

**BACKGROUND INDOOR AIR STUDY
WORK PLAN**

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**TOP STOP PETROLEUM RELEASE SITE
GUNNISON, UTAH**

DEQ
Environmental Response & Remediation

SCANNED

Prepared for:

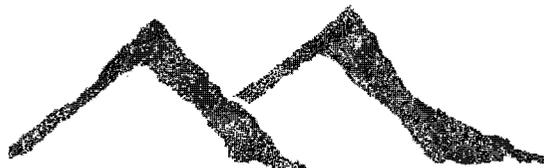
Morgan Atkinson, PG
Environmental Engineer
State of Utah

Division of Environmental Response and Remediation

DERR 2009-001321

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Prepared by:



RMEC ENVIRONMENTAL, INC.

RMEC ENVIRONMENTAL, INC.
2188 South Highland Drive, Suite 201
Salt Lake City, Utah 84106
(801) 467-3661
www.rmec.net

TABLE OF CONTENTS

1.0 INTRODUCTION/BACKGROUND INFORMATION	1
1.1 PURPOSE AND STATEMENT OF BASIS	1
2.0 PLAN PURPOSE, ORGANIZATION AND OBJECTIVES	2
3.0 DATA QUALITY OBJECTIVES.....	3
4.0 CHEMICALS OF CONCERN.....	6
5.0 SAMPLING AND ANALYSIS PLAN.....	7
5.1 SELECTION, LOCATION AND COORDINATION OF BACKGROUND SAMPLE SITES	7
5.2 INDOOR AIR SAMPLING METHODOLOGY	8
5.3 SAMPLE COLLECTION AND HOLD TIMES.....	8
5.4 SAMPLE ANALYSIS.....	8
5.5 SAMPLE IDENTIFICATION AND CUSTODY	9
6.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES.....	10
6.1 FIELD QUALITY ASSURANCE/QUALITY CONTROL	10
6.2 DUPLICATE SAMPLES.....	10
6.3 SPLIT SAMPLES	10
6.4 LABORATORY QUALITY ASSURANCE/QUALITY CONTROL.....	10
7.0 DATA QUALITY ASSESSMENT.....	11
7.1 PRECISION.....	11
7.2 ACCURACY	11
7.3 COMPLETENESS.....	11
7.4 REPRESENTATIVENESS.....	11
7.5 COMPARABILITY	12
8.0 DATA VALIDATION	13
9.0 PUBLIC NOTICE PROCEDURES	14
10.0 REFERENCES	15

APPENDIX A - BENZENE BACKGROUND STUDY AREA/SAMPLE LOCATION MAP

APPENDIX B - RESIDENT ACCESS FORM LETTERS

APPENDIX C – BUILDING SURVEY FORM

APPENDIX D – NOTICE OF PUBLIC COMMENT PERIOD

1.0 INTRODUCTION/BACKGROUND INFORMATION

RMEC Environmental, Inc. (RMEC) has prepared this Background Indoor Air Study Work Plan (Work Plan) on behalf of Wind River Petroleum/Top Stop Convenience Stores. This Work Plan was developed as an element of the overall corrective action plan (CAP) for the petroleum release that occurred at the Top Stop Convenience store in Gunnison, Utah. The development of this Work Plan was stipulated by the Utah Division of Environmental Response and Remediation (DERR) in a July 21, 2008 letter to Wind River Petroleum/Top Stop Convenience Stores, as part of the comments and requirements in connection with the CAP Summary Letter developed by Wasatch Environmental (Wasatch). The purpose of this Work Plan is to detail the methods and materials that will be used for the establishment of indoor air quality action levels which will be applied to homes and businesses in Gunnison that were impacted by the Top Stop Petroleum release.

All parties impacted by the Top Stop release may be subject to the indoor air quality action levels that will be established by the implementation of this Work Plan and, therefore, will have the opportunity to review and comment on the plan before it is finalized and implemented. Section 9.0 describes the public notice procedures used to gather comments regarding this work plan.

1.1 Purpose and Statement of Basis

RMEC is proposing to conduct an air quality study that will establish background levels of petroleum vapors in Gunnison homes that have not been impacted by the Top Stop petroleum release. Data from the study of unaffected homes will be used to establish community-based indoor air quality action levels which can be compared to indoor air sampling data from homes that have been impacted by the Top Stop release. While there are a number of compounds found in petroleum, benzene poses the greatest health risk and typically is the driver for the establishment of remediation action levels. When benzene concentrations are within allowable risk-based limits, the concentrations of other petroleum-related compounds typically are also well within allowable risk levels. Concentrations of all petroleum-related vapors will be measured and tracked during the study; however, this Work Plan will focus on the establishment of a community-based action level for benzene.

The precedence for using community-based indoor background levels of air contaminants as the basis for developing target indoor actions levels for areas impacted by a chemical release has been established during other petroleum release incidents. For example, in August of 2007, the U.S. Environmental Protection Agency (EPA) issued a Statement of Basis that described the criteria it used to establish remediation standards for homes and businesses that were impacted by a petroleum release from a Chevron gasoline service station in the Riggs Park community of Chillum, Maryland. The EPA used indoor air sampling data to establish indoor background concentrations of benzene, toluene, ethyl benzene, and xylene (BTEX) and methyl tertiary butyl ether (MTBE) in homes throughout the Riggs Park community. This data was eventually used to establish the target indoor air levels for the affected homes. RMEC proposes to use this approach, with modifications specific to the circumstances in Gunnison, as the basis for establishing the indoor air action levels for the Gunnison Top Stop release.

2.0 PLAN PURPOSE, ORGANIZATION AND OBJECTIVES

This document contains both a Sampling and Analytical Plan (SAP) and a Quality Assurance Project Plan (QAPP). The primary objective for the sampling and analyses described in this Plan is:

- 1) Determine the background indoor concentrations of petroleum-related vapors (benzene, toluene, ethyl benzene & xylene - BTEX) in homes and businesses within the city of Gunnison that have not been impacted by the petroleum release from the Top Stop service station and to use this information to establish indoor air quality action levels for homes and businesses that have been impacted by the release. As stated above, benzene is typically the driver for the establishment of risk-based remediation goals so this Work Plan will focus on establishing indoor background levels of benzene in the Gunnison area. Airborne levels of other petroleum-related vapors will be measured during the study, but will not be statistically analyzed.

The SAP portion of this plan will define the protocol used to identify buildings that will be used in the background study, define the sampling and analytical methods that will be used to collect consistent and comparable data and to define the statistical analyses that will be used to analyze the data generated from the sampling.

The primary purpose of the QAPP portion of the plan is to provide an overview of the project, describe the need for additional sampling, and define the Quality Assurance/Quality Control (QA/QC) activities that will be applied to the project. These QA/QC activities were developed to ensure that the air sampling and analytical data meet the needs and quality for their intended use.

The critical elements presented in this plan were developed using the Environmental Protection Agency's Guidance on Systematic Planning Using the Data Quality Objectives (EPA/240/B-06/001, February 2006). This guidance document defines the systematic planning process for the collection of environmental data and defines the use of Data Quality Objectives (DQOs) to establish performance and acceptance criteria which, in turn, serve as the basis for designing a plan for collecting data of sufficient quantity and quality to support the goals of a study.

3.0 DATA QUALITY OBJECTIVES

DQOs are qualitative and quantitative statements based on scientific methods that clarify project objectives, define appropriate types of data to collect, determine the most appropriate conditions for data collection and specify tolerable levels of potential decision errors. The qualitative aspects of DQOs encourage good planning and complement the quantitative aspects. The quantitative aspects use statistics to design the most efficient and cost-effective field investigation, while limiting the potential for making incorrect decisions. Using DQOs, the total allowable error in investigation data will be controlled in order to achieve an acceptable level of confidence in the data that is evaluated as part of the decision making process.

EPA guidance presents the DQO framework as a seven (7)-step planning process aimed at ensuring that the type, quantity, quality, and cost of obtaining environmental data are appropriate for their intended use. Each of these steps is outlined below.

Step 1. State the Problem(s)

When petroleum releases from an underground storage tank (UST) migrate offsite, the release must be cleaned up to a point where airborne levels of petroleum vapors in affected properties are within risk-based screening levels. Benzene, which is one of several petroleum compounds, is a known carcinogen and, typically, is the primary driver for these risk-based levels at petroleum release sites. Utah UST regulations require airborne levels of carcinogens, such as benzene, to be reduced to less than a 10^{-6} risk level following a petroleum release. The indoor benzene air screening level that would result in a 10^{-6} risk level for a 30-year exposure, as calculated from the ASTM Risk-Based Corrective Action Guide (ASTM E1739-95 2002), can be well below typical ambient benzene concentrations. Therefore, it is not always practical to achieve this benzene level in indoor air.

Since there may not be a practical way to reduce ambient benzene concentrations below the 10^{-6} risk level, a precedent has been established to use ambient or background concentrations of a chemical of concern as a target remediation goal when the prescribed risk levels cannot be attained. Indoor background benzene concentrations can vary by region due to the infiltration of ambient (outside) air and there are no universally-accepted data that establishes background levels of benzene for specific geographical areas. Therefore, site-specific ambient indoor benzene concentrations need to be established for homes and businesses in the downtown Gunnison area that are well away from the influence of the Top Stop petroleum plume, but otherwise demographically and geographically similar to the homes and businesses impacted by the Top Stop Petroleum release.

Step 2. Identify the Decision(s)

The primary decision to be made from the sampling is the establishment of a reasonable estimate of ambient indoor benzene (and other petroleum hydrocarbon) levels in homes and businesses in the downtown Gunnison area that have not been impacted by the Top Stop release. These data will serve as a baseline for future remediation goals.

The primary decision to be made from the indoor sampling is whether indoor levels of petroleum-related vapors (using benzene levels as the indicator) in homes above the Top Stop petroleum plume are statistically different (greater) than background levels in other homes and businesses in the downtown Gunnison area.

Step 3. Identify Information Inputs

The information needed for this study is a statistically valid and scientifically defensible estimate of mean benzene (and other petroleum hydrocarbon) levels in homes and businesses in downtown Gunnison that have not been impacted by the Top Stop release.

Step 4. Define the Study Boundaries

All of the impacted homes are within a few blocks of Main Street. In order to provide background data that is consistent for the homes above the gasoline plume, background air samples will be collected from various indoor locations in the downtown Gunnison area at minimum specified distances from the petroleum plume. Indoor samples will be collected from homes and business that agree to the sampling and pass specific screening criteria. Section 5 contains the detailed protocol for the selection of sample locations and methods for collection of the indoor samples.

Step 5. Develop the Analytical Approach

Air samples will be collected at indoor locations by personnel that have technical expertise in collecting air samples. Summa evacuated cylinders will be used to collect integrated samples from living spaces within homes that been selected for the background study. Systematic and detailed inspections will be performed in each of the homes selected for sampling to identify and control factors that may affect indoor petroleum vapor concentrations. All sampling will be performed in accordance with an established sampling protocol. All samples will be analyzed by an American Industrial Hygiene Association (AIHA) -accredited laboratory using the EPA T015 analytical method. Chain-of-custody procedures for sample handling and analysis will be strictly followed and appropriate QA/QC procedures will be followed by the field sampling crew and the analytical laboratory. Section 5 of this plan provides a detailed description of the sampling and analytical procedures that will be used for the project.

The indoor air sampling described in this Work Plan is being performed to establish background levels of petroleum vapors in non-impacted areas of Gunnison. Eventually these data will be used to develop target action levels for petroleum vapors in homes and businesses that are situated above the Top Stop petroleum plume. As previously stated, benzene vapor levels are typically the driver for the risk-based corrective actions. If benzene levels in the homes and businesses situated above the plume exceed the 95% upper confidence limit of the mean level of benzene vapors in indoor air in non-impacted homes (i.e. background levels for Gunnison), or if other petroleum vapor levels in the affected homes exceed risk-based screening levels, further actions will be taken to identify and/or reduce the vapor concentrations. Such actions could include:

- Sub-slab monitoring to determine if vapor intrusion from the Top Stop release is causing the elevated vapor levels.
- Performing a thorough in-house inspection for other potential sources of the vapors.
- Installing or upgrading sub-slab or other vapor mitigation systems in the vicinity of the affected homes.

To protect homeowner confidentiality, RMEC will randomly assign all homes included in the study a unique identification number. Data from the study will be reported using these unique identification numbers and the measured levels of petroleum vapors for the buildings included in the background study will only be transmitted to the homeowner upon request.

Step 6. Specify Limits on Decision Errors

Samples will be analyzed using an EPA-certified analytical method (TO-15) by DataChem Laboratories of Salt Lake City, an AIHA-accredited laboratory. Quality assurance and quality control (QA/QC) of the laboratory data will be accomplished by following the QA/QC procedures dictated by the TO15 method.

Air sampling will be performed in homes the outside the plume using protocol described in this Work Plan to establish the background level of benzene within the community. Data from the study of unaffected homes will be used to establish community-based indoor air quality action levels.

Initially, air sampling will be conducted in a total of 20 homes to establish the arithmetic mean and 95% upper confidence limit (95% UCL) of the arithmetic mean of background benzene following the approach described in, Supplemental Guidance to RAGS: Calculating the Concentration Term (Publication 9285.7-081, May 1992, United States Environmental Protection Agency). If necessary, additional homes may be sampled. The final number of homes to be sampled will be based on the number needed to calculate a stable standard deviation as described by Simon (see <http://www.childrensmercy.org/stats/weblog2006/StandardDeviation.asp>).

ProUCL 4.00.02, a product of the US Environmental Protection Agency, will be used to calculate the 95% UCL of the arithmetic mean of background benzene measures. The approaches utilized in this software for statistical calculations are detailed in ProUCL Version 4.0 Technical Guide. The specific approach for calculating the 95% UCL will be based on the distribution characteristics of the measures taken from the sample of homes outside the plume as assessed using ProUCL distribution diagnostics and follow the approaches outlined in Supplemental Guidance to RAGS: Calculating the Concentration Term. For example, the general approach that will be used if the benzene air sampling data are deemed approximately normal is:

$$UCL = \bar{x} + t(s/\sqrt{n}) \quad (\text{Highlight 6: Supplemental Guidance to RAGS})$$

If the benzene air sampling data are determined to be lognormal, the 95% UCL will be calculated using the following:

$$UCL = e^{(\bar{x} + 0.5s^2 + sH/\sqrt{n-1})} \quad (\text{Highlight 5: Supplemental Guidance to RAGS})$$

Data from this study will be analyzed and reported in accordance general statistical approached described above; however, other statistical analysis may be applied to this data.

Step 7. Optimize the Design for Obtaining Data

As information becomes available during the course of this project, this Work Plan may be revised to modify the sampling protocols. Also, the sample size may be increased if a stable standard deviation cannot be generated from the initial sample size of 20 homes. All changes in the sampling plan will be discussed with and approved by DERR before they are implemented.

4.0 CHEMICALS OF CONCERN

The chemicals of concern for this site are the aliphatic and aromatic hydrocarbons that are components of gasoline. Air samples will be collected and analyzed in accordance with EPA Method T015. This method allows identification and quantification of benzene, toluene, ethyl benzene and xylene, (BTEX), the primary aromatic hydrocarbons in gasoline, as well as other aromatic and aliphatic hydrocarbons typically found in gasoline. The background level of benzene, as established by the protocol described in this Work Plan, will be used as the indoor air quality action level for the Gunnison homes affected by the Top Stop release. The Risk Based Screening Levels (RBSLs) for other petroleum components, as described and calculated in the Guidelines for Utah's Corrective Action Process for Leaking Underground Storage Tanks, will be used as the indoor air quality action levels for these chemicals.

5.0 SAMPLING AND ANALYSIS PLAN

5.1 Selection, Location and Coordination of Background Sample Sites

The background air samples will be collected at various locations in the downtown Gunnison area, at distances at least ½ block away from the current suspected boundaries of the Top Stop shallow groundwater contaminant plume. In general, RMEC will attempt to collect the background samples from homes and businesses located within 2 blocks east or west of Main Street (Highway 89) and at least ½ block north or south away from the known boundaries of the plume from the Top Stop release. A minimum of 20 samples will be collected, the majority of which will be from private residences. Approximate boundaries and zones of the study area are depicted on the site plan attached as Appendix A. Four zones have been identified on the site map to ensure the entire down town area of Gunnison is included in the background sampling and to ensure an even distribution of sampling locations within the downtown area.

- 5.1.1 Letters will be mailed out to all residents located in each of the study areas informing them that a study is being performed to establish background concentrations of benzene in homes in the Gunnison area and inviting them to participate in the study. The description of the air monitoring process and the details of what is expected from the residents that agree to participate will be included in the letter. A copy of the proposed letter is attached in Appendix B.
- 5.1.2 The letters will be followed up by phone calls and/or face to face visits with property owners and/or residents to answer any questions and encourage their participation in the study. The Gunnison City Council will be engaged to assist, as appropriate, in identifying potential homes for the study and in obtaining an adequate number of homes to perform the background sampling.
- 5.1.3 Homeowners that agree to the study will be required to sign an access agreement that defines the stipulations of the air sampling. In addition to this, all homes will be pre-screened using the checklist in Appendix C. This checklist may be modified, as necessary, to address the specific needs of this project. The checklist is designed to identify and eliminate potential sources of petroleum that may bias the study. If obvious sources of petroleum products, such as gasoline cans or motor vehicles, are discovered in living areas of the home, the residents will be asked to remove them prior to the air monitoring. If the residents do not or cannot comply with this request, the home will be eliminated from the study.
- 5.1.4 Heating ventilation and air conditioning (HVAC) systems will be inspected as part of the pre-screening process. Homes with HVAC systems that are designed or operating in a manner that may increase petroleum concentrations in the buildings may also be eliminated from the background study. For example, homes with HVAC systems that draw return air from garages or petroleum storage areas may not be suitable for the study. The DERR will be included in any decisions to include or eliminate a property from inclusion in the study.
- 5.1.5 A final list of all properties identified for the background sampling will be sent to the DERR prior to any sampling being performed. Appendix A will be updated to show the distribution of the properties on the aerial photograph once they have been identified.

5.2 Indoor Air Sampling Methodology

The air samples will be collected using 6-liter Summa evacuated canisters equipped with a regulator to allow an integrated sample to be collected over a 24-hour period. Pressure gauges on each of the regulators will be used to record canister pressures before and after sampling. The initial vacuum pressure in the canisters must be in the range of 26 to 28 inches of Hg in order for the sampling to proceed.

The regulators controlling the air flow into the 6 liter canisters will be calibrated by the laboratory (DataChem) to allow a 90% fill of the canister after 24 hours. This equates to an air flow of 3.75 ml/min. The air flow rates into the canisters will be checked using a primary air flow calibration device (Bios Dry Cal) immediately after the control valves on the regulator are opened. If flow rates into the canisters are not in the range of 3.5 to 4.5 cc/minute, the sampling will not proceed. If the measured flow rate is within the designated range, this measured flow rate will be used to provide an estimate of the time required for a 90% fill of the canister and this sample time will be used for that particular sample.

As much as possible, the canisters will be placed on the main, ground-level floor in a central location within each building. The canisters will be placed at a height of one to five feet above the floor in order to sample the air in the breathing zones of the home occupants. Occupants will be given written and verbal instructions regarding activities that should not be performed in the home to ensure no events take place that would skew the typical petroleum vapor concentrations in the home in either direction. As much as possible the canisters will be secured against tampering and checked periodically throughout the 24-hour sample period to detect any signs of tampering.

The canisters will be retrieved from the homes immediately following completion of the 24-hour integrated sampling period. Final pressures in the canisters, as indicated by the pressure gauge, will be recorded. Only those canisters that register a final pressure greater than or equal to 1 inch of Hg will be submitted for analysis. Appropriate sample collection forms will be used to record all sample collection data. Laboratory-provided chain of custody forms will be used for sample submission to the analytical laboratory.

5.3 Sample Collection and Hold Times

Retrieved canisters shall be delivered to the laboratory within 48-hours following the integrated sample period.

5.4 Sample Analysis

Samples will be analyzed by DataChem Laboratories in Salt Lake City, UT on a standard turn-around-time basis. The Summa canisters will be analyzed for volatile organic compounds (VOCs) using the full scan option of EPA Method T015.

DataChem recalculates the minimum detection level (MDL) for the various analytes in the T015 Method on an annual basis. The most current MDL for benzene in the full scan mode of Method T015 has been calculated to be $0.32 \mu\text{g}/\text{m}^3$. This MDL value is very close to the $0.31 \mu\text{g}/\text{m}^3$ residential Risk Based Screening Level (ASTM E1739-95 2002) for benzene and lower than the $0.50 \mu\text{g}/\text{m}^3$ commercial RBSL for benzene.

A benzene MDL of $0.16 \mu\text{g}/\text{m}^3$ can be achieved using the selected ion monitoring (SIM) modification to the T015 Method. However, the full scan T015 Method gives greater information than the SIM modification to the method. The full scan T015 has the ability to look at non-target analytes (TICs) as

well as having greater confidence by having full spectra to identify the target analytes. The SIM modification of T015 does not allow for identification of TICs and may have lower degree of confidence in compound detection. Therefore, RMEC proposes to utilize full scan option of the T015 Method.

5.5 Sample Identification and Custody

Sample chain-of-custody procedures will be followed to account for each sample during collection, storage, handling and shipping activities. Every sample collected at the site will be labeled with the following information:

- Project name or number.
- Unique sample identification number.
- Sample date and time.
- Sampler's initials.
- Pertinent remarks as needed.

The individual physically responsible for sample collection will complete a chain-of-custody record in the field. The sampler is personally responsible for the care and custody of samples until hand-delivered to DataChem. When transferring sample possession, the persons relinquishing and receiving the sample(s) will sign, date and write the time of day on the chain-of-custody record. This record may also serve as a laboratory request form, specifying the analyses requested for each set of samples.

6.0 QUALITY ASSURANCE AND QUALITY CONTROL PROCEDURES

The following procedures will be performed for both field and laboratory QA/QC samples. These procedures will be used to document data quality and identify measurement discrepancies needing correction.

6.1 Field Quality Assurance/Quality Control

Field QA/QC includes properly following the sampling methods described in Section 5.0. Any deviations from these methods will be carefully documented. Failure to provide proper documentation may limit the use of analytical data and may contribute to uncertainty in analytical results.

6.2 Duplicate Samples

One duplicate sample for every 10 field samples will be collected to determine the variability in BTEX concentrations at a given location. Duplicate samples will be collected by placing two Summa canisters side by side at a given location and simultaneously collecting the air samples over the established sampling period.

6.3 Split Samples

Due to the nature of the air sample collection, split samples will not be analyzed.

6.4 Laboratory Quality Assurance/Quality Control

Internal laboratory QA/QC procedures will be followed as described in DataChem Laboratory's Quality Assurance Plan. In addition to reporting QA/QC analytical results, the laboratory will report out-of-control occurrences (i.e., poor analysis replication, poor spike recovery, instrument calibration problems, blank contamination, etc.). The laboratory will take corrective action at any time during the analytical process when QA/QC data or analytical judgments deem it necessary. Corrective action may include, but is not limited to:

- re-calculation;
- instrument re-calibration;
- preparation of new standards or blanks;
- re-extraction/digestion;
- re-analysis; and/or
- dilution and re-analysis.

7.0 DATA QUALITY ASSESSMENT

To adequately support decisions based on analytical results, the following data quality objectives were established for each of the five data quality assessment parameters: precision, accuracy, completeness, representativeness and comparability. These objectives are expressed as quantitative and qualitative statements concerning the type of data needed to support a decision, based on a specified level of uncertainty.

7.1 Precision

Data from field and laboratory duplicate analysis will be used to assess sampling and analytical precision. Precision will be checked by collecting and analyzing two field duplicate samples as described in Section 6. Precision will be evaluated by calculating the relative percent difference (RPD), where:

$$\text{RPD} = \frac{\text{difference between the two measured values}}{\text{average of the two measured values}} \times 100\%$$

The RPD will be calculated for each analytical parameter. Air sample duplicates will have RPDs of 50% or less. If this criterion is not met, a careful examination of sampling techniques and analytical procedures will be conducted to identify the cause of the high RPD, and evaluate the usability of the data.

7.2 Accuracy

Internal laboratory spike data will be examined to determine analytical accuracy. The number and frequency of internal quality control events is outlined in the laboratory's Quality Assurance Plan. These specific laboratory quality assurance protocols are adopted as part of this plan. Field blanks are not applicable and will not be used to trace potential field and/or laboratory contamination. However, the analytical laboratory analyzes a method blank to trace potential laboratory contamination. Spiked samples may be used if significant problems occur with laboratory replication.

7.3 Completeness

Data completeness is a measure of the amount of information that must be collected to allow for successful achievement of this investigation's objectives. Completeness will be presented as the percentage of valid measurements with respect to the total number of planned measurements. The closer the numbers, the more complete the measurement process. Completion will take into consideration environmental conditions and the potential for change with respect to time and location.

7.4 Representativeness

Representativeness is a qualitative parameter that expresses the degree to which sample data precisely and accurately represents a characteristic of a population, parameter variations at a sampling point, or an environmental condition. The design and rationale for the sampling program described in this plan (i.e., the purpose for sampling, the selection of sample locations, the number of samples to be collected, the ambient conditions for sample collection, and the sampling techniques) ensure that environmental conditions will be sufficiently represented. A complete discussion of the methods and approaches used to satisfy the representativeness criteria is found throughout this SAP/QAPP.

7.5 Comparability

Comparability is a qualitative parameter expressing the confidence with which one data set may be compared to another. Data sets will be compared only when precision and accuracy meet the specified acceptance criteria established above. Samples will be collected and analytical sample results will be reported according to standard procedures and methods in order to be comparable with other similar measurement data and sample results. The comparability goal will be achieved by using the methods to collect and analyze representative samples described in Section 6 and by reporting analytical results in appropriate and consistent units. In essence, comparability will be achieved and maintained through consistent sampling conditions, sampling procedures, sample preservation methods, analytical methods, and data reporting units.

8.0 DATA VALIDATION

The data validation process involves two basic lines of inquiry. First, the data is evaluated to determine if the laboratory followed, in detail, the specified analytical method. Second, the data is evaluated to determine if samples were amenable to analysis by the referenced method. Due to the nature of work proposed for this phase of the project, independent data validation is not anticipated. However, if the DERR requires independent validation for this data set, all analytical data generated during this air sampling plan will be independently reviewed and validated by ChemVal Consulting of Salt Lake City, Utah.

Instrumental parameters including tuning, performance checks, and calibration will be investigated, as well as quality control parameters for method, laboratory, and sample effects. Calculations are spot-checked for both accuracy and transcription errors. Spike recoveries and blank results will be verified and compared to acceptance limits. Positive results in samples are checked for confirmation or correct spectral data, and are also checked for calculation and reporting errors. When all of the checks have been performed, exceptions to QA/QC parameters will be evaluated for their effect on the reliability of the reported results. These evaluations may result in flagging of the data to communicate a higher degree of variability than expected by the analytical method used. A final report will be generated to explain the specific results and findings of the validation process.

9.0 PUBLIC NOTICE PROCEDURES

This Work Plan will be made available to the public for a 14-day public comment period beginning on February 16 and running through March 2, 2009. All homes and business impacted by the Top Stop petroleum release will receive a copy of the Notice of Public Comment Period (Appendix D) via mail and/or hand delivery. In addition to this, the Notice of Public Comment Period will be published in the San Pete Messenger on February 11, 2009. The Work Plan will be made available for review at the following locations:

DERR Public Website for the Gunnison Top Stop Release:
http://www.deq.utah.gov/Issues/Gunnison_TopStop/index.htm

Utah Department of Environmental Response and Remediation (DERR) Offices
168 North 1950 West (Building #2), First Floor
Salt Lake City, Utah 84114-4840

Gunnison Civic Library
38 West Center
Gunnison, Utah 84634

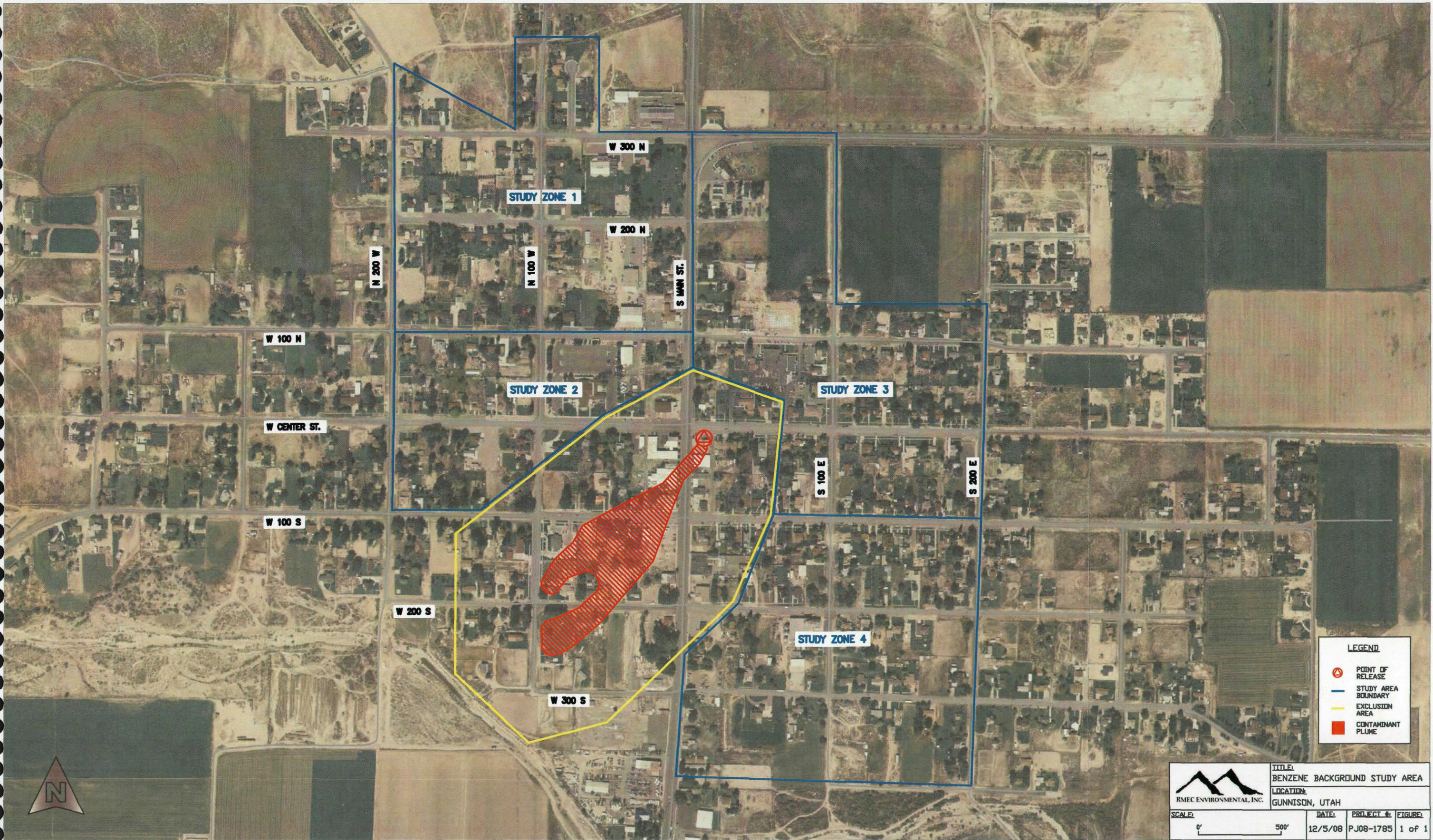
Public review and comments on the plan are welcomed. Comments on the Work Plan can be submitted to the DERR at the following email address: gunnisonleak@utah.gov.

10.0 REFERENCES

- EPA, 2006. *Guidance on Systematic Planning Using the Data Quality Objectives Process*. United States Environmental Protection Agency. EPA QA/G-4, dated February 2006.
- EPA, 2006. *Statement of Basis, Chevron Gasoline Release at Chillum, Maryland*. United States Environmental Protection Agency, August 30, 2007.
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- Building Science and Engineering Associates, 2006. *Riggs Park Air Quality Study, Final Program Report*. Prepared for the Government of the District of Columbia, Department of Health. Dated September 2006.
- EPA, 1992. *Supplemental Guidance to RAGS: Calculating the Concentration Term*. United States Environmental Protection Agency. EPA Publication PB92-963373
- EPA, 2007. *ProUCL Version 4.00.02 User Guide*. Prepared for the United States Environmental Protection Agency by Anita Singh, Robert Maichle, Ashok Singh, Sanghee Lee and Narain Armbya.
- ASTM, 2002. *Standard Guide for Risk Based Corrective Action Applied at Petroleum Release Sites*. ASTM E1739-95 (2002).

Appendix A –

**Benzene Background Study Area/
Sample Location Map**



LEGEND

-  POINT OF RELEASE
-  STUDY AREA BOUNDARY
-  EXCLUSION AREA
-  CONTAMINANT PLUME



TITLE:
BENZENE BACKGROUND STUDY AREA

LOCATION:
GUNNISON, UTAH

SCALE: 0' 500'	DATE: 12/5/08	PROJECT #: PJ08-1785	FIGURE: 1 of 1
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Appendix B –

Resident Access Form Letters



Date

Resident/Business Name
Street Address
Gunnison, Utah 84634

SUBJECT: BACKGROUND AIR QUALITY STUDY

Dear Resident:

As part of the ongoing corrective action for the Gunnison Top Stop petroleum storage tank release, the Utah Division of Environmental Response and Remediation (DERR) has recommended that Top Stop Convenience Stores (Top Stop) conduct a community-based background indoor air study. Information from this study will be used to establish target indoor air quality action levels as an alternative to the conservative risk-based numbers specified in DERR's Underground Storage Tank (UST) guidelines. Pursuant to this, RMEC Environmental, Inc. (RMEC) has been contracted by Top Stop to conduct air sampling in homes that have not been impacted by the petroleum release.

It has been determined that your home is not within the boundaries of the Top Stop petroleum plume. Therefore, we are requesting that you allow representatives from RMEC to perform air monitoring in your home. Information from the sampling will be used to determine levels of petroleum vapors that can be expected for typical homes in Gunnison. The air sampling will require a stainless steel Summa canister to be placed in your home for a 24-hour period. Summa canisters are spherically shaped, evacuated cylinders about the size of a volleyball. When opened, surrounding air inside your home will be drawn into the Summa canister through a regulator. The regulator will be set to control the airflow and ensure that air is drawn into the Summa at a constant rate over the 24-hour sample period.

If you are willing to participate, personnel from RMEC will come to your home, set the canister in a convenient location, and conduct a cursory building inspection. In addition, RMEC will conduct a questionnaire interview with the building occupant(s). RMEC expects that at least 20 homes in the downtown Gunnison area will have to be sampled to generate meaningful background data. Please consider allowing RMEC to perform this sampling in your home.

A representative from RMEC will be contacting you within the next week either by phone or in person to get your response. He/she will be able to answer any questions you may have at that time. Please be assured that we will respect your privacy while performing the air sampling and we will keep all information from the sampling strictly confidential. Please feel free to call me if you have any questions or need additional information in this matter.

Sincerely,

Frank DeRosso, MSPH, CIH
President/Senior Scientist
RMEC ENVIRONMENTAL, INC.



**Appendix C –
Building Survey Form**



INDOOR AIR QUALITY QUESTIONNAIRE AND BUILDING INVENTORY

This form will be completed by RMEC for each residence involved in indoor air testing.

Site Identification Number: _____

Address: _____

Preparer's Name: _____ Date/Time Prepared: _____

1. OCCUPANT:

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

Home Phone: _____ Office Phone: _____

Number of Occupants/persons at this location _____ Age of Occupants _____

2. OWNER OR LANDLORD: (Check if same as occupant ____)

Interviewed: Y / N

Last Name: _____ First Name: _____

Address: _____

County: _____

Home Phone: _____ Office Phone: _____

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response)

Residential
Industrial

School
Church

Commercial/Multi-use
Other: _____



If the property is residential, type? (Circle appropriate response)

- | | | |
|--------------|-----------------|-------------------|
| Ranch | 2-Family | 3-Family |
| Raised Ranch | Split Level | Colonial |
| Cape Cod | Contemporary | Mobile Home |
| Duplex | Apartment House | Townhouses/Condos |
| Modular | Log Home | Other: _____ |

If multiple units, how many? _____

If the property is commercial, type?

Business Type(s) _____
Does it include residences (i.e., multi-use)? Y / N If yes, how many? _____

Other characteristics:

Number of floors _____ Building age _____
Is the building insulated? Y / N How air tight? Tight / Average / Not Tight

4. AIRFLOW

Use air current tubes or tracer smoke to evaluate airflow patterns and qualitatively describe:

Airflow between floors

Airflow near source

Outdoor air infiltration

Infiltration into air ducts



5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply)

- a. **Above grade construction:** Wood frame Concrete Stone Brick
- b. **Basement type:** Full Crawlspace Slab Other _____
- c. **Basement floor:** Concrete Dirt Stone Other _____
- d. **Basement floor:** Uncovered Covered Covered with _____
- e. **Concrete floor:** Unsealed Sealed Sealed with _____
- f. **Foundation walls:** Poured Block Stone Other _____
- g. **Foundation walls:** Unsealed Sealed Sealed with _____
- h. **The basement is:** Wet Damp Dry Moldy
- i. **The basement is:** Finished Unfinished Partially finished
- j. **Sump present?** Y / N
- k. **Water in sump?** Y / N / not applicable

Basement/Lowest level depth below grade: _____ (feet)

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, drains)

6. HEATING, VENTING and AIR CONDITIONING (Circle all that apply)

Type of heating systems(s) used in this building: (circle all that apply – note primary)

- Hot air circulation Heat pump Hot water baseboard
- Space heaters Steam radiation Radiant floor
- Electric baseboard Wood stove Outdoor wood boiler Other _____

The primary type of fuel used is:

- Natural Gas Fuel Oil Kerosene
- Electric Propane Solar
- Wood Coal

Domestic hot water tank fueled by: _____

Boiler/furnace located in: Basement Outdoors Main Floor Other _____

Air conditioning: Central Air Window units Open Windows None



- n. Is there a bathroom exhaust fan? Y / N If yes, where vented? _____
- o. Is there a clothes dryer? Y / N If yes, is it vented outside? Y / N
- p. Has there been a pesticide application? Y / N When & Type? _____

Are there odors in the building? Y / N

If yes, please describe: _____

Do any of the building occupants use solvents at work? Y / N

(e.g., chemical manufacturing or laboratory, auto mechanic or auto body shop, painting, fuel oil delivery, boiler mechanic, pesticide application, cosmetologist)

If yes, what types of solvents are used? _____

If yes, are their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

- | | |
|--|---------|
| Yes, use dry-cleaning regularly (weekly) | No |
| Yes, use dry-cleaning infrequently (monthly or less) | Unknown |
| Yes, work at a dry-cleaning service | |

Is there a radon mitigation system for the building/structure? Y / N Date of Installation: _____

Is the system active or passive? Active/Passive

9. WATER AND SEWAGE

Water Supply: Public Water Drilled Well Driven Well Dug Well Other: _____

Sewage Disposal: Public Sewer Septic Tank Leach Field Dry Well Other: _____



10. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building on the following page. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note.

Basement:

A large rectangular area of graph paper with a grid of small squares, intended for drawing a plan view sketch of the basement floor.

First Floor:

A large rectangular area of graph paper with a grid of small squares, intended for drawing a plan view sketch of the first floor.



11. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (industries, gas stations, repair shops, landfills, etc.), outdoor air sampling locations(s) and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the locations of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.

A large, empty grid of graph paper, consisting of small squares, intended for drawing a site sketch. The grid covers most of the lower half of the page.

Since there may not be a practical way to reduce indoor benzene concentrations below the 10^{-6} risk level, a precedent has been established to use ambient or background concentrations of a chemical of concern as a target remediation goal when the prescribed risk levels cannot be attained. Indoor background benzene concentrations can vary by region due to the infiltration of ambient (outside) air and there are no universally-accepted data that establishes background levels of benzene for specific geographical areas. Therefore, site-specific ambient indoor benzene concentrations need to be established for homes and businesses in the downtown Gunnison area that are well away from the influence of the Top Stop petroleum plume, but otherwise demographically and geographically similar to the homes and businesses impacted by the Top Stop petroleum release.

RMEC is proposing to conduct an air quality study that will establish background levels of petroleum vapors in Gunnison homes that have not been impacted by the Top Stop petroleum release. Data from the study of unaffected homes will be used to establish community-based indoor air quality action levels which can be compared to indoor air sampling data from homes that have been impacted by the Top Stop release. The Work Plan provides a detailed description on how the background data will be generated.

Schedule

The process of collecting indoor air quality data from homes not affected by the release is expected to begin approximately two weeks after DERR approval of the Work Plan. It is expected that a minimum of twenty homes will be tested during the background study. At this time it is difficult to predict how much time will be required to enlist this number of homes. However, once all of the homes for the background study have been identified, RMEC expects that the air monitoring will be completed and a final report issued within 60 days.

A copy of the Work Plan prepared for this site will be available at the DERR offices in Salt Lake City (address below; office hours 7:00 a.m. to 6:00 p.m., Monday through Thursday) and at the **Gunnison Civic Library** located at 38 West Center, Gunnison, Utah 84634. An electronic copy of the plan is available on the DERR website for the Gunnison Top Stop Release at:

http://www.deq.utah.gov/Issues/Gunnison_TopStop/index.htm

Public review and comments on the plan are welcomed. Comments on the Work Plan can be submitted to the DERR at the following email address: gunnisonleak@utah.gov. For additional information or comment(s), please contact:

Morgan Atkinson, Project Manager (801-536-4100)
Division of Environmental Response and Remediation
168 North 1950 West, 1st Floor, Salt Lake City, Utah 84116

The comment period is open from February 18, 2009 until March 4, 2009.