft Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments

Trial No. 3

Time

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: T04242.SIL

T05242.SIL

PVT on D/C power Run overnight

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV Hi		Yes ☒ No ☐	NRV Med	

T04243.DAT

T05243.DAT

Test Location: A-Field

Date: 9/2/98

Temperature: 76°F

Interference Material: Black

Operator: LOZOJ

Weather: 86% RH 6MPH
After Lightning Storm

Det S/N	S/W Ver
980206-04	M5020-1

Det S/N	S/W Ver
980206-05	M5020-1

27°C

26°C

10:40Am

Pre-test

	Alarm		Response	Clear Time
H	Yes ☒	No ☐	BLS MED	
G	Yes ☒	No ☐	NRV HI	

	Alarm		Response	Clear Time
	Yes ☒	No ☐	BLS LOW	
	Yes ☒	No ☐	NRV MED	

Trial No. 1

Time 10:54

Distance 10ft Chall. Time 2:00

Alarm		Response	Clear Time
Yes	☐		
No	☒		

Distance 10ft Chall. Time 2:00

Alarm		Response	Clear Time
Yes	☐		
No	☒		

Comments T04244.DAT T05244.DAT

Trial No. 2

Time 11:00

Distance Chall. Time

Alarm		Response	Clear Time
Yes	☐		
No	☒		

Distance Chall. Time

Alarm		Response	Clear Time
Yes	☐		
No	☒		

Comments

Trial No. 3

Time 11:04

Distance Chall. Time

Alarm		Response	Clear Time
Yes	☐		
No	☒		

Distance Chall. Time

Alarm		Response	Clear Time
Yes	☐		
No	☒		

Comments T04245.SIL T05245.SIL

Post-test

	Alarm		Response	Clear Time
H	Yes ☐	No ☐		
G	Yes ☐	No ☐		

Alarm		Response	Clear Time
Yes ☐	No ☐		
Yes ☐	No ☐		

Test Location: M- Field

Interference Material: STB

Date: 9/2/98

Operator: Lozoj

Temperature: 77°F

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-7	980206-05	M502D-7

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Hi		Yes ☒ No ☐	BLS MED	
G	Yes ☒ No ☐	NRV MED		Yes ☒ No ☐	NRV MED	

Trial No. 1

Time: 11:19

Distance 10 ft	Chall. Time 2:00		Distance 10 ft	Chall. Time 2:00	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04246.DAT T05246.DAT

Trial No. 2

Time: 11:27

Distance	Chall. Time		Distance	Chall. Time	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments:

Trial No. 3

Time: 11:28

Distance	Chall. Time		Distance	Chall. Time	
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04247.SIG T05247.SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M- Field

Interference Material: DS2

Date: 9/2/98

Operator: LOZOI

Temperature:

Weather:

Det S/N	S/W Ver
980206-04	M502D-1

Det S/N	S/W Ver
980206-05	M502D-1

Pre-test

H

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS MED	

G

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV Hi	

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS MED	

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV ~~Low~~ MED	

Trial No. 1

Time 11:43

Distance 10 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 10 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04 248.DAT

T05 248.DAT

Trial No. 2

Time 11:48

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments add fm

add fm

Trial No. 3

Time 11:55

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☒ No ☐	GB Low	

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04 249 SLC

Post-test

H

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS MED	

G

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV Hi	

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS MED	

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV MED	

T04 250.DAT

T05 250.DAT

Test Location: M-Field

Date: 9/2/98

Temperature: 87°F

Aer-O-Water 6 EM 6% (3M Defense NF)

Interference Material: AFFF vapor MIL-F-24385

Operator: Lozo

Weather: 74% RH 4 MPH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M5020-1	980206-05	M5020-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV MED		Yes ☒ No ☐	NRV MED	

Trial No. 1

Time 13:26

Distance 10ft Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 10FT Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04251.DAT w/fan

T05 251.DAT w/fan

Trial No. 2

Time 13:31

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments

Trial No. 3

Time 13:37

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04252.SIK

T05 252.SIK

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Date: 9/2/98

Temperature: 84°F

Interference Material: CLP (Breakfree) Cleaner Lubricant & preservative

Operator: LOZOI

Weather:

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	MSUZI-1	980206-05	

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV MED		Yes ☒ No ☐	NRV MED	

Trial No. 1 — Time 1347

Distance 3 ft Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments: T04 25J. DAT on clock w/ fan — T05 25J. DAT U4 clock w/ fan

Trial No. 2 — Time 13:52

Distance Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments:

Trial No. 3 — Time 13:56

Distance Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments: T04 254. SIG — T05 254. SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M- Field

Interference Material: LSA oil

Date: 9/2/98

Operator: Lozos

Temperature: 85°F

Weather: 71% RH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test

H

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS Low	

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS Low	

G

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV Hi	

Alarm	Response	Clear Time
Yes ☒ No ☐	NRV HEJ	

Trial No. 1

Time 14:39

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☑		

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☑		

Comments T04257.DAT on Clock

T05257.DAT

Trial No. 2

Time 14:43

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☑		

Comments

Trial No. 3

Time

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☑		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04258.SIG

T05258.SIG

Post-test

H

Alarm	Response	Clear Time
Yes ☐ No ☐		

Alarm	Response	Clear Time
Yes ☐ No ☐		

G

Alarm	Response	Clear Time
Yes ☐ No ☐		

Alarm	Response	Clear Time
Yes ☐ No ☐		

Test Location: Mr Field

Interference Material: RIC (Rifle Bore Cleaner)

Date: 9/2/98

Operator: LOZOS

Temperature: 85°F

Weather: 75% RH

Det S/N	S/W Ver	Det S/N	S/W Ver

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS L	
G	Yes ☒ No ☐	NRV Hi		Yes ☒ No ☐	NRV H	

Trial No.	Time	Distance	Chall. Time	Alarm	Response	Clear Time	Alarm	Response	Clear Time
1	14:11			Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04255.DAT on cloth w/ fan — T05255.DAT

Trial No.	Time	Distance	Chall. Time	Alarm	Response	Clear Time	Alarm	Response	Clear Time
2	14:20			Yes ☐ No ☒			Yes ☐ No ☒		

Comments:

Trial No.	Time	Distance	Chall. Time	Alarm	Response	Clear Time	Alarm	Response	Clear Time
3	14:25			Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04256.SIG — T05 0256.SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-field

Interference Material: 9.9% DEET EPA Reg 7405-60-48295 Insect Repellent Aerosol

Date: 9/2/98

Operator: LUZUS

Temperature: 86°F

Weather: 70's PC

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M5020-1	980206-05	M5020-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV Low		Yes ☒ No ☐	NRV MED	

Trial No. 1

Time 14:59

Distance 3ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 3ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04259.DAT on cloth w/fan

T05259.DAT

Trial No. 2

Time 15:04

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments

Trial No. 3

Time 15:10

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments T04 260.SIL

T05 260.SIL

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low		Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV Hi		Yes ☒ No ☐	NRV MED	

T04 261.DAT

T05 261.DAT

Test Location: M-Field

Interference Material: 12% DEET Cream, insect repellant

Date: 9/3/15

Operator: LOZ05

Temperature: 64°F → 69°F

Weather: 95% RH Omit

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test 7:25A

H

G

Alarm	Response	Clear Time
Yes ☒ No ☐	BL ~~LOW~~ MED	
Yes ☒ No ☐	NRV ~~HI~~ MED	

Alarm	Response	Clear Time
Yes ☒ No ☐	BL ~~LOW~~ MED	
Yes ☒ No ☐	NRV MED	

Trial No. 1

Time 8:06

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐		
No ☒		

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐		
No ☒		

Comments T04262.DAT on cloth w/ fan

T05262.DAT

Trial No. 2

Time 8:12

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐		
No ☒		

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time
Yes ☐		
No ☒		

Comments

Trial No. 8:17

Time

Distance 1 ft Chall. Time

Alarm	Response	Clear Time
Yes ☐		
No ☒		

Distance 1 ft Chall. Time

Alarm	Response	Clear Time
Yes ☐		
No ☒		

Comments T04263.SIK mud cloth

T05263.SIK

Post-test

H

G

Alarm	Response	Clear Time
Yes ☐ No ☐		
Yes ☐ No ☐		

Alarm	Response	Clear Time
Yes ☐ No ☐		
Yes ☐ No ☐		

Test Location: M-Field

Date: 9/3/98

Temperature: 73°F

Interference Material: M56 (JPT) TURBINE EXHAUST

Operator: Lozos

Weather: 80% RH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-2

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS MED		Yes ☒ No ☐	BLS MED	
G	Yes ☒ No ☐	NRV MED		Yes ☒ No ☐	NRV MED	

Lost Comm, Re-Boot Computer

Trial No. 1 — Time 9:16

Distance 25ft, Chall. Time 2:00			Distance 25ft, Chall. Time 2:00		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☒ No ☐	VX Low		Yes ☒ No ☐	VX Low	

Comments: T04264.DA7 T05264.DA7
alarm when turbine shut off (both), ejector purges JPT @ shut off

Trial No. 2 — Time 9:22

Distance, Chall. Time			Distance, Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☒ No ☐	VX Low		Yes ☒ No ☐	VX Low	

Comments: alarm when turbine shut off (both), ejector JPT @ shutoff

Trial No. 3 — Time 9:31

Distance, Chall. Time			Distance, Chall. Time		
Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04265.SIV T05265.SIV

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M- Field

Interference Material: WASP/Hand Spray Insecticide Tetramethrin

Date: 9/3/98

Operator: Lozos

Temperature: 77°F

Weather: Sun, RH

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Hi		Yes ☒ No ☐	BLS MED	
G	Yes ☒ No ☐	NRV MED		Yes ☒ No ☐	NRV MED	

Trial No. 1 — Time 9:47

Distance 3 ft Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments: T04266.DAT — T05266.DAT

Trial No. 2 — Time 9:50

Distance 3 ft Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments

Trial No. 3 — Time 9:54

Distance →1 ft Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐			Yes ☐		
No ☒			No ☒		

Comments: T04267.SIL — T05267.SIL

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Field

Interference Material: Fog Oil Smoke

Date: 9/3/98

Operator: L O ZOS

Temperature: 79°F

Weather: Sunny

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M5020-1	980206-05	M5020-1

Pre-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☒ No ☐	RLS Hi		Yes ☒ No ☐	RLS MED	
G	Yes ☒ No ☐	NRV Low		Yes ☒ No ☐	NRV MED	

Trial No. 1 — Time 10:10

Distance 25 ft Chall. Time 2:00

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04 268.DAT — T05 268.DAT

1 Min Turbine warm up, 2 min Smoke

Trial No. 2 — Time 10:19

Distance — Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments

Trial No. 3 — Time 10:27

Distance — Chall. Time

Alarm	Response	Clear Time	Alarm	Response	Clear Time
Yes ☐ No ☒			Yes ☐ No ☒		

Comments: T04269 SIG — T05269.SIG

Post-test

	Alarm	Response	Clear Time	Alarm	Response	Clear Time
H	Yes ☐ No ☐			Yes ☐ No ☐		
G	Yes ☐ No ☐			Yes ☐ No ☐		

Test Location: M-Fill

Interference Material: M76 Smoke Grenades IR Screens

Date: 9/3/98

Operator: Lotts

Temperature: 78°F → 82°F

Weather: 77% RH → 55% RH 5 mph

Det S/N	S/W Ver	Det S/N	S/W Ver
980206-04	M502D-1	980206-05	M502D-1

Pre-test

	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV MED	

	Alarm	Response	Clear Time
H	Yes ☒ No ☐	BLS Low	
G	Yes ☒ No ☐	NRV MED	

Trial No. 1 | **Time 12:24**

Distance 20 ft Chall. Time 5 sec

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance 20 ft Chall. Time 5 sec

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: T04270.DAT w/ Rain/Dirt Filter

T05270.DAT

Trial No. 2 | **Time 12:30**

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments

Trial No. 3 | **Time**

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Distance Chall. Time

Alarm	Response	Clear Time
Yes ☐ No ☒		

Comments: T04271.SIG

T05271.SIG

Post-test

	Alarm	Response	Clear Time
H	Yes ☒ No ☐	H Med	
G	Yes ☒ No ☐	NRV MED	

T04272.DAT

Alarm	Response	Clear Time
Yes ☒ No ☐	BLS Low	
Yes ☒ No ☐	NRV MED	

T05272.DAT