Draft Final
Prescribed Burn Air Monitoring Report
Munitions Response Site 16
Former Fort Ord, California
Revision 0

Prepared for

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MACTEC Project No. 4088053164 10.4

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By NLA with permission

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LIST OF ACRONYMS AND ABBREVIATIONS

Army	United States Department of the Army
CAAQS	California Ambient Air Quality Standard
CDQMP	Chemical Data Quality Management Plan
COPC	chemical of potential concern
CS	Candidate station
DQOs	data quality objectives
DTSC	Department of Toxic Substances Control
EPA	Environmental Protection Agency
GPS	Global Positioning System
Harding ESE	Harding ESE, Inc. (formerly Harding Lawson Associates; now MACTEC)
HLA	Harding Lawson Associates (now MACTEC)
IA	Interim Action
MACTEC	MACTEC Engineering and Consulting, Inc. (formerly Harding ESE, Inc. and HLA)
MBUAPCD	Monterey Bay Unified Air Pollution Control District
MEC	Munitions and Explosives of Concern
MR	Munitions Response
MR RI/FS	Munitions Response Remedial Investigation/Feasibility Study
OE RI/FS	Ordnance and Explosives Remedial Investigation/Feasibility Study
PM	particulate matter
PM_{10}	particulate matter less than 10 microns
PS	public station
RPD	relative percent difference
SAP	Sampling and Analysis Plan
TWA	Time Weighted Average
$\mu g/m^3$	micrograms per cubic meter of air
USACE	United States Department of the Army, Corps of Engineers
USEPA	United States Environmental Protection Agency

EXECUTIVE SUMMARY

This Air Monitoring Report describes the results of air sampling conducted to assess the potential impacts to air resulting from prescribed burn operations required to complete the interim action cleanup for munitions and explosives of concern (MEC) at Munitions Response Site (MRS) -16 at the former Fort Ord in Monterey County, California.

The Army, as the lead agency, determined that an Interim Action was appropriate to protect human health from the imminent threat posed by MEC at Interim Action sites at the former Fort Ord while an ongoing comprehensive study of MEC cleanup needs at former Fort Ord is conducted under the basewide Munitions Response Remedial Investigation/Feasibility Study (MR RI/FS). The Army's Interim Action Ordnance and Explosive (OE) RI/FS Proposed Plan and Record of Decision identified prescribed burning as the preferred alternative to clear vegetation prior to MEC remedial action for Interim Action sites. Site specific work activities pertaining to the MRS-16 Interim Action including the prescribed burn, air sampling and analysis, and MEC removal procedures are presented in the *Final Work Plan, MRS-16 Munitions and Explosives of Concern Removal, Former Fort Ord, California* (*Shaw, 2006*).

Under the air sampling program, concentration data for particulate matter less than ten microns (PM_{10}) were collected for a 24-hour period that included the active ignition phase of the prescribed burn. Air samples were collected from seven (7) public stations. The sampling locations were determined in consultation with the Army, United States Environmental Protection Agency (USEPA), Department of Toxic Substances Control (DTSC), and the MBUAPCD in October 2006. In addition, the Monterey Bay Unified Air Pollution Control District (MBUAPCD) collected air samples during the burn at additional locations and/or for additional analytes that complemented those collected by the Army.

Air samples were collected at each station in consecutive 8-hour and 16-hour intervals to comprise a 24-hour sample representing the prescribed burn event starting at active ignition. The air samples were analyzed for PM_{10}.

The primary objectives of this investigation were to (1) confirm or refine conclusions drawn from other studies that ground-level concentrations of PM_{10} downwind of the prescribed burn will be below human health-protective regulatory screening levels, and (2) provide data to assess the adequacy of the of the burn prescription relative to smoke dispersion and downwind impacts.

With regard to the first objective, the conclusion of this investigation is that, except for the sample collected from the Spreckels School (MRS16-PS5), PM_{10} was not observed at any site at concentrations above the California Ambient Air Quality Standard (CAAQS) screening level of 50 micrograms per cubic meter ($\mu g/m^3$) during the 24-hour monitoring period. In addition, data from meteorological stations utilized for the burn program as well as visual observations during the monitoring program confirm that monitoring stations were appropriately located to collect information in areas that were impacted by smoke, even though the impacts were short-term. Sampling station MRS16-PS5 at the Spreckels School was located generally in an upwind position relative to MRS-16 burn during active ignition process, and generally downwind from an agricultural burn in the Salinas Valley that burned and/or smoldered before, during, and after the MRS-16 prescribed burn. These factors, as well as the station's position adjacent to a plowed agricultural field, support the conclusion that the elevated PM_{10} level recorded by this station is not representative of particulates only attributable to the MRS-16 prescribed burn.

With regard to the second objective, the available data, which shows 24-hour PM_{10} results below the California Ambient Air Quality Standard (CAAQS) screening level, supports the conclusion that the MRS-16 prescribed burn, as implemented, provided for adequate smoke dispersion and negligible downwind impacts.

1.0 PROJECT DESCRIPTION

This section describes the project objectives and summarizes the prescribed burn operations and sampling program.

1.1 Objectives

The *Final Prescribed Burn Air Sampling and Analysis Plan* (*Shaw, 2006, Appendix L*) outlined procedures for collection and analysis of air samples in areas potentially affected by air emissions from a prescribed burn at MRS-16 (Plate 1-1). The objectives of the sampling and analysis program described therein were to:

1) Evaluate whether prescribed burns at the former For Ord result in downwind ambient concentrations of PM_{10} that exceed the applicable health-based screening level (CAAQS).

2) Provide data to assess the adequacy of the burn prescription relative to smoke dispersion and downwind impacts. The air sampling program was therefore focused on the detection and quantification of particulate matter related to vegetation combustion (PM_{10}).

Based on these objectives, air monitoring for PM_{10} was conducted starting at the active burn stage and continued for a 24-hour period.

1.2 Summary of Prescribed Burn Operations

The prescribed burn operations at MRS-16 were performed by the Army's Fire Department on October 19, 2006. The extent of the area to be burned was approximately 60 acres. Ignition began at approximately 10:30 a.m. and ended at approximately 1:30 p.m. Air sampling was conducted for a 24-hour period from approximately 10:30 a.m. October 19 to 10:30 a.m. October 20, 2006. It should be noted that agricultural burning and subsequent smoldering was occurring in the Salinas Valley near Fort Ord before, during, and after the prescribed burn operations at MRS-16. Surface wind direction during

ignition was generally from the northeast, and from the west, south, and southeast after ignition and into the evening. From the early morning of October 20, 2006 until the end of the monitoring period, the wind direction was predominantly from the southeast to northeast.

1.3 Summary of Sampling Program

This section describes the location of sampling stations and sampling activities completed for the prescribed burn air sampling program. To meet the Army's project objectives, the investigation consisted of sampling during the burn (the day of active ignition), and continuing for a total of 24-hours. The *Final Prescribed Burn Air Sampling and Analysis Plan* (*SHAW, 2006*) provides additional details regarding the rationale for sampling locations and selection of specific analytes. Table 1-1 summarizes the sampling and analytical methods, type of equipment, and sampling media used, the analysis performed and the sampling locations and identification numbers for each of the sampling stations. Analytical results for the Prescribed Burn Air Monitoring Program are presented in Table 1-2.

1.3.1 Sampling Locations

A total of seven (7) public sampling locations were used during the investigation. The sampling locations were determined in consultation with the Army, USEPA, DTSC, and the MBUAPCD. Five of the sample locations were pre-selected sites (MRS 16-PS1 through MRS 16-PS5). The five pre-selected sampling locations included nearby schools that, based on data collected during past burn events, may be affected by smoke impacts. Because the actual areas of smoke impact could not be known in advance of a burn event, the pre-selected sampling stations were supplemented with two sampling stations selected based on smoke dispersion modeling conducted the day before the prescribed burn (October 18, 2006). The two supplemental locations, selected from a total of six (6) candidate sites were established at Del Rey Woods Elementary School (MRS 16–CS2) and the Salinas Rural Fire Department station, Laureles Grade (MRS 16-CS3; Plate 1-1). The coordinates of each sampling location were recorded using Global Positioning System (GPS) technology.

1.3.2 Prescribed Burn Air Sampling

This section summarizes the prescribed burn air sampling activities completed for this study. Sampling activities began with the active ignition phase and continued for a 24-hour period.

Prescribed burn air sampling was performed by MACTEC on October 19 and 20, 2006, during which samples were collected at all seven of the sampling stations (Table 1-2). MBUAPCD performed sampling at their permanent monitoring locations and also utilized some of the MACTEC sampling locations during the prescribed burn.

Air monitoring for PM_{10} was performed by collecting "integrated" time-weighted average (TWA) samples on Teflon filter media for approximately 8-hours, which included the active ignition period. A second set of TWA samples were collected at each station over approximately 16 hours to complete the 24-hour monitoring period. All samples were collected at approximately two meters above ground level, which is at or near human adult breathing zone and within the probe siting criteria recommended by the USEPA. One field blank sample was prepared and one duplicate air sample was collected at the Salinas Rural Fire Department station at Laureles Grade (MRS16-CS3, Plate 1-1).

2.0 RESULTS

This section summarizes the results of the air sampling conducted for the former Fort Ord Prescribed Burn Air Monitoring Program.

2.1 Analytical Test Methods

This section presents a brief description of the sample collection methods, analytical methods, and laboratory used for analysis in the Prescribed Burn Air Monitoring Program. A more detailed discussion of the analytical method is included in Section L7.0 of Appendix L of the *Final Work Plan MRS-16 Munitions and Explosives of Concern Removal Former Fort Ord, California*, (*SHAW, 2006*). As described in Section 1.3.2, "integrated" TWA samples were collected and submitted for laboratory analysis.

2.1.1 Particulate Matter (PM_{10})

Integrated TWA air samples for PM_{10} were collected at the sample stations using Teflon filter media with low volume sampling equipment. PM_{10}, which may be produced in large amounts from vegetation burning, was collected to provide a relative indication of smoke impact at the sampling locations. All samples were analyzed by Data Chem Laboratories, in Cincinnati, Ohio.

2.2 Analytical Results

This section presents a summary of all analytical results generated during the Prescribed Burn Air Monitoring Program. Field sampling forms and field notes from each site are included as Appendices A and B. Laboratory data was subject to USEPA Level IV validation, and the findings of the data validation are presented in Section 4.1. The laboratory data report is included in Appendix C. A discussion of the data validation results is presented in Section 4.0.

2.2.1 Sampling Results

As described in Section 2.1.1, two sets of samples were collected at each sampling location. Therefore, two sets of data are reported for PM_{10} analyses from each site, representing the initial 8-hour sampling period and the remaining 16-hour sampling period (24 hours total). The purpose for this sampling design was to have the ability to assess the highest impact periods during the burn and to collect samples over a 24-hour duration for comparison to the air quality standard. The results indicate that greater impacts were seen during the first 8 hours, which included the active ignition period. At all stations, the time-weighted average concentration of PM_{10} had decreased during the remaining 16 hours of monitoring. Sample results at each station are discussed below.

2.2.1.1 Marshall Elementary School (MRS 16-PS1)

The PM_{10} concentrations observed at MRS 16-PS1 were 28.9 $\mu g/m^3$ during the initial 8-hour sampling period and 26.71 $\mu g/m^3$ for the 16-hour sample period (Table 1-2). The calculated result for the 24-hour period is 27.4 $\mu g/m^3$.

2.2.1.2 Manzanita School (MRS 16-PS2)

The PM_{10} concentrations observed at MRS 16-PS2 were 33.0 $\mu g/m^3$ during the initial 8-hour sampling period and 18.5 $\mu g/m^3$ for the 16-hour sample period (Table 1-2). The calculated result for the 24-hour period is 23.4 $\mu g/m^3$.

2.2.1.3 Ingham School (MRS 16-PS3)

The PM_{10} concentrations observed at MRS 16-PS3 were 29.0 $\mu g/m^3$ during the initial 8-hour sampling period and 19.0 $\mu g/m^3$ for the 16-hour sample period (Table 1-2). The calculated result for the 24-hour period is 22.3 $\mu g/m^3$.

2.2.1.4 Salinas Rural Fire Department-(Portola) (MRS 16-PS4)

The PM_{10} concentrations observed at MRS 16-PS4 were 53.7 $\mu g/m^3$ during the initial 8-hour sampling period and 23.0 $\mu g/m^3$ for the 16-hour sample period (Table 1-2). The calculated result for the 24-hour period is 33.4 $\mu g/m^3$.

2.2.1.5 Spreckels School (MRS 16-PS5)

The PM_{10} concentrations observed at MRS 16-PS5 were 100.6 $\mu g/m^3$ during the initial 8-hour sampling period and 44.5 $\mu g/m^3$ for the 16-hour sample period (Table 1-2). The calculated result for the 24-hour period is 63.4 $\mu g/m^3$, slightly above the CAAQS of 50 $\mu g/m^3$. As noted in Section 1.2, agricultural burning and subsequent smoldering was in progress during the MRS-16 prescribed burn, and likely influenced the results at this site. This site was also adjacent to a recently plowed agricultural field, which may have also been an additional source of particulate matter. A discussion of the site results relative to these other factors is provided in Section 3.1.

2.2.1.6 Del Rey Woods Elementary (MRS 16-CS2)

The PM_{10} concentrations observed at MRS 16-CS2 were 33.1 $\mu g/m^3$ during the initial 8-hour sampling period and 16.5 $\mu g/m^3$ for the 16-hour sample period (Table 1-2). The calculated result for the 24-hour period is 22.0 $\mu g/m^3$.

2.2.1.7 Salinas Rural Fire Department-(Laureles) (MRS 16-CS3)

The PM_{10} concentrations observed at MRS 16-CS2 were 20.9 $\mu g/m^3$; and 14.7 $\mu g/m^3$ for the 16-hour sample period (Table 1-2). The calculated result for the 24-hour period is 16.8 $\mu g/m^3$.

The results for the duplicate sample collected at the Salinas Rural Fire Department were 29.0 $\mu g/m^3$ for the initial 8-hour sample and 14.7 $\mu g/m^3$ for the 16-hour sample.

Except for the samples collected from the Spreckels School, the PM_{10} results were below the California Ambient Air Quality Standard of 50 $\mu g/m^3$.

3.0 DATA ANALYSIS

This section describes how the validated analytical results summarized in Table 1-2 were used to make comparisons to the human health-protective regulatory screening level presented in Table 1-2. Regulatory screening levels for chemicals in ambient air are generally expressed as either acute (on order of 1-hour peak exposures) or long term (on order of annual average exposures). Because public exposure to smoke from prescribed burns at the former Fort Ord would typically be no more than a few days per year, the most appropriate time scale for examining the potential significance of exposure to compounds in the smoke from prescribed burns at the former Fort Ord is acute exposure. The 24-hour California Ambient Air Quality Standard of 50 $\mu g/m^3$ was used as the appropriate screening level.

3.1 Comparison of Sampling Results to Regulatory Screening Levels

The monitoring data collected during the MRS-16 prescribed burn are summarized in Table 1-2 along with the regulatory screening level for comparison. A comparison of results presented in Section 2.2.1 to regulatory screening levels indicate that PM_{10} concentrations were not reported above the 24-hour CAAQS of 50 $\mu g/m^3$ at any site except for the Spreckels School which had a 24-hour average PM_{10} at a concentration of 63.4 $\mu g/m^3$. The elevated PM_{10} concentration at the Speckels School is unlikely to have resulted from the MRS-16 prescribed burn, for the following reasons:

1. The predominant wind direction during the ignition period (from approximately 10:30 am to 1:30 pm on October 19, 2006) was generally from northeast to southwest, away from Spreckels. After ignition in the mid- afternoon, wind directions were briefly (approximately 2 to 3 hours) predominantly from the west, towards Spreckels. For the remainder of the monitoring program (until approximately 10:30 a.m. October 20, 2006), winds were generally from the southwest to northeast. The measured wind directions show that except for a 2 to 3 hour period after ignition,

a substantial portion wind direction during the burn was traveling in directions other than towards Spreckels.

2. For the periods before, during, and after the MRS-16 prescribed burn, a separate agricultural burn and subsequent smoldering in the Salinas Valley was occurring east (upwind) of the school, which likely contributed to particulates collected at that station.

3. The sampling station at the Spreckels School was in close proximity to and downwind of a recently plowed agricultural field. Particulates attributable to windblown soil also may have contributed to the total PM_{10} concentrations recorded at the site.

3.2 Evaluation of Sampling Station Placement

In accordance with the sampling objectives of the project, sampling stations were placed in areas expected to receive smoke impacts. Locations were based on observations from previous burns and on smoke dispersion modeling conducted the day before the prescribed burn. Wind direction data collected from the remote automated weather station (RAWS) closest to the burn (Table 1-3) was compared to the selected monitoring locations to evaluate their positions relative to smoke dispersion. Wind roses which graphically show the wind direction during the 8- and 16-hour monitoring periods are presented on Plate 1-1. A summary of wind directions relative to monitoring locations is provided below:

- Ignition period (approximately 10:30 a.m. to 1:30 p.m.): winds were predominantly from the northeast towards the southwest in the general direction of Manzanita School (MRS 16-PS2), Del Rey Woods Elementary (MRS 16-CS2), and the MBUAPCD station at their office.

- Early afternoon (approximately 1:30 p.m. to 3:30 p.m.): winds were predominantly from the north and northeast towards the south and southwest in the general direction of Salinas Rural Fire Department-(Laureles) (MRS 16-CS3) and Ingham School (MRS 16-PS3)

- Mid – late afternoon (approximately 3:30 p.m. 6:30p.m.): winds were predominantly from the west towards the east in the general direction of Salinas Rural Fire Department-(Portola) (MRS 16-PS4) and Spreckels School (MRS 16-PS5)

- Evening of October 19 through the end of the monitoring program at approximately 10:30, October 20, 2007: winds ranged from the southwest to the northeast towards the general direction of Marshall Elementary School (MRS 16-PS1) and continuing to the west and southwest towards the Manzanita School (MRS 16-PS2), and Del Rey Woods Elementary (MRS 16-CS2) locations.

The available data presented in Table 1-3 and the summary above indicate that the wind (and smoke) direction throughout the monitoring program varied considerably and that monitoring stations were in appropriate down-wind positions to monitor ground-level smoke impacts, if any, as they occurred. As mentioned above in Section 2.2.1, with the exception of the results from the Spreckels School (MRS 16-PS5) monitoring station which do not appear to represent smoke impacts related to MRS-16 prescribed burn, the 24-hour CAAQS was not exceeded at any of the monitoring locations.

4.0 SUMMARY OF DATA QUALITY ASSESSMENT

This section presents a summary of data validation procedures and results, quality control inspections conducted, and data quality objectives of the Prescribed Burn Air Monitoring Program.

4.1 Data Validation

This section summarizes the data validation results for the air sampling conducted.

4.1.1 Summary of Data Validation Results

Data validation was performed by MACTEC on the analytical results generated from the Prescribed Burn monitoring program. Data validation consisted of review and re-calculation of the laboratory raw data to verify accuracy of concentrations reported. The laboratory provided the equivalent of an EPA Level IV data package for each data set submitted for analysis.

4.1.1.1 Field Blanks

Target compounds were not observed in field blanks associated with the project samples.

4.1.1.2 Co-Located Field Samples

As described in the *Final Prescribed Burn Air SAP* (Shaw, *2006; Appendix L)*, one co-located sample was collected to evaluate both field and analytical precision. The co-located sample was collected for PM_{10} analysis during the 8-hour and 16-hour sample collection intervals at station MRS 16-CS3 (Salinas Rural Fire Department [Laureles Grade station]).

The duplicate precision of each of the co-located samples was evaluated by calculating the relative percent difference (RPD) between the detected results in the primary sample and its associated co-located sample. A standard control limit for field duplicate samples of 50% RPD was used for the evaluation. All co-located samples met the 50% RPD control limit. Since the source and effect of imprecision in

co-located sample results on the quality of the data is not known, it is not included in EPA Level 3 or Level 4 review. Table 1-2 presents the co-located sample results.

4.1.1.3 Overall Data Usability

Based upon the findings of the data validation effort, the data are considered valid and useable as reported by the laboratory.

4.2 Quality Control Inspections

This section discusses the quality control (QC) process performed for the project. The QC process is described in detail in the project *Chemical Data Quality Management Plan* (CDQMP) (*HLA, 1997*). In general, the QC process is comprised of a preparatory phase, initial phase, follow-up phase, and completion/acceptance inspection; compliance to these processes is summarized below.

The preparatory phase of the program consisted of: technical review of the project requirements by team members (e.g., the Work Plan, SAP, and Health and Safety Plan); confirming that all clearance, permits, and site access issues were addressed (by the Army); confirming that all equipment was in place and in working order; and completion of appropriate project kick-off meetings with subcontractors. The kick-off meeting was completed with the analytical laboratory prior to the start of the field program and is documented under separate cover.

The initial phase was performed at the beginning and during the early stages of the field program implementation. The process included: confirmation that the initial phase was completed correctly, a review of the execution of the field activities and compliance with the project plans, and review of field documentation for adequacy (e.g., daily logs, chains of custody, sampling forms, and checklists).

The follow-up phase was performed from the early stages to the completion of the field program. This phase focused on continued compliance to appropriate plans and identification and correction of unsatisfactory/nonconforming conditions.

A completion/acceptance inspection will be performed prior to the project close-out to verify that project requirements relevant to the to the field program were satisfied. This phase will also include identification and correction of unsatisfactory/nonconforming conditions. Client acceptance of the work performed will be confirmed before project close-out.

4.3 Data Quality Objectives

The following section discusses the elements the Prescribed Burn Air Monitoring Program relative to the data quality objectives (DQOs) identified in the *Final Prescribed Burn Air SAP* (*Shaw, 2006; Appendix L*).

4.3.1 Statement of the Problem

Combustion of vegetation from prescribed burning has potential temporary smoke impacts to downwind sensitive receptors. These smoke impacts need to be evaluated relative to human health screening levels.

4.3.2 Identification of Decisions

The primary decisions related to this project are to (1) evaluate whether prescribed burns at the former Fort Ord result in downwind ambient concentrations of PM_{10} that exceed the applicable human health-based screening level (California ambient air quality standard), (2) provide data to support the evaluation of the burn prescription relative to smoke dispersion and downwind impacts to the public.

4.3.3 Identification of Inputs to Decisions

Inputs to decisions necessary for evaluating prescribed burn activities at former Fort Ord such as the identification of PM_{10} as the target contaminant had been identified through evaluation of data presented in previous technical publications, including the *Draft Final Summary After-Action Report: Ranges 43-48 Prescribed Burn, Former Fort Ord, California (Army, 2004) Draft Final, Prescribed Burn Supplemental Report, Ranges 43-48* (*MACTEC 2006*), and *Health Consultation, Former Fort Ord Site* (Agency for Toxic Substances and Disease Registry, 2005). Based on the information provided in those documents,

PM_{10} was selected as the COPC for the MRS-16 prescribed burn. The appropriate screening level (California ambient air quality standard) was selected based on previous coordination between the Army, USACE, U.S. Environmental Protection Agency, Region 9 (EPA), California Environmental Protection Agency (Cal EPA) Department of Toxic Substances Control, (DTSC), California Air Resources Board (CARB), and Monterey Bay Unified Air Pollution Control District (MBUAPCD) during the development of the sampling and analysis plan for the prescribed burn at Ranges 43-48 (*MACTEC, 2003*).
Other inputs were implemented during the completion of the burn, such as measurement of PM_{10} in air, and visual field observations.

4.3.4 Definition of Study Boundaries

The study boundary was defined as the area downwind of the prescribed burn event that received smoke impacts. Air samples were collected to address the conditions during the 24-hour interval beginning with the burn ignition on the day of the prescribed burn event. A discussion of results relative to smoke impacts and conclusions are presented in Section 5.0.

4.3.5 Development of Decision Rules

The decision rules identified for the program were as follows:

- If measured concentrations of PM_{10} in air are less than established screening levels, then no modifications will be made to future prescribed burn operations.

- If measured concentrations of PM_{10} in air are greater than or equal to established screening levels, then modifications to future prescribed burn operations will be evaluated.

4.3.6 Specification of Limits on Decision Errors

The specification of limits on decision errors discussed in the *Final Prescribed Burn Air SAP* (*SHAW, 2006*) focused on potential outcomes of selected decisions regarding modifications to future

prescribed burns. Decisions regarding future prescribed burns are currently being developed and will be identified at a later date.

4.3.7 Optimization of Investigation Design for Obtaining Data

The investigation performed for the prescribed burn was implemented according to criteria described in the *Final Prescribed Burn Air SAP* (Shaw, *2006; Appendix L*) to optimize the data collection effort. Because the downwind PM_{10} concentration distribution was nonrandom within the study area, a judgmental sampling design was implemented.

The rationale supporting the investigation design focused on the following objectives:

- Obtain samples that confirm the presence or absence of PM_{10}
- Obtain samples that characterize the maximum PM_{10} concentrations in air near the prescribed burn event and in downwind populated areas.

Another element of the optimization process was to consider and respond to, if necessary, the possibility that the location of the highest concentrations of COPCs in air may vary during the event as meteorological conditions evolve throughout the day. This issue was addressed by identifying and establishing six possible candidate stations (MRS16-CS1 through CS6), and selecting two (MRS16-CS2 and MRS16-CS3) prior to the burn ignition based on the preceding day's meteorological conditions.

5.0 CONCLUSIONS

The primary objectives of this investigation were to (1) confirm or refine conclusions drawn from other studies that ground-level concentrations of PM_{10} downwind of the prescribed burn will be below human health-protective regulatory screening levels, and (2) provide data to assess the adequacy of the burn prescription relative to smoke dispersion and downwind impacts.

With regard to the first objective, it is the conclusion of this investigation is that PM_{10} was not observed at any site at concentrations above the screening level during the 24-hour period that included the prescribed burn. Results from station MRS-16-PS5 (Spreckels School) showing concentrations above the California Ambient Air Quality Standard (CAAQS) screening level of 50 micrograms per cubic meter ($\mu g/m^3$) are not considered representative of particulate impacts from the MRS-16 prescribed burn because of the conditions near or adjacent to the site as described in Section 3.1. Those factors, which include an agricultural burn being conducted in the Salinas Valley during the MRS-16 prescribed burn, as well as the station's position adjacent to a plowed agricultural field, indicate the elevated PM_{10} level is not representative of particulates that are only attributable to the MRS-16 prescribed burn. Aerial photographs presented in Figure 6 of the Draft Final Prescribed Burn 2006 MRS-16 After Action Report (Section 1 of this document) illustrate the origin and extent of smoke on the day of the MRS-16 prescribed burn, as well as the nearby agricultural burn.

With regard to the second objective, the available data supports the conclusion that the MRS-16 prescribed burn prescription provided for adequate smoke dispersion and negligible downwind impacts. The data from this investigation will be considered along with visual observations from the burn to allow the Army and its contractors to consider modifications to the burn prescription as appropriate, for future work. The data from this investigation showed that PM_{10} concentrations (the best overall measures of smoke impacts) were below the 24-hour California Ambient Air Quality Standards (CAAQS) at all but

one monitoring site. The value of these data from that monitoring site is suspect in that other sources beyond the MRS-16 prescribed burn likely contributed to the sample.

6.0 REFERENCES

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Agency for Toxic Substances and Disease Registry (2005) *Health Consultation, Former Fort Ord Site*

Shaw Environmental, Inc. (SHAW), 2006. *Final Prescribed Burn Air Sampling and Analysis Plan, Munitions Response Site 16, Former Fort Ord, California*. March.

_____, 2006 *Final Work Plan, MRS-16 Munitions and Explosives of Concern Removal, Former Fort Ord, California*

Harding ESE, Inc. (Harding ESE; formerly Harding Lawson Associates (HLA); now known as MACTEC), 1997 *Chemical Data Quality Management Plan* (CDQMP)

TABLES

Table 1-1. Summary of Sampling and Analytical Methods
MRS-16 Prescribed Burn
Air Monitoring Program
Former Fort Ord, California

Pollutant	Sampling Equipment	Sampling Method	Analytical Method	Quality Assurance / Quality Control		
				Field Duplicates	Field Blanks	Lab QA/QC
Particulate Matter < 10 microns (PM_{10})	Low Volume Sampler with Size-Selective Inlet equipped with Teflon filter (Airmetrics MiniVol)	USEPA Compendium Method IO-2.1, modified for low volume and less than 24 hour sampling	USEPA Compendium Method IO-3.1	One per day of sampling	10%	See Note 1.

N/A Not applicable

Note 1: Laboratory Quality Assurance/Quality Control (QA/QC) samples, at a minimum, will be performed at the frequency specified in the analytical method. Analytical parameters such as initial calibrations and instrument conditions will be in compliance with the acceptance criteria as specified in the analytical method.

Approved by: _____

Reviewed by: _____

Table 1-2. Summary of Sampling Locations and Analytical Results
MRS-16 Prescribed Burn
Air Monitoring Program
Former Fort Ord, California

Station ID	Station Name	Sample Duration (Approx)	Volume (liters)	Volume (m^3)	Results per Filter (mg)	Results per Filter (µg)	Results Per Sampling Interval (µg/m^3)	Calculated Results 24-hr (µg/m^3)	Exceeds CAAQS of 50 µg/m^3
Pre-Selected Sites									
MRS 16 PS1	Marshall Elementary School	8 hr	2,420.6	2.42	0.07	70	28.9	27.4	NO
		16 hr	4,867.4	4.87	0.13	130	26.7		
MRS 16 PS2	Manzanita School	8 hr	2,423.6	2.42	0.08	80	33.0	23.4	NO
		16 hr	4,855.4	4.86	0.09	90	18.5		
MRS 16 PS3	Ingham School	8 hr	2,412.2	2.41	0.07	70	29.0	22.3	NO
		16 hr	4,746.8	4.75	0.09	90	19.0		
MRS 16 PS4	Salinas Rural Fire Department (Portola)	8 hr	2,419.5	2.42	0.13	130	53.7	33.4	NO
		16 hr	4,773.7	4.77	0.11	110	23.0		
MRS 16 PS5	Spreckels School	8 hr	2,385.2	2.39	0.24	240	100.6	63.4	YES
		16 hr	4,715.9	4.72	0.21	210	44.5		
Candidate Stations									
MRS 16 CS2	Del Rey Woods Elementary	8 hr	2,414.8	2.41	0.08	80	33.1	22.0	NO
		16 hr	4,844.3	4.84	0.08	80	16.5		
MRS 16 CS2	Salinas Rural Fire Department (Laureles)	8 hr	2,397.3	2.40	0.05	50	20.9	16.8	NO
		16 hr	4,766.8	4.77	0.07	70	14.7		

Table 1-2. Summary of Sampling Locations and Analytical Results
MRS-16 Prescribed Burn
Air Monitoring Program
Former Fort Ord, California

Station ID	Station Name	Sample Duration (Approx)	Volume (liters)	Volume (m^3)	Results per Filter (mg)	Results per Filter (µg)	Results Per Sampling Interval (µg/m^3)	Calculated Results 24-hr (µg/m^3)	Exceeds CAAQS of 50 µg/m^3
MRS 16 CS3 (dup)	Salinas Rural Fire Department (Laureles)	8 hr	2,411.1	2.41	0.07	70	29.0	19.5	NO
		16 hr	4,773.1	4.77	0.07	70	14.7		
Blank (8-hr interval)	Staging Area	NA	NA	NA	ND (0.05)	NA			NA
Blank (16-hr interval)	Staging Area	NA	NA	NA	ND (0.05)	NA			NA

NA Not applicable
ND None Detected; the value in parentheses is the analytical limit of detection.

Note 1: Candidate Stations were selected for sampling from 6 total candidates (CS1 through CS6)

Approved by: _____

Reviewed by: _____

Table 1-3. Wind Directional Data from Remote Automated Weather Station 2 (RAWS 2), October 19 and 20, 2006*

Date	Time (Pacific Daylight)**	Wind Direction (from, in degrees)
10/19/2006	10:26:00 AM	46
10/19/2006	11:26:00 AM	41
10/19/2006	12:26:00 PM	35
10/19/2006	1:26:00 PM	350
10/19/2006	2:26:00 PM	299
10/19/2006	3:26:00 PM	296
10/19/2006	3:56:00 PM	273
10/19/2006	5:26:00 PM	270
10/19/2006	6:26:00 PM	221
10/19/2006	7:26:00 PM	201
10/19/2006	7:56:00 PM	235
10/19/2006	9:26:00 PM	180
10/19/2006	10:26:00 PM	138
10/19/2006	11:26:00 PM	150
10/19/2006	12:26:00 AM	112
10/19/2006	1:26:00 AM	74
10/20/2006	2:26:00 AM	123
10/20/2006	3:26:00 AM	128
10/20/2006	3:56:00 AM	127
10/20/2006	5:26:00 AM	130
10/20/2006	6:26:00 AM	91
10/20/2006	7:26:00 AM	110
10/20/2006	8:26:00 AM	93
10/20/2006	9:26:00 AM	70
10/20/2006	9:56:00 AM	66
10/20/2006	11:26:00 AM	58

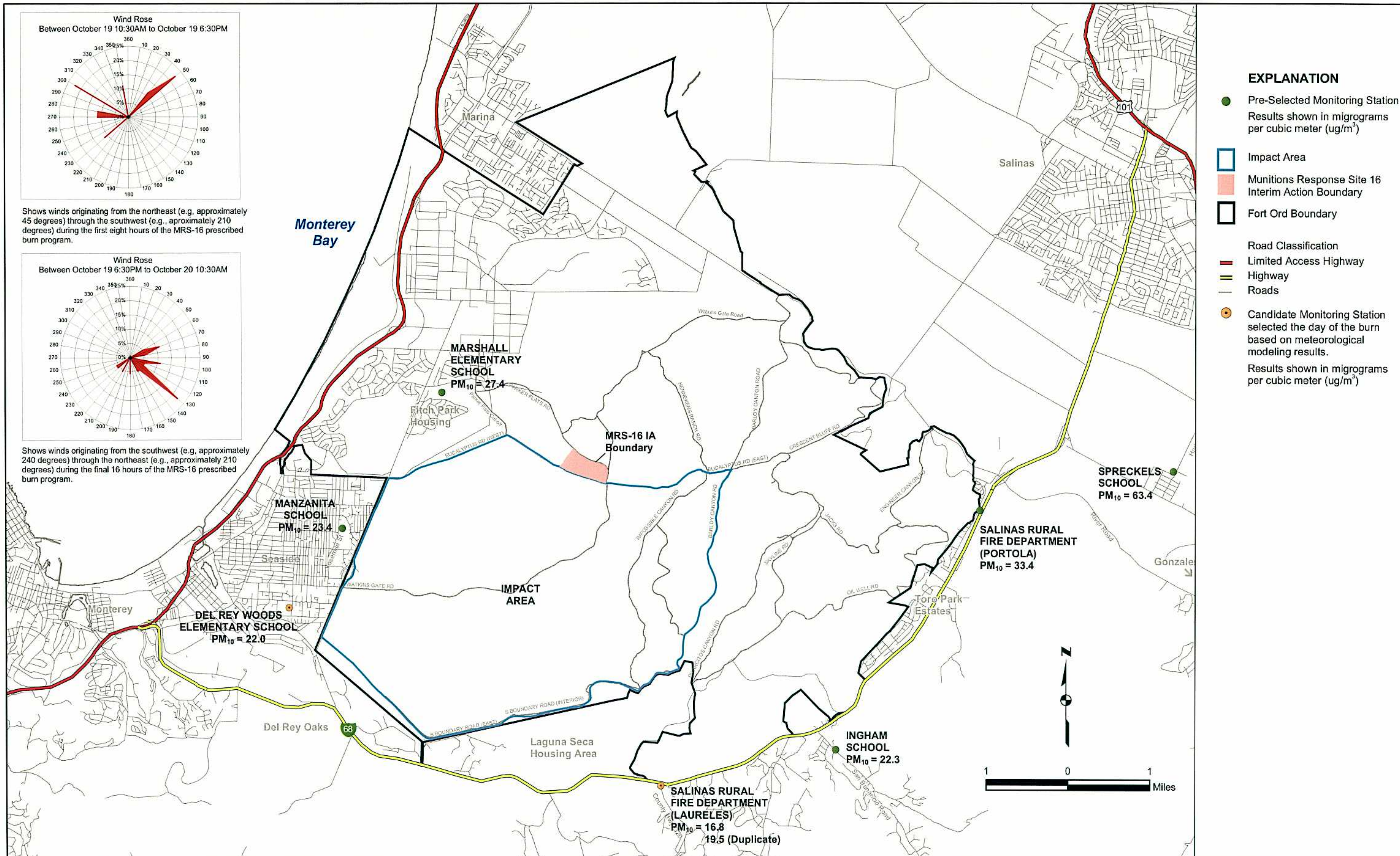
* Based on information provided by Dr. Wendell Nuss, Naval Postgradute School Department of Meteorology, Monterey, California.

** Represents conditions during the air monitoring program which occurred from approximately 10:30 a.m. October 19 through 10:30 a.m. October 20, 2006.

Checked _____

Approved _____

PLATES


Wind Rose
Between October 19 10:30AM to October 19 6:30PM
Shows winds originating from the northeast (e.g, approximately 45 degrees) through the southwest (e.g., aproximately 210 degrees) during the first eight hours of the MRS-16 prescribed burn program.
Wind Rose
Between October 19 6:30PM to October 20 10:30AM
Shows winds originating from the southwest (e.g, approximately 240 degrees) through the northeast (e.g., approximately 210 degrees) during the final 16 hours of the MRS-16 prescribed burn program.
Monterey Bay
Marina
Salinas
MARSHALL ELEMENTARY SCHOOL
PM10 = 27.4
Fitch Park Housing
MRS-16 IA Boundary
MANZANITA SCHOOL
PM10 = 23.4
Seaside
IMPACT AREA
Monterey
DEL REY WOODS ELEMENTARY SCHOOL
PM10 = 22.0
Del Rey Oaks
Laguna Seca Housing Area
SALINAS RURAL FIRE DEPARTMENT (LAURELES)
PM10 = 16.8
19.5 (Duplicate)
INGHAM SCHOOL
PM10 = 22.3
SALINAS RURAL FIRE DEPARTMENT (PORTOLA)
PM10 = 33.4
SPRECKELS SCHOOL
PM10 = 63.4
Toro Park Estates
Gonzales
1 0 1 Miles
EXPLANATION
Pre-Selected Monitoring Station
Results shown in migrograms per cubic meter (ug/m3)
Impact Area
Munitions Response Site 16 Interim Action Boundary
Fort Ord Boundary
Road Classification
Limited Access Highway
Highway
Roads
Candidate Monitoring Station selected the day of the burn based on meteorological modeling results.
Results shown in migrograms per cubic meter (ug/m3)

DRAWN: TJH	PROJECT NO: 4088053164 10.4	MACTEC	Munitions Response Site (MRS) 16 Prescribed Burn Air Monitoring Report Former Fort Ord, California	PM$_{10}$ Sampling Results Munition Response Site16
ENGINEER:	SCALE: AS SHOWN			PLATE
CHECKED: JG	APPROVED: BLW			1-1
DATE: 1/2007	DATE: 4/24/07			

PM10Results.mxd- 2/22/07

APPENDIX A

FIELD SAMPLING FORMS

Checked by: BCW

MINIVOL SAMPLING FIELD DATA FORM

SITE: FORT ORD, CA / SALINAS FD laureles (DUP)

PROJECT: MRS-16 Pres. Burn | TECHNICIAN: TOM GHIGLIOTTO

START DATE: 10/19/06 | STOP DATE:

SAMPLER ID	START TIME	STOP TIME	FILTER NUMBER	FLOWMETER START	FLOWMETER STOP
4333	PST 10:58:00 AM Elapsed Time Indicator 0.3	PST 7:01:07 PM Elapsed Time Indicator 8.4	CS3CTF 16593A	4.75	4.75
4333	PST 7:02:30 Elapsed Time Indicator 8.4	PST 10:58:00 AM Elapsed Time Indicator 24.3	CS3CTF 16594B	4.75	4.75
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			

COMMENTS:

NO CONSTRUCTION ACTIVITIES. LAGUNA SECA HAS A RACING EVENT 10/19/06 & 10/20/06

MINIVOL SAMPLING FIELD DATA FORM

SITE: FORT ORD, CA / SALINAS FD LAURELES

PROJECT: MRS-16 Prns. Burn | TECHNICIAN: Tom ChiglioTTO

START DATE: 10/19/06 | STOP DATE:

SAMPLER ID	START TIME	STOP TIME	FILTER NUMBER	FLOWMETER START	FLOWMETER STOP
4332	PST 10:58:05 AM Elapsed Time Indicator 0.1	PST 6:59:10 PM Elapsed Time Indicator 8.2	CS3PTF 16591A	4.75	4.75
4332	PST 7:00:39 PM Elapsed Time Indicator 8.2	PST 10:58:05 AM Elapsed Time Indicator 24.1	CS3PTF 16592B	4.75	4.75
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			

COMMENTS:

No Construction Activities. Laguna Seca has a Racing event 10/19/06 & 10/20/06

MINIVOL SAMPLING FIELD DATA FORM

SITE: Fort Ord, CA / Del Rey Woods	
PROJECT: MRS-16 Pres. Burn	**TECHNICIAN:** Tom [illegible]
START DATE: 10/19/06	**STOP DATE:**

SAMPLER ID	START TIME	STOP TIME	FILTER NUMBER	FLOWMETER START	FLOWMETER STOP
4334	PST 10:41:43 am Elapsed Time Indicator 0.2	PST 6:41:45 pm Elapsed Time Indicator 8.2	CS2PTF 16589A	5	5
4334	PST 6:42:45 pm Elapsed Time Indicator 8.2	PST 10:41:45 Elapsed Time Indicator 24.1	CS2PTF 16590B	5	5
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			

COMMENTS: No School This Week. No Construction Activities Noticed in the Area.

MINIVOL SAMPLING FIELD DATA FORM

SITE: Ft Ord / CA — Marshall Elementary

PROJECT: MRS-16 Prescribed Burn — TECHNICIAN: Matt Walraven

START DATE: 10/19/06 — STOP DATE: 10/20/06

SAMPLER ID	START TIME	STOP TIME	FILTER NUMBER	FLOWMETER START	FLOWMETER STOP
4249	PST 10:57:57 10/19/06 Elapsed Time Indicator 1.3	PST 18:59:55 10/19/06 Elapsed Time Indicator 9.3	~~PS1PTF16594A~~ PS1PTF16579A	(5.0)	(5.0)
4249	PST 19:01:05 10/19/06 Elapsed Time Indicator 9.3	PST 10:57:57 10/20/06 Elapsed Time Indicator 25.3	PS1PTF16580B	(5.0)	(5.0)
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			

COMMENTS:

10/19 10:57 Smoke is visible ~~in~~ moving along canyon to the south. No smoke or smell at Marshall.

10/20 11:00 Another vehicle is parked in the gravel area near the sampler - potential to contribute to particulate loading for this sample.

MINIVOL SAMPLING FIELD DATA FORM

SITE: Ft Ord / CA — MANZANITA ELEMENTARY

PROJECT: MRS-16 PRESCRIBED BURN — TECHNICIAN: MATT WALRAVEN

START DATE: 10/19/06 — STOP DATE: 10/20/06

SAMPLER ID	START TIME	STOP TIME	FILTER NUMBER	FLOWMETER START	FLOWMETER STOP
M 4331	PST 10:42:02 10/19/06 Elapsed Time Indicator 0.3	PST 18:43:25 10/19/06 Elapsed Time Indicator 8.3	PS2PTF16581A	(4.5)	(4.5)
4331	PST 18:44:00 10/19/06 Elapsed Time Indicator 8.3	PST 10:42:45 10/20/06 Elapsed Time Indicator 24.3	PS2PTF16582B	(4.5)	(4.5)
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			

COMMENTS:

MINIVOL SAMPLING FIELD DATA FORM

SITE: Fort Ord MRS-16 Burn Salinas FD Portola

PROJECT:

TECHNICIAN: B Wilcer

START DATE: 10/19/06

STOP DATE:

SAMPLER ID	START TIME	STOP TIME	FILTER NUMBER	FLOWMETER START	FLOWMETER STOP
4335	PST 10:56 Elapsed Time Indicator 0.2	PST 7:03 PM Elapsed Time Indicator 8.4	PS4PTF165585A	4.5	4.5
4335	PST 7:05 pm Elapsed Time Indicator 8.4	PST 11:06 Elapsed Time Indicator 24.4	PS4PTF165586B	4.5	4.5
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			

COMMENTS:

Site Conditions:

10:56 Building is in process of re-roof, substrate exposed, no tar paper or roof tiles on. Visible smoke towards Salinas Valley, very slight smoke odor

19:06 Calm, noticable smoke smell, but not strong

10/20/06 11:09 Calm, Warm, roofers on site Sub roof still exposed

MINIVOL SAMPLING FIELD DATA FORM

SITE: Fort Orol MRS-16 Burn Ingram School

PROJECT: TECHNICIAN: Bruce Wilcer

START DATE: 10/19/06 STOP DATE:

SAMPLER ID	START TIME	STOP TIME	FILTER NUMBER	FLOWMETER START	FLOWMETER STOP
4337	PST 10:42 Elapsed Time Indicator 0.4	PST 6:46 PM Elapsed Time Indicator 8.4	PS3PTF16583A	4.5	4.5
4337	PST 6:49 PM Elapsed Time Indicator 8.4	PST 10:42 Elapsed Time Indicator 24.3	PS3PTF16584B	4.5	4.5
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			

COMMENTS:

10/19 Site conditions @ 8:32 clear, chilly ~~etc~~ calm wind

18:50 Calm, very slight smoke odor

10/20 10:45 Site conditions: clear, warm, no smoke odor.

MINIVOL SAMPLING FIELD DATA FORM

SITE: Fort Ord MRS-6 Burn — Spreckels School

PROJECT: — TECHNICIAN: B. Wilcox

START DATE: 10/19/06 — STOP DATE:

SAMPLER ID	START TIME	STOP TIME	FILTER NUMBER	FLOWMETER START	FLOWMETER STOP
4336	PST 11:18 Elapsed Time Indicator 1.1	PST 7:22 PM Elapsed Time Indicator 9.2	PS5 PTF 16587A	4.5	4.5
4336	PST 7:25 pm Elapsed Time Indicator 9.2	PST 11:28 Elapsed Time Indicator 25.2	PS5 PTF 16588B	4.5	4.5
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			
	PST Elapsed Time Indicator	PST Elapsed Time Indicator			

COMMENTS:

11:19 Site Conditions Warm, calm gentle breeze Variable, kids playing ball on field ~ 30' away, plowed field across the street, smoke throughout the valley active burn to north in hills, slight smoke odor.

19:20 Some smoke odor, not strong.

APPENDIX B

FIELD SAMPLING NOTES

Checked by: DLW

Eshwb Suites
Web Cam

John Bartlet 831 970-3600
Bob Nunes

Sheet 1 of 1

Project: Ft Ord Pres Burn Job No.: 408805 3164 09.#
Subject: FIELD INVESTIGATION DAILY REPORT Date: 10/19/06
Equipment Rental: _____ Company: _____ To: B. Wilcer
Equipment Hours: _____ F.E. Time from: _____ to: _____ By: M. Walraven

(outside service and expense record must be attached for any outside costs)

0730 T = 48.6°F, RH = 52.5%, 29.95" Hg, 3.6 mph-E
0815 At Manzanita School - set up, call to B. Wilcer - no radio. - standby
1010-1015 Test Burn - successful, active ignition appears imminent
1020 T = 75.5°F, RH = 31.4%, 30.09" Hg, 2.8 mph NW
1042 Start Minivol # 4331, mob to Marshall
1057 Start Minivol # 4249,
1100 T = 76.9°F, RH = 24.9%, 30.08" Hg, 2.0-4.5 mph E
- smoke plume visible to the south, moving westward (towards Monterey)
- no visible smoke in Marshall school canyon, no odor
1233 SHAW WAREHOUSE:
- T = 78.2°F, RH = 21.9%, 30.08" Hg, 5.9 mph ENE
1844 Change filter & battery at Manzanita - mob To Marshall
1843 T = 62.4°F, RH = 58.8%, 30.09" Hg, 0-1.0 mph WSW
1859 Change filter & battery at MARSHALL
1904 T = 58.2°F, RH = 66.6%, 30.09" Hg, 2.9 mph ~~SW~~ SE (2)

Attachments:

Initial

29.97 150'

Sheet ____ of ____

Project: Ft Ord Presc. Burn Job No.: 4088053164 09.5
Subject: FIELD INVESTIGATION DAILY REPORT Date: 10/30/06
Equipment Rental: ____ Company: ____ To: B. Wilcer
Equipment Hours: ____ F.E. Time from: ____ to: ____ By: M. Walraven

(outside service and expense record must be attached for any outside costs)

10:39 T = 75.2°F, RH = 25.5%, 29.97" Hg, 8 mph ENE
10:42 Shut off minivol @ Manzanita
- tear down station
10:57 Shut off minivol @ Marshall
- tear down station
T = 75.1°F, RH = 24.1%, 29.97" Hg, 0-4.1 mph NE
11:15 Post calibrate
Clean instruments
Pack Samples
Pack for demob
14:00 Demob

Attachments:

Initial

Fort Ord MRS-16 Burn Field Program

Date	Prepared By	Work Paper No.
10/19/06	BLW	1 of
	Reviewed By	

0600 Travel to Fort Ord,
-0830 Sign in @ Shaw

0900 Met w/ Gail Y to review MMS model for 10/19/06. 1800 & 2000 time increments not showing, currently under development

0920 Left message w/ Dick Lindt @ NPS need to speak to him re: model modifications

0930 - 1145 Equip setup & model check in Staging Area

HAS discussion: Largely driving & traffic concerns, review hazard analysis sheet

Notifications to Carlos Pina (MPUSD)
to John Bartlett (Engineer)
" Mike Urquides (Salinas FD)
Dr Kahn (Spreckels)

1145 - 1245 Lunch

1245 - 300 Continue setup, select 2 candidate sites (Del Rey Woods & Salinas FD Laureles)

* Paralta well was eliminated from consideration because of heavy road grading & construction activities in immediate area.

Fort Ord MRS 16 Prescribed Burn

Date	Prepared By	Work Paper No.
10/19/06	B. Wilcox	1 of 2
	Reviewed By	

06:45 Arrive @ Shaw yard, finish setup
07:45 Mobilize to 1st site - Ingham School
08:15 At Ingham, waiting for word that full ignition has occurred.

Site conditions: clear, chilly, calm wind
10:12 Waiting for word that full ignition has begun, nothing yet.

10:42 Start Ingham.
10:54 At Salinas FD Portola - setup.
11:05 Setup at Speckels
Photos 1st Ingham sampling station
2nd Speckels Station facing approx NE shows station & active burn
3rd 4th 5th panorama shot of burn @ Speckels

11:35 leave Speckels for Shaw shop.
Photos 6 & 7 In Speckels facing MRS-16 Burn.

11:50 Photos 8 & 9 At Merrill Ranch looking towards MRS-16 Burn
12:00 At Ord Market
10 & 11: 2 shots towards MRS-16

12:10 At Shaw yard

Date	Prepared By	Work Paper No.
10/19/06	B. Wilcox	2
	Reviewed By	

12:10 - 13:00 process, legerwork
13:00 - 13:30 lunch
13:30 - 16:00 Stop by BAAC office to get update discuss project w/ team, check sampling stations All stations OK, little to no smoke odor
16:00 - 17:50 prep for PM samples
17:50 - 18:50 process Ingram School, slight smoke odor
18:50 - 19:10 process Salinas FD Portola noticable smoke smell, but not strong
19:10 - 19:50 process Spreckels School Reservation Road corridor very smoky odor approx. 2 miles from Blanco (east) to ~ ½ mile from Injin.
19:50 - 20:05 Process samples at Shaw yard, leave.

Fort Ord MRS-16 Prescribed Burn

Date	Prepared By	Work Paper No.
10/20/06	B. Wilcox	1 of 1
	Reviewed By	

08:00 Mobilize to Shaw Yard, start demobe.
10:00 Leave for Ingham School to remove station
10:50 Leave for Salinas FD Portola to remove Station
11:10 Leave for Spreckels School to remove Station
11:45 Return to Shaw Yard to finish demobe
17:00 Leave FO for Novato
19:30 Arrive in Novato

Sheet 1 of 1

Project: FO MRS-16 Prescribed Burn - Monitoring Job No.: 4088053164 09.2
Subject: FIELD INVESTIGATION DAILY REPORT Date: 8/3/06
Equipment Rental: ______ Company: ______ To: File
Equipment Hours: ______ F.E. Time from: ______ to: ______ By: BLW

(outside service and expense record must be attached for any outside costs)

08:00 Begin Setup @ Shaws Yard; clean & place Tables, chairs, equipment
Minivol Inventory

Unit Number	Batteries
SN 4335	3771, 3772
SN 4336	3769, 3770
SN 4333	3518, 3519
SN 4337	3773, 3774
SN 4332	3765, 3766
SN 4330	3777, 3778
SN 4249	3775, 3776
SN 4334	3767, 3768
SN 4331	3779, 3780

10:30 Start Calibration of Units
- Used Datachem filter # PTFE 16578 for task - not suitable for future sample media - test filter
- Temp = 56°F, Press = 29.39 in Hg

Calc ΔH Goal: $T = 56°F = 286.49°K$
$P = 29.39 \text{ in Hg} = 746.51 \text{ mm Hg}$

$\frac{746.51}{286.49} \times 0.619807 = 1.615$ in H_2O on Digital manometer

11:45 Finish calibration
12:00 - 14:00 BLW lunch/meeting w/ D. Eizan Korbay & T Gigliotto get fence
14:00 - 17:00 ~~5:00~~ Set up fencing: ~~[illegible]~~ MRS16 - PS1 through PS5
17:00 - 19:30 Finish, travel to Novato.

Attachments: *Note: Sprinkler too close @ Ingham (PS3) Fence & potential dusty area @ Spreckels (PS5) Initial BLW

Harding Lawson Associates

Date	Prepared By	Work Paper No.
6/20/06	B. Wilcox	1
	Reviewed By	

Revised)

(831) 212-4443

6/20/06 Tuesday

Fort Ord Fields Recon w/ Doug Cover (ESA)

At Shaws compound - 2nd Bay available

- Need 2 long tables
- Check with Shaw how many fence enclosures?
- Bring Halogen light also

09:20 At Marshall Park: site is uneven, need fence

Cleared area available corner of Malmedy & Kalbor

Photo 1 looking SE

2 looking ~E

09:40 At Marshall school possible site in visitor parking area or grass strip in front parking Area (both better than play structure) - need fence

Photo 3 looking S at v.s. parking

4 " W at main parking & grass

09:55 Marzanita - need to talk to Lisa Burns

Rear of Play Area looks better than former garden area - need fence

Photo 5 looking east at location

6 " " " " with building to right

10:15 At Parallon Well

Large tree downwind (OK), uneven, setup in SE corner Photo 7 looking ~~South~~ into corner

8 " West at enclosure

no fence needed

Date	Prepared By	Work Paper No.
6/20/06	B. Wilcox	2
	Reviewed By	

10:40 At Adventist School - Locked
Photo 9 Facing south looking into ~~playground~~ main ground
10 " SW looking into playground
Area looks OK - need fence -
Area between Mescal & GVM Blvd very narrow, in low area - lot of traffic
Could go between Mescal & playground fence if necessary
Possible alternate: Del Rey Woods school - parking lot closest to east edge of property Intersection of Plumas & Noche Buen
12:00 At SBFD Laureles Good open area in front (wood chip area)
need fence - did not make contact w/ Captain
Photo 11 Looking SW chip area for station
12 " SE " " " " doors in background

12:30 At Ingham Mr. Baggese gates open 6:30 Am to 9:00 PM
They will get us a key, Lock gate
Summer school through 7/20, 8/23 resume
John Bartlett - custodian
Two keys ABG (gate) 2004 key (enclosure)
13
14

13:12 At Toro Park Site: 40 - 50 yards from residents to the east, good open area to the west (see BLM Training for location)
15 Facing West looking away from site
16 " East looking at adjacent residence
Site is just NE of intersection of Trail #45 and perimeter road.

Date	Prepared By	Work Paper No.
6/29/06	B. Wilcox	3
	Reviewed By	

13:30 Salinas Rural FD Portola
New Chief Mike Urquides (831) 455-1828
Selected some location (need fence)
Photo 17 Approx SW Wood chip area from near visitor entrance
18 " WNW Wood chip area facing station entrance

13:55 At Buena Vista
Eric Tarallo (Principal)
8-4:30 Summer 8-5:00 N. flat Custodian until 7-10 during school year
Aug 23 school starts

Photo 19 Facing N.West sampling area on brown grass (field is irrigated)
Photo 20 Facing N.West slightly north additional nearby buildings (need fence)

14:25 At Spreckles School
Area behind backstop at field bordered on west by Hatton / Hawkin (need fence)
Photo 21 Looking NE at site
22 Looking SW at site w/building in background.
Carol Johnson (Principal)
Need to call Dr. Harold Kahn Superintendent
(831) 455-2550 ext: 816
Office is closed last two weeks in July (after 7/14)
Will need to call Dr. Kahn after 7/14
Joseph Gonzales (maint director)
15:00 Leave for Novato

Shaw Shaw Environmental, Inc.

FIELD ACTIVITY DAILY LOG

Daily Log | Date: 10 | 19 | 06 | No. | | | | Sheet 1 of 1

PROJECT NAME: FORT ORD, CA

Project Number: 783751

FIELD ACTIVITY SUBJECT: QC

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS:

0600 - TBSM

0630 - Set up for the day

0700 - Load Equipment, Matt is loading filter

0805 - Arrive @ Del Rey Woods, Set up SN: 4334 w/ Filter 16589A. Spoke with Janitors to let them know we are Sampling They were not aware of why I was here So I explained. Will wait for call to proceed.

0930 - Still Waiting for better Wind Conditions to ignite Test Fire.

1040 - Start 1st Sample @ Del Rey Wood ES

1058 - Start 2nd Sample & Dup @ Laureles FD. Will mob back & Start periodic checks

1300 - All pumps Running. Set up 6PS to Shoot in Marshall, Del Rey Woods, Laureles FD & Spreckels.

1600 - Back @ Shaw download 6PS. Corrected file & Sent to Bruce, Paperwork.

1815 - Set out to Switch Filters & Batteries

1841 - Change out @ Del Rey Woods

Shaw - Klak-Bisfoot Dan 3 - Vince 4 Steve 5

Kevin-2 Val-1

VISITORS ON SITE:

Marc Edwards

Clinton Huckins

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:

N/a

WEATHER CONDITIONS:

52 TO 71

P.C. / Clear

IMPORTANT TELEPHONE CALLS:

N/a

SHAW PERSONNEL ON SITE.

SIGNITURE: Jon

DATE: 10 | 19 | 06

Shaw™ Shaw Environmental, Inc.

FIELD ACTIVITY DAILY LOG

K1

Daily Log	Date:	10	20	06
	No.			
	Sheet		Of	

PROJECT NAME: FORT ORD, CA

Project Number: 783751

FIELD ACTIVITY SUBJECT: QC / Air Monitoring

DESCRIPTION OF DAILY ACTIVITIES AND EVENTS,

0630- TBSM
0700- Set out to check Air Monitor Stations
0830- Back @ office
0900- Load up Equipment, prepare to collect Samples.
1015- Set out to collect Samples.
1041- Begin @ Del Rey Woods.
1100- Collect @ Salinas Laureles FD. Mob back to office.
1130- Relinquish Samples & paperwork to MATT, Depart Site.

VISITORS ON SITE:

CHANGES FROM PLANS AND SPECIFICATIONS, AND OTHER SPECIAL ORDERS AND IMPORTANT DECISIONS:

WEATHER CONDITIONS:
54 TO 71
Clear

IMPORTANT TELEPHONE CALLS:

SHAW PERSONNEL ON SITE:

SIGNITURE:

DATE:

APPENDIX C

LABORATORY DATA REPORT

Checked by: BCW

DATA CHEM LABORATORIES, INC.

Submitted To:
Scott Tucker
Mactec
5341 Old Redwood Highway
Petaluma, CA
94954

Reference Data:	**PM-10 Particulates**
Sample Location:	Ft Ord Prescribed Burn;
Job No.:	4088053164 09.4
Sample Type:	Filter
Client Sample No.:	PS1PTF16579A through CS7BTF16596B
P.O. No.:	Not Available
Method Reference:	PM-10 by NIOSH 0500
Sample Set ID No.:	06-W-5783
DATACHEM Lab No.:	06-40082 through 06-40099
Sample Receipt Date:	10/25/2006
Analysis Date:	11/1/2006

The samples were analyzed in accordance with PM-10 by NIOSH method 0500.

Sample condition was acceptable upon receipt except where noted.

The results are provided in the enclosed data table. Results relate only to the items tested and are not blank corrected unless indicated in the data table.

This report shall not be reproduced except in full, without the written approval of the laboratory.

Rob Nieman
Analyst

Reviewer

Reviewed by: 11/6/06

CINCINNATI OFFICE
4388 GLENDALE-MILFORD ROAD
CINCINNATI, OHIO 45242-3706
513 733-5336, FAX 513 733-5347

WEST COAST OFFICE
11 SANTA YORMA COURT
NOVATO, CALIFORNIA 94945
800 280-8071, FAX 415 893-9469

Results
PM-10 Particulates

Client #	DCL #	Sample Volume (L)	mg/sample	mg/m^3
PS1PTF16579A	06-40082	2420.6	**0.07**	**0.03**
PS1PTF16580B	06-40083	4867.4	**0.13**	**0.027**
PS2PTF16581A	06-40084	2423.6	**0.08**	**0.03**
PS2PTF16582B	06-40085	4855.4	**0.09**	**0.02**
PS3PTF16583A	06-40086	2412.2	**0.07**	**0.03**
PS3PTF16584B	06-40087	4746.8	**0.09**	**0.02**
PS4PTF16585A	06-40088	2419.5	**0.13**	**0.054**
PS4PTF16586B	06-40089	4773.7	**0.11**	**0.023**
PS5PTF16587A	06-40090	2385.2	**0.24**	**0.10**
PS5PTF16588B	06-40091	4715.9	**0.21**	**0.045**
CS2PTF16589A	06-40092	2414.8	**0.08**	**0.03**
CS2PTF16590B	06-40093	4844.3	**0.08**	**0.02**
CS3PTF16591A	06-40094	2397.3	**0.05**	**0.02**
CS3PTF16592B	06-40095	4766.8	**0.07**	**0.01**
CS3PTF16593A	06-40096	2411.1	**0.07**	**0.03**
CS3PTF16594B	06-40097	4773.1	**0.07**	**0.01**
CS7PTF16595A	06-40098	2400.0	ND	<0.02
CS7PTF16596B	06-40099	4800.0	ND	<0.01
EQL			**0.05**	

ND indicates not detected at or above the estimated quantitation limit (EQL).

Rob Nieman
Analyst

Reviewer

Air Sampling Data Log

MACTEC

06-W-5783

Client: Ft Ord Prescibed Burn

MACTEC Job Number: 4088053164 09.4

Date: 10/19 - 10/20/06

Building: _____ Area _____

Rotometer Number: Air Metrics MNF1162

Name or Location	SS# or ID# or Description	Sample Type or Analyte	Sample #	Start Date	Stop Date	Start Time	Stop Time	Total Time (minutes)	Start Rate	Stop Rate	Average Rate (l / min)	Volume (liters)	Turn Around Time
MRS16-PS1	Marshall Elementary 40082	PM10	PS1PTF165979A	10/19/2006	10/19/2006	10:58	19:00	482	4.99	5.05	5.02	2,420.6	Normal
MRS16-PS1	Marshall Elementary 40083	PM10	PS1PTF165980B	10/19/2006	10/20/2006	19:01	10:58	957	5.05	5.12	5.09	4,867.4	Normal
MRS16-PS2	Manzanita 40084	PM10	PS2PTF165981A	10/19/2006	10/19/2006	10:42	18:43	481	4.99	5.04	5.04	2,423.6	Normal
MRS16-PS2	Manzanita 40085	PM10	PS2PTF165982B	10/19/2006	10/20/2006	18:44	10:43	959	5.04	5.09	5.06	4,855.4	Normal
MRS16-PS3	Ingham 40086	PM10	PS3PTF165983A	10/19/2006	10/19/2006	10:42	18:46	484	4.99	4.98	4.98	2,412.2	Normal
MRS16-PS3	Ingham 40087	PM10	PS3PTF165984B	10/19/2006	10/20/2006	18:49	10:42	953	4.98	4.98	4.98	4,746.8	Normal
MRS16-PS4	Salinas FD Portola 40088	PM10	PS4PTF165985A	10/19/2006	10/19/2006	10:56	19:03	487	4.99	4.97	4.97	2,419.5	Normal
MRS16-PS4	Salinas FD Portola 40089	PM10	PS4PTF165986B	10/19/2006	10/20/2006	19:05	11:08	963	4.97	4.95	4.96	4,773.7	Normal
MRS16-PS5	Spreckels 40090	PM10	PS5PTF165987A	10/19/2006	10/19/2006	11:18	19:22	484	4.99	4.93	4.93	2,385.2	Normal
MRS16-PS5	Spreckels 40091	PM10	PS5PTF165988B	10/19/2006	10/20/2006	19:25	11:28	963	4.93	4.87	4.90	4,715.9	Normal
MRS16-CS2	Del Rey Woods 40092	PM10	CS2PTF165989A	10/19/2006	10/19/2006	10:42	18:42	480	4.99	5.03	5.03	2,414.8	Normal
MRS16-CS2	Del Rey Woods 40093	PM10	CS2PTF165990B	10/19/2006	10/20/2006	18:43	10:42	959	5.03	5.07	5.05	4,844.3	Normal
MRS16-CS3	Salinas FD Laureles 40094	PM10	CS3PTF165991A	10/19/2006	10/19/2006	10:58	18:59	481	4.99	4.98	4.98	2,397.3	Normal
MRS16-CS3	Salinas FD Laureles 40095	PM10	CS3PTF165992B	10/19/2006	10/20/2006	19:01	10:58	957	4.98	4.98	4.98	4,766.8	Normal
MRS16-CS3	Salinas FD Laureles (Dup) 40096	PM10	CS3CTF165993A	10/19/2006	10/19/2006	10:58	19:01	483	4.99	4.99	4.99	2,411.1	Normal
MRS16-CS3	Salinas FD Laureles (Dup) 40097	PM10	CS3CTF165994B	10/19/2006	10/20/2006	19:02	10:58	956	4.99	4.99	4.99	4,773.1	Normal
MRS16-CS7	Station B 40098	PM10	CS7BTF165995A	10/19/2006	10/19/2006	10:30	18:30	480	5.00	5.00	5.00	2,400.0	Normal
MRS16-CS7	Station B 40099	PM10	CS7BTF165996B	10/19/2006	10/20/2006	18:30	10:30	960	5.00	5.00	5.00	4,800.0	Normal

Chain of Custody	Time	Date
Reliquished by:	15:30	10/24/06
Received by:	10/25/06	0934
Reliquished by:		
Received by:		

Collected By: Matthew Waldhuien

Notes: Retain samples following PM10 analyses.

Subsequent analyses may be required

Phone: (707) 793-3886

MHW -MACTEC
10192006

2006_Ft Ord COC.xls

ClientID	LabID	SDGID	MthRef	Matrix	Analyte	Reuslt	units	RptLmt	CAS#	SmpRec	SampExt	SmpAnl	Comments
PS1PTF16579A	06-40082	06W5783	PM-10	Air	PM-10	0.07	mg	0.05	NA	10/25/06	NA	11/1/06	
PS1PTF16580B	06-40083	06W5783	PM-10	Air	PM-10	0.13	mg	0.05	NA	10/25/06	NA	11/1/06	
PS2PTF16581A	06-40084	06W5783	PM-10	Air	PM-10	0.08	mg	0.05	NA	10/25/06	NA	11/1/06	
PS2PTF16582B	06-40085	06W5783	PM-10	Air	PM-10	0.09	mg	0.05	NA	10/25/06	NA	11/1/06	
PS3PTF16583A	06-40086	06W5783	PM-10	Air	PM-10	0.07	mg	0.05	NA	10/25/06	NA	11/1/06	
PS3PTF16584B	06-40087	06W5783	PM-10	Air	PM-10	0.09	mg	0.05	NA	10/25/06	NA	11/1/06	
PS4PTF16585A	06-40088	06W5783	PM-10	Air	PM-10	0.13	mg	0.05	NA	10/25/06	NA	11/1/06	
PS4PTF16586B	06-40089	06W5783	PM-10	Air	PM-10	0.11	mg	0.05	NA	10/25/06	NA	11/1/06	
PS5PTF16587A	06-40090	06W5783	PM-10	Air	PM-10	0.24	mg	0.05	NA	10/25/06	NA	11/1/06	
PS5PTF16588B	06-40091	06W5783	PM-10	Air	PM-10	0.21	mg	0.05	NA	10/25/06	NA	11/1/06	
CS2PTF16589A	06-40092	06W5783	PM-10	Air	PM-10	0.08	mg	0.05	NA	10/25/06	NA	11/1/06	
CS2PTF16590B	06-40093	06W5783	PM-10	Air	PM-10	0.08	mg	0.05	NA	10/25/06	NA	11/1/06	
CS3PTF16591A	06-40094	06W5783	PM-10	Air	PM-10	0.05	mg	0.05	NA	10/25/06	NA	11/1/06	
CS3PTF16592B	06-40095	06W5783	PM-10	Air	PM-10	0.07	mg	0.05	NA	10/25/06	NA	11/1/06	
CS3PTF16593A	06-40096	06W5783	PM-10	Air	PM-10	0.07	mg	0.05	NA	10/25/06	NA	11/1/06	
CS3PTF16594B	06-40097	06W5783	PM-10	Air	PM-10	0.07	mg	0.05	NA	10/25/06	NA	11/1/06	
CS7PTF16595A	06-40098	06W5783	PM-10	Air	PM-10	ND	mg	0.05	NA	10/25/06	NA	11/1/06	
CS7PTF16596B	06-40099	06W5783	PM-10	Air	PM-10	ND	mg	0.05	NA	10/25/06	NA	11/1/06	

MACTEC
MACTEC Engineering and Consulting, Inc.
5341 Old Redwood Highway, Suite 300
Petaluma, CA 94954

JOB NO. 4088053164 SHEET 1 OF 1
PHASE DATA VALIDATION TASK 10.1
JOB NAME 2006 FT ORD PRES. BURN AIR MONITORING
BY M. WALRAVEN DATE 11/16/06
CHECKED BY S. TUCKER DATE 11/16/06

$$\left(\frac{X\,mg}{L_T}\right)\left(\frac{1{,}000\,\mu g}{mg}\right) = \frac{\mu g}{L} = \frac{mg}{m^3}$$

$\Rightarrow$ PS1PTF16579A $\Leftrightarrow$ $\left(\frac{0.07\,mg}{2420.6\,L}\right)\left(\frac{1{,}000\,\mu g}{mg}\right) = 0.0289\,\frac{mg}{m^3} \cong \frac{0.03}{0.02}\,\frac{mg}{m^3}$

GIVEN:

$\frac{1\,\mu g}{L} = \frac{1\,mg}{m^3}$

$1\,mg = 1{,}000\,\mu g$

X = mg/sample

L_T = Sample Volume (LITERS)

Volume	Result	mg/m^3	
2,420.6	0.07	0.029	0.03
4,867.4	0.13	0.027	0.03
2,423.6	0.08	0.033	0.03
4,855.4	0.09	0.019	0.02
2,412.2	0.07	0.029	0.03
4,746.8	0.09	0.019	0.02
2,419.5	0.13	0.054	0.05
4,773.7	0.11	0.023	0.02
2,385.2	0.24	0.101	0.10
4,715.9	0.21	0.045	0.04
2,414.8	0.08	0.033	0.03
4,844.3	0.08	0.017	0.02
2,397.3	0.05	0.021	0.02
4,766.8	0.07	0.015	0.01
2,411.1	0.07	0.029	0.03
4,773.1	0.07	0.015	0.01
2,400.0	ND	BLANK	BLANK
4,800.0	ND	BLANK	BLANK

$$\frac{(result)}{(volume)} * 1{,}000 = \frac{mg}{m^3}$$

11/16/06

DCLSet#	Sample #	Client	Method	Acct
06-W-5783	06-40082 → 40099	Medic	PM-10 by NIOSH 0600	5010
06-W-5852	06-40502 → 40507	EORM	NIOSH 0500	5010
06-W-5884	06-40770 → 40773	Energy Sols.	" "	5004
06-W-5892	06-40843 → 40853	EORM	" "	5010

0.05 mg/sample for PTFE + PVC

PQL = 0.10 mg/sample for MCE

Balance # 108464

Sample #	Final wt (g)		for 11/1/06 ~~Sample~~ Initial wt (g)	Δg
40082 (PTFE 16579)	0.07112	Dup=0.07112	0.07105	0.00007 ✓
40083 (PTFE 16580)	0.06789		0.06776	0.00013 ✓
40084 (PTFE 16581)	0.06910		0.06902	0.00008 ✓
40085 (PTFE 16582)	0.07219		0.07210	0.00009 ✓
40086 (PTFE 16583)	0.07361		0.07354	0.00007 ✓
40087 (PTFE 16584)	0.07203		0.07194	0.00009 ✓
40088 (PTFE 16585)	0.07158		0.07145	0.00013 ✓
40089 (PTFE 16586)	0.07142		0.07131	0.00011 ✓
40090 (PTFE 16587)	0.07265		0.07241	0.00024 ✓
40091 (PTFE 16588)	0.08243		0.08222	0.00021 ✓
40092 (PTFE 10589)	0.07006	Dup=0.07006	0.06998	0.00008 ✓
40093 (PTFE 16590)	0.07382		0.07374	0.00008 ✓
40094 (PTFE 16591)	0.07404		0.07399	0.00005 ✓
40095 (PTFE 16592)	0.07369		0.07362	0.00007 ✓
40096 (PTFE 16593)	0.07169		0.07162	0.00007 ✓
40097 (PTFE 16594)	0.07776		0.07769	0.00007 ✓
40098 (PTFE 16595)	0.07352		0.07353	-0.00001 ✓
40099 (PTFE 16596)	0.07143		0.07144	-0.00001 ✓
40502 (SW1026-10) mw MCE	0.05022		0.05019	0.00003
40503 (SW1026-11) mw MCE	0.04975		0.04968	0.00007
40507 (SW1026-Blank) mw MCE	0.05000	Dup=0.05000	0.05002	-0.00002

Continued on Page 6

Read and Understood By

Signed [signature] Date 11/1/06

Signed Kelly Hagan Date 11/1/06

PROJECT Dust (cont.)

Notebook No. 3838
Continued From Page 5

Sample #	Final wt	Initial wt	Δg
407701(-01) PVC 149	0.01406	0.01396	0.00010
407711(-02) MW PVC	0.01727	0.01717	0.00010
407721(-03) PVC 166	0.02691	0.02689	0.00002
407731(-04) MW PVC	0.01778 Avg=0.01778	0.01771	0.00007
408431(-02) MW MCE	0.05139	0.04996	0.00143
408441(-03) MW MCE	0.04942	0.04925	0.00017
408451(-04) MW MCE	0.05035	0.05023	0.00012
408461(-06) MW MCE	0.05021	0.05019	0.00002
408471(-08) MW MCE	0.05001	0.04971	0.00030
408531(-14) MW MCE	0.04857	0.04831	0.00026
LCS1 (PVC1)	0.01665	Target = 0.01665g	
LCS2 (PVC2)	0.01395	Target = 0.01395g	

RW 11/1/06

Continued on Page

Read and Understood By

Signed [signature] Date 11/1/06

Signed Kelly Hogan Date 11/1/06