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Prepared for the U.S. Department of Energy under Contract DE-AC05-76RL01830

Assessment of Waste Treatment Plant LAB C3V (LB-S1) Stack Sampling Probe Location for Compliance with ANSI/HPS N13.1-1999

JA Glissmeyer JGH Geeting

February 2013



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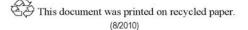
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Prepared for the U.S. Department of Energy under Contract DE-AC05-76RL01830 and Memorandum of Agreement (MOA):24590-QL-HC9-WA49-00001

Pacific Northwest National Laboratory Richland, Washington 99352

Completeness of Testing

This report describes the results of work and testing specified by Test Plan *TP-WTPSP-094.* The work and any associated testing followed the quality assurance requirements outlined in the test specification/plan. The descriptions provided in this test report are an accurate account of both the conduct of the work and the data collected. Test results are reported. Also reported are any unusual or anomalous occurrences that are different from expected results. The test results and this report have been reviewed and verified.

Approved:

Kinath

Dean E. Kurath Program Manager

<u>2/14/13</u> Date

Summary

This report documents a series of tests used to assess the proposed air sampling location in the Hanford Tank Waste Treatment and Immobilization Plant (WTP) LAB C3V (LB-S1) exhaust stack with respect to the applicable criteria regarding the placement of an air sampling probe. Federal regulations^(a) require that an air sampling probe be located in the exhaust stack in accordance with the criteria of American National Standards Institute/Health Physics Society (ANSI/HPS) N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stack and Ducts of Nuclear Facilities*. These criteria address the capability of the sampling probe to extract a sample that represents the effluent stream.

Testing was performed on a scale model of the stack as part of the River Protection Project—Waste Treatment Plant Support Program under Contract No. DE-AC05-76RL01830 according to a statement of work issued by Bechtel National Inc. (BNI 24590-QL-SRA-W000-00101 Rev. 2, *N13.1-1999 Stack Monitor Scale Model Testing and Qualification*) and Work Authorization 09 of Memorandum of Agreement 24590-QL-HC9-WA49-00001, and modified by Subcontract Change Notices 123 and 126. The internal Pacific Northwest National Laboratory (PNNL) project for this task is 53024, Work for *Hanford Contractors Stack Monitoring*. The testing described in this document was further guided by the Test Plan, *Air Sampling Probe Location Tests for Waste Treatment Plant LAB C3V (LB-S1) Air Exhaust System* (TP-WTPSP-094).

Tests consisted of various measurements taken over a grid of points in the duct cross-section at the designed sampling probe location. The ANSI/HPS N13.1-1999 criteria and the corresponding results of the test series on the scale model are summarized below.

- <u>Uniform Air Velocity</u>—The gas momentum across the stack cross-section where the sample is extracted should be well mixed or uniform. Uniformity is defined as the variability of the measurements about the mean and expressed as the percent coefficient of variation (%COV). The %COV is calculated as the standard deviation divided by the mean and expressed as a percentage; thus, the lower the %COV value, the more uniform the velocity. The qualification criterion is that the %COV of the air velocity must be ≤20 across the center two-thirds of the cross-section of the duct where the sampling probe is to be located.
- 2. <u>Angular Flow</u>—The purpose of this test is to determine whether the air velocity vector is aligned with the sampling nozzle. The average flow angle relative to the nozzle axis should not exceed 20°.
- 3. <u>Uniform Concentration of Tracer Gases</u>—A uniform contaminant concentration in the sampling plane enables the extraction of samples that represent the true concentration. The two qualification criteria are that 1) the %COV of the measured tracer gas concentration is ≤20 across the center two-thirds of the duct cross-section, and 2) the gas concentration at any of the measurement points does not deviate from the overall mean concentration of all of the measurement points by >30 percent.

⁽a) Title 40 of the Code of Federal Regulations (CFR), Part 61, National Emissions Standards for Hazardous Air Pollutants (NESHAP), Subpart H, National Emission Standard For Emissions of Radionuclides other than Radon from Department of Energy Facilities.

4. <u>Uniform Concentration of Tracer Particles</u>—Uniformity in contaminant concentration at the sampling probe was further demonstrated using tracer particles large enough to exhibit inertial effects. Particles of 10 µm aerodynamic diameter were used. The qualification criterion is that the %COV of particle concentration is ≤20 for the measurement points in the center two-thirds of the duct at the sampling probe location.

The results of the tests for the LB-S1 model are summarized in Table S.1. The criteria for sampling probe locations given in ANSI/HPS N13.1-1999 were met in all cases. These criteria address the capability of the sampling probe to extract a sample that represents the effluent stream. Based on these scale model tests, the WTP prototypic sampling point, located 10.3 duct diameters downstream of the last 90 degree elbow, meets the air sampling probe requirements of the ANSI/HPS N13.1-1999 standard. [Note: The pipe fitting for the test port is 10.6 duct diameters from the last elbow, but the sampler turns 90° and extends down the stack 19.4". These tests were conducted at the distance of the sampling plane rather than the pipe fitting.] Additional velocity uniformity and flow angle tests on the actual stacks will be necessary during cold startup to confirm the validity of the modeled results. Guidance on those tests is provided in the conclusion of this report.

	Acceptance Criteria	Units	LB-S1
Velocity Uniformity	≤ 20	%COV	3.1-7.6
Flow Angle	≤ 20	Degrees	3.5-6.9
Gas Tracer Uniformity	≤20	%COV	1.0-7.3
	≤30	Maximum % Deviation from Mean	2.0-14.9
Particle Tracer Uniformity	≤20	%COV	7.3–14.1

Table S.1. Summary of Results for the LB-S1 Scale Model Stack

Quality Assurance

The PNNL quality assurance (QA) program is based on the requirements defined in the U.S. Department of Energy Order 414.1D, *Quality Assurance*, and 10 CFR 830, *Energy/Nuclear Safety Management*, and Subpart A—*Quality Assurance Requirements* (a.k.a., the Quality Rule). PNNL has chosen to implement the following consensus standards in a graded approach:

- ASME NQA-1-2000, *Quality Assurance Requirements for Nuclear Facility Applications*, Part I, "Requirements for Quality Assurance Programs for Nuclear Facilities."
- ASME NQA-1-2000, Part II, Subpart 2.7, *Quality Assurance Requirements for Computer Software for Nuclear Facility Applications.*
- ASME NQA-1-2000, Part IV, Subpart 4.2, Graded Approach Application of Quality Assurance Requirements for Research and Development.

The procedures necessary to implement the requirements are documented through PNNL's "How Do I...?" (HDI), which is a system for managing the delivery of laboratory-level policies, requirements, and procedures.

The Waste Treatment Plant Support Program (WTPSP) implements an NQA-1-2000 QA program, using a graded approach presented in NQA-1-2000, Part IV, Subpart 4.2. The WTPSP Quality Assurance manual (QA-WTPSP-0002) describes the technology life cycle stages under the WTPSP QA plan (QA-WTPSP-0001). The technology life cycle includes the progression of technology development, commercialization, and retirement in process phases of basic and applied research and development (R&D), engineering and production, and operation until process completion. The life cycle is characterized by flexible and informal QA activities in basic research, which becomes more structured and formalized through the applied R&D stages. The work described in this report has been completed under the QA Technology level of Developmental Work as the data will be used for applying for air discharge permits.

• DEVELOPMENTAL WORK—Developmental work consists of research tasks moving toward technology commercialization. These tasks still require a degree of flexibility, and there is still a degree of uncertainty that exists in many cases. The role of quality on developmental work is to make sure that adequate controls exist to support movement into commercialization.

WTPSP addresses internal verification and validation activities by conducting an Independent Technical Review of the final data report in accordance with WTPSP's procedure QA-WTPSP-0601, *Document Preparation and Change*. This review verifies that the reported results are traceable, that inferences and conclusions are soundly based, and the reported work satisfies the test plan objectives. Appendix B lists the reviewed test plan, test instructions (TIs), and calculation packages used for the tests documented in this report.

Acknowledgments

Preparing, executing, and post-processing scale model measurements involved a number of Pacific Northwest National Laboratory staff. We would like to particularly acknowledge the support of our quality engineer, Kirsten Meier, and the administrative support from Chrissy Charron and Mona Champion. We would also like to express our appreciation to scientific staff members Ernest Antonio, Julia Flaherty, Carmen Arimescu, Mikhail Pekour, and Xiao-Ying Yu who conducted measurements under a variety of weather conditions. Additionally, Gary Josephson provided the technical review. Michael Parker provided editorial support for this report.

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Acronyms

%COV	percent coefficient of variation
acfm	actual cubic feet per minute
	*
afpm	actual feet per minute
ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
BNI	Bechtel National, Inc.
ССР	computer-assisted calculation package
CFR	Code of Federal Regulations
DOE	U.S. Department of Energy
DV	hydraulic diameter \times mean velocity
EPA	U.S. Environmental Protection Agency
HDI	"How Do I?"
HEPA	high-efficiency particulate air (filter)
HPS	Health Physics Society
LB-S1	LAB C3V ventilation system emission unit
NESHAP	National Emissions Standards for Hazardous Air Pollutants
OPC	optical particle counter
PNNL	Pacific Northwest National Laboratory
QA	quality assurance
scfm	standard cubic feet per minute
SF_6	sulfur hexafluoride
sfpm	standard feet per minute
TI	test instruction
WTP	Hanford Tank Waste Treatment and Immobilization Plant
WTPSP	Waste Treatment Plant Support Program

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1.0 Introduction

The purpose of these scale model tests is to document the extent to which the current Bechtel National, Inc. (BNI) design for the LAB C3V (LB-S1) air exhaust stack in the Hanford Tank Waste Treatment and Immobilization Plant (WTP) meets the applicable regulatory guidance. Title 40 of the Code of Federal Regulations (CFR), Part 61, National Emissions Standards for Hazardous Air Pollutants (NESHAP), Subpart H, *National Emission Standard For Emissions of Radionuclides other than Radon from Department of Energy Facilities* requires that a sampling probe be located in the exhaust stack according to the criteria of the American National Standards Institute/Health Physics Society (ANSI/HPS) N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stack and Ducts of Nuclear Facilities*^(a). The capability of the sampling probe locations to meet this standard has been demonstrated with a series of tests on scale models as described in the standard. The resulting data will be used by BNI as input to the air discharge permitting process before WTP cold commissioning.

This work is performed as part of the River Protection Project—Waste Treatment Plant Support Program under Contract No. DE-AC05-76RL01830 according to the statement of work issued by BNI (BNI 24590-QL-SRA-W000-00101, *N13.1-1999 Stack Monitor Scale Model Testing and Qualification*, Revision 2) and Work Authorization 09 of Memorandum of Agreement 24590-QL-HC9-WA49-00001 and modified by Subcontract Change Notices 123 and 126. The internal Pacific Northwest National Laboratory (PNNL) project for this task is 53024, *Work for Hanford Contractors Stack Monitoring*.

PNNL personnel conducted the scale model tests in 2012. No BNI personnel were directly involved in the tests. BNI WTP point of contact and facility engineers provided the most current engineering input to support PNNL's tests. BNI retains responsibility for the technical design of the stack discharge and air monitoring systems.

1.1 Qualification Criteria

The qualification criteria for the location of a stack air monitoring probe are taken from ANSI/HPS N13.1-1999 and paraphrased as follows:

- <u>Uniform Air Velocity</u>—It is important to have fairly uniform gas velocity across the stack cross-section where the sample is extracted. Consequently, the velocity is measured at several discrete points in the duct cross-section at the proposed location of the sampling nozzle. Uniformity is defined as the variability of the measurements about the mean and expressed using the percent coefficient of variation (%COV).^(b) The %COV is calculated as the standard deviation divided by the mean and expressed as a percentage; thus, the lower the %COV value, the more uniform the velocity. The qualification criterion is that the %COV of the air velocity must be ≤20 in the center two-thirds of the duct cross-section where the sampling probe is to be located.
- 2. <u>Angular Flow</u>—Sampling nozzles are typically aligned with the axis of the stack. If air travels through the stack in cyclonic fashion, the air velocity vector approaching a sampling nozzle could be

⁽a) Health Physics Society, McLean, VA 22101. The standard has been reaffirmed in 2011 and is identical to the 1999 version. The regulations have not been updated yet, so the 1999 version is still referenced.

⁽b) *Coefficient of variation* is considered dated terminology. The modern equivalent is *percent relative standard deviation*. Older terminology is used here for consistency with the standard.

sufficiently misaligned with the nozzle to impair the extraction of particles. Consequently, the flow angle is measured in the duct at the proposed location of the sampling probe. The average of the flow angle measurements (made at the same grid of points as the velocity measurements) should not exceed 20° relative to the sampling nozzle axis.

- 3. <u>Uniform Concentration of Tracer Gases</u>—A uniform contaminant concentration in the sampling plane enables the extraction of samples that represent the true concentration within the duct. The uniformity of the concentration is first tested with a tracer gas to represent gaseous effluents. The fan is a good mixer, so injecting the tracer downstream of the fan provides worst case results. The qualification criteria are that 1) the %COV of the measured tracer gas concentration is ≤20 across the center two-thirds of the duct cross-section at the sampling location, and 2) the concentrations at all the measurement points do not deviate from the mean by >30 percent.
- 4. <u>Uniform Concentration of Tracer Particles</u>—The second set of tests addressing contaminant concentration uniformity at the sampling position uses tracer particles large enough to exhibit inertial effects. Tracer particles with an aerodynamic diameter of 10 µm are used by default unless it is known that larger contaminant particles will be present in the airstream. The qualification criterion is that the %COV of particle concentration is ≤20 across the center two-thirds of the duct at the sampling location.

Tests to determine if all criteria were met were conducted on a scale model of the LB-S1 stack. Conducting tests on a scale model of the exhaust system allows for the designed air sampling location to be qualified before cold commissioning and, in the case that testing results are not satisfactory, for design compensations to be made. Tracer concentration, velocity, and flow angle measurements were made using the same grid of points and duct cross-section. The ANSI/HPS N13.1-1999 standard sets additional qualification criteria for the use of a scale model as a substitute for the actual stack, including the following:

- the scale model and its sampling location must be geometrically similar to the actual stack
- the product of the hydraulic diameter and the mean velocity (DV value) for the scale model must be within a factor of six of the DV value for the actual stack
- the Reynolds number for the actual and model stacks must be >10,000.

The scale model results are considered valid if it is further shown that:

- the velocity profile in the actual stack meets the uniformity criterion (%COV ≤ 20)
- the velocity uniformity COV values for the actual and model stacks agree within 5 %COV
- the flow angle criterion (with a mean value $\leq 20^{\circ}$) is met.

Subsequent sections of this report provide descriptions and results of scale model testing. Tests to determine the validity of the scale model testing will be included in cold startup testing of the actual WTP stack under a separate test plan.

2.0 LAB C3V (LB-S1) Stack

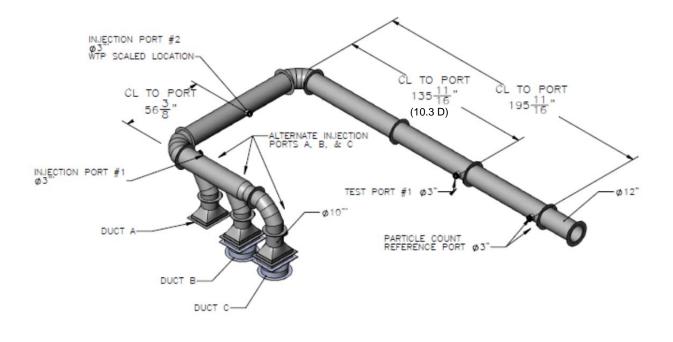
2.1 Stack Geometry

Figure 2.1 provides the layout for the LB-S1 stack design. Figure 2.2 and Figure 2.3 provide photos of the scale model used for testing. Air was drawn in through four high efficiency particulate air (HEPA) filters to a common plenum. Duct heaters were installed between the common plenum and the fans to facilitate cold-weather testing.^(a) Two fans were connected to duct A, B, or C. At each fan outlet a damper was installed to simulate the flow turbulence of the backdraft damper in WTP BNI design documents. In all cases, two fans were used and the unused inlet was blanked off. It should be noted that the test system upstream of the backdraft dampers was not to scale.

The test system was to scale from the backdraft dampers to the end of the stack. Some of the scaled design dimensions are provided in Figure 2.1. Test Port 1 represents the planned location for operational stack sampling according to current WTP BNI designs (10.3 duct diameters from the last pipe elbow to the sampling plane). All injection ports are located downstream of the fans and are therefore considered conservative in terms of mixing. Injection Port 2 is the WTP-based prototypic injection port and was used for most of the scaled testing. Injection Port 1 was an optional injection located further upstream in case mixing proved inadequate from the WTP prototypic location. Mixing proved satisfactory for all cases. Only one particle tracer test used Injection Port 1. Injection Ports A, B, and C are additional optional injection locations located immediately downstream of the fans and were not used for this testing.

The scaling ratio of the actual dimensions to the scale model dimensions is 5:1. The scale model was constructed with a duct diameter of 12 in. for convenience and to maintain the ability to re-use duct sections for subsequent stack designs. Table 2.1 lists the diameter of the actual stack with the scaling factor for the 12-in. scale model diameter. The calculations of the key scale model dimensions were performed in spreadsheets and verified and validated in accordance with the Waste Treatment Plant Support Program (WTPSP's) procedure QA-WTPSP-0304, *Calculations*. ANSI/HPS N13.1-1999, Clause 5.2.2.2, requires that the models be geometrically similar to the actual stacks. Acceptable deviations in key dimensions of the scale model arising from scaling and fabrication errors are within ± 5 percent for cross-sectional dimensions and 25 percent of a duct diameter in overall length between the sampling point and the flow disturbances. These deviations have less impact on the test results than the normal standard deviation of repeat tests. However, to minimize the deviations due to construction, the construction specification called for a tolerance of $\pm \frac{1}{8}$ in. per 10 ft parallel to the direction of flow and $\pm \frac{1}{8}$ in. for cross-sectional dimensions. The key scale model dimension for the as-built scale models were measured and recorded by testing staff.

⁽a) The air temperature in the operating WTP air exhaust stacks does not need to be simulated because it has negligible effect on the turbulence produced by the geometries of the systems. However, the air temperature during particle tracer uniformity testing was maintained above 55°F so that the optical particle counters and gas analyzer would provide reliable data.



3 FANS INLETS 2 USED AT A TIME FOR TESTING

Figure 2.1. Layout of the LB-S1 Test System

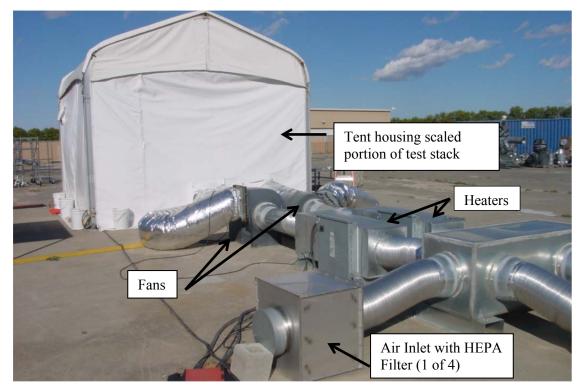


Figure 2.2. Photo of Outdoor (not-to-scale) Portion of the LB-S1 Test System



Figure 2.3. Photo of Air Inlet to the Scaled Portion of the LB-S1 Test System (configuration shown with fans connected to Ducts A and B with Duct C blanked off)

Table 2.1 .	Scaling Factor for	12-in. Diameter	Scale Model Stack
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	Actual Stack Diameter	Scaling Factor
LB-S1	60 in.	5

2.2 Stack Flows

Tests of scale model stacks were conducted at flow rates that bracket the range of expected normal and accident flow rates and operating configurations. Various combinations of flow rates and operating configurations were tested. BNI provided normal, minimum, and maximum flow rates for each of the three systems tested in this group. Maximum flow rates are approximately 120 percent of the normal flow rates, whereas minimum flow rates are approximately 83 percent of normal.

Additional considerations come from Clause 5.2.2.2 of the ANSI/HPS N13.1-1999 standard. The standard requires that the scale model's DV value be within a factor of six of the actual stack. For stacks with a circular cross-section, this is equivalent to requiring that the ratio of flow rate to stack diameter be within a factor of six of the actual stack. In addition, the standard requires that the Reynolds number for the prototype and model stacks both exceed 10,000.

Three fans are available for the LB-S1 exhaust system, which exhausts air from the C3 ventilation system in the laboratory facility. Two fans will be operated at a time and one will be on standby. The maximum, normal, and minimum flow rates in the LB-S1 exhaust system are expected to be 84,900, 73,350, and 62,750 standard cubic feet per minute (scfm), respectively. At the design temperatures (maximum, normal, and minimum) and pressures the target actual flows to be scaled for modeling are 88,800, 74,150, and 61,600 actual cubic feet per minute (acfm), respectively. Each fan is equipped with an adjustable-speed drive to compensate for filter loading and pressure variations.

Table 2.2 lists the range of design flow conditions for the actual stack, including the air flow (in acfm), air velocity (in actual feet per minute [afpm]) and the Reynolds number. The table also lists the corresponding model operating parameters needed for the scale model's hydraulic diameter × mean velocity (DV) value to be within a factor of 6 (i.e., $^{1}/_{6}$) of the actual stacks. The conditions prescribed for these scale model tests fulfill the criterion of a Reynolds number >10,000.

	Air Flow (acfm)Air Velocity (afpm)		Reynol	Reynolds Number		
Fan(s)–Flow	Actual Stack	Scale Model Minimum	Actual Stack	Scale Model Minimum	Actual Stack	Scale Model Minimum
Dual fan – Max flow	88,800	2960	4580	3816	2.1E+06	3.6E+05
Dual fan – Normal flow	74,150	2472	3824	3187	1.9E+06	3.2E+05
Dual fan – Min flow	61,600	2053	3177	2647	1.7E+06	2.2E+05

Table 2.2. Summary of Flow Parameters for the Actual and Scale Model Stacks

Table 2.3 lists the DV values for the actual and scale model stacks for the operating conditions given in Table 2.2. It also lists the scale model DV when the air velocity in the model stack matches that of the actual stack, which is our preferred operating condition for the model if the fan capacity will accommodate it.

	DV (ft ² /min)			
Fan(s)—Flow	Predicted for Actual Stack	Scale Model Minimum	Scale Model Maximum	
LB-S1				
Dual fans-Max flow	22,900	3816	4580	
Dual fans-Normal flow	19,120	3187	3824	
Dual fans-Min flow	15,885	2647	3177	

 Table 2.3.
 Summary of DV Values for the Actual and Scale Model Stacks

3.0 Testing Methods

The testing methods were based on the requirements of ANSI/HPS N13.1-1999, Clauses 5.2 and 5.3. A test plan, TP-WTPSP-094, *Air Sampling Probe Location Tests for Waste Treatment Plant LAB C3V* (*LB-S1*) *Air Exhaust System*, was prepared by PNNL and approved by BNI. This plan referenced the use of PNNL procedures, which define, in general, how tests should be conducted. A test instruction (TI) was prepared for each test type and each scale model stack. These TIs contain specific instructions pertaining to the tests that are not addressed in the general procedures. Such information includes the following:

- layout of measurement points
- location of tracer injection points
- list of equipment and instrumentation
- safety requirements
- list of test runs
- test description and measurement data sheets with hand entries
- table of preliminary results.

Because the final data sheets and a description of the test methods are included in this report, the TIs are not included. This project's quality assurance (QA) program is described in Section 3.1 of this report. A summary of the methods used for each test type is presented in Section 3.2.

3.1 Quality Assurance

The PNNL QA program is based on the requirements defined in the U.S. Department of Energy (DOE) Order 414.1D, *Quality Assurance*, and 10 CFR 830, *Energy/Nuclear Safety Management*, and Subpart A—*Quality Assurance Requirements* (a.k.a., the Quality Rule). PNNL has chosen to implement the following consensus standards in a graded approach:

- ASME NQA-1-2000, *Quality Assurance Requirements for Nuclear Facility Applications*, Part I, "Requirements for Quality Assurance Programs for Nuclear Facilities" (ASME 2001)
- ASME NQA-1-2000, Part II, Subpart 2.7, *Quality Assurance Requirements for Computer Software for Nuclear Facility Applications* (ASME 2001)
- ASME NQA-1-2000, Part IV, Subpart 4.2, Graded Approach Application of Quality Assurance Requirements for Research and Development (ASME 2001).

The procedures necessary to implement the requirements are documented through PNNL's "How Do I...?" (HDI), which is a system for managing the delivery of laboratory-level policies, requirements, and procedures.

The WTPSP implements an NQA-1-2000 QA program using the graded approach presented in NQA-1-2000, Part IV, Subpart 4.2. The WTPSP QA manual (QA-WTPSP-0002) describes the technology life cycle stages under the WTPSP QA plan (QA-WTPSP-0001). The technology life cycle includes the progression of technology development, commercialization, and retirement in process phases of basic and applied research and development (R&D), engineering and production, and operation until

process completion. The life cycle is characterized by flexible and informal QA activities in basic research, which become more structured and formalized through the applied R&D stages.

- Basic Research—Basic research consists of research tasks conducted to acquire and disseminate new scientific knowledge. During basic research, maximum flexibility is desired to allow the researcher the necessary latitude to conduct the research.
- Applied Research—Applied research consists of research tasks that acquire data and documentation necessary to confirm satisfactory reproducibility of results. The emphasis during this stage is on achieving adequate documentation and controls necessary to achieve reproducible results.
- Developmental Work—Developmental work consists of research tasks moving toward technology commercialization. These tasks still require a degree of flexibility because, in many cases, a degree of uncertainty still exists. The role of quality on developmental work is to make sure that adequate controls exist to support movement into commercialization.
- R&D Support Activities—Support activities are conventional and secondary activities that support the advancement of knowledge or development of technology, but allow the primary purpose of the work to be accomplished in a credible manner. An example of a support activity is controlling and maintaining documents and records. The level of quality for these activities is the same as for developmental work.

The work described in this report has been completed as Developmental Work. WTPSP addresses internal verification and validation activities by conducting an independent technical review of the final data report in accordance with WTPSP procedure QA-WTPSP-0601, *Document Preparation and Change*. This review verifies that the reported results are traceable, that inferences and conclusions are soundly based, and that the reported work satisfies the test plan objectives. Appendix B lists the reviewed test plan, TIs, and calculation packages used for the tests documented in this report.

3.2 Stack Tests

The qualification tests described in the following sections were conducted under flow conditions between approximately 83 and 120 percent of the normal design flow condition listed in Table 2.2. The test matrix included with TP-WTPSP-094 described the minimum number of tests required for the LB-S1 stack.

Before conducting the tests to determine whether the qualification criteria described in Section 1.1 were met, two additional measurement sets were made. First, the major features of the stack were measured, including the longitudinal distances from the fan ducts to the bends, reducers, and ports and the duct diameter at each port. The second set of preliminary measurements determined the fan frequency drive settings needed to achieve the desired flow rates. For these measurements, the location within the duct cross-section with velocity measurements closest to the mean velocity was determined at Test Port 1. Next, velocities were measured at this location in 5-Hz fan frequency increments. By developing a frequency vs. velocity relationship for the scale model stack, the frequency setting needed to achieve the targeted flow conditions was determined.

Measurements were made at specific locations within the duct for each of the four qualification criteria tests. The number and distance between measurement points was based on U.S. Environmental

Protection Agency (EPA) procedure 40 CFR 60, Appendix A, Method 1, for circular stacks. For 12- to 24-in. duct diameters, eight traverse points are required at the relative positions shown in Figure 3.1. Measurements were also taken at the center point. In lieu of using two measurement points nearest to the walls at 3.2 percent of the duct diameter from the duct walls, the minimum distance from the wall was set to 0.5 in., as prescribed by EPA Method 1. The measurement point closest to the port was labeled Point 1 and the point farthest from the port was labeled Point 8.

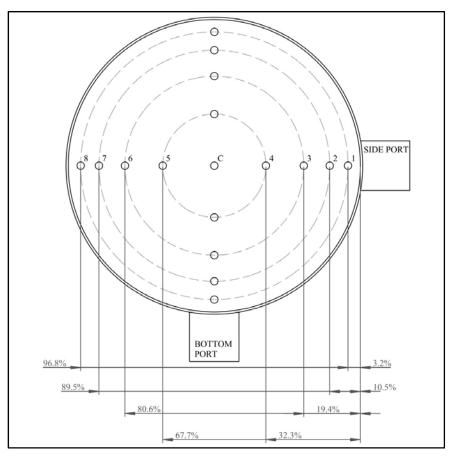


Figure 3.1. Cross-Section of the Duct at the Testing Ports With Measurement Points

3.2.1 Velocity Uniformity

The uniformity of air velocity at the stack monitoring location indicates whether the momentum in the stack is evenly distributed. The method used to conduct the velocity uniformity tests was based on 40 CFR 60, Appendix A, Method 1. The criterion for qualification from the velocity uniformity test is that the %COV should be less than 20 in the center two-thirds of the duct (i.e., Points 2-7).

For each run, three air velocity readings were obtained at each measurement point. The measured velocity was the average of the three readings. The measured velocity for each point was used to determine the mean and standard deviation of the velocity across the cross-sectional plane. The %COV was calculated as the standard deviation divided by the mean expressed as a percentage.

Air velocity and duct air temperature measurements were made using a handheld thermal anemometer. The thermal anemometer compensates for temperature and barometric pressure to report velocity in standard feet per minute. Figure 3.2 shows the thermal anemometer (TSI, Model 9535, Shoreview, Minnesota) used for this test. Testing was conducted in accordance with EMS-JAG-04 and TI-WTPSP-098.

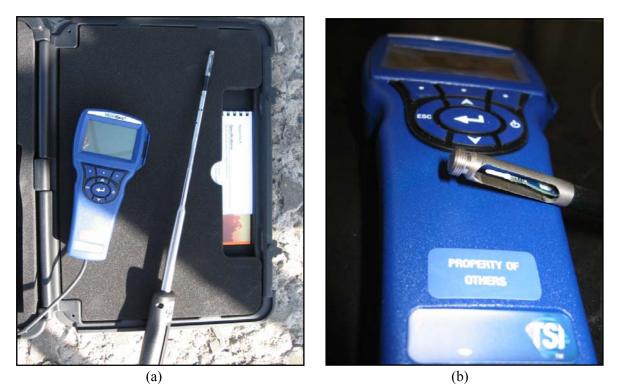


Figure 3.2. Thermal Anemometer Used for the Velocity Uniformity Test: (a) Thermal Anemometer Device, and (b) Close-Up of Thermal Anemometer Probe Tip

3.2.2 Flow Angle

The air velocity vector approaching the sample nozzle should be aligned with the axis of the nozzle within an acceptable range so that the sample extraction performance is not degraded. The test method is based on 40 CFR 60, Appendix A, Method 1, Section 11.4, "Verification of the Absence of Cyclonic Flow." The term "flow angle" refers to the angle between the velocity vector of the flow in the duct and the axis of the sampling nozzle. For testing activities, the flow angle was measured at a grid of nine points across two axes in a cross-section of the duct (see Figure 3.3). The qualification criterion for the flow angle test is that the average angle should not exceed 20°.

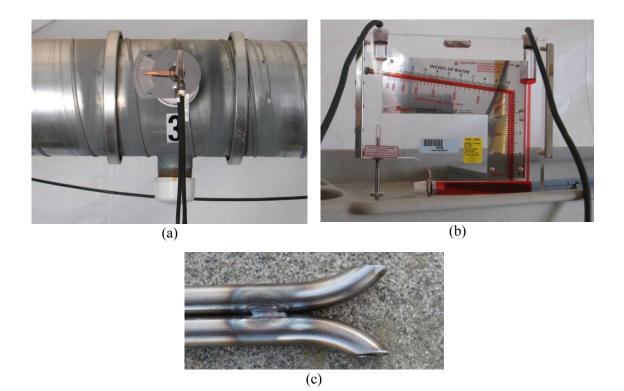


Figure 3.3. Equipment Used for the Flow Angle Test Included (a) an S-Type Pitot Tube Inserted in a Measurement Port With the Protractor Plate, and (b) a Slant-Tube Manometer; (c) Shows the Openings at the Tip of the S-Type Pitot Tube

Flow angles were measured using an S-type Pitot tube (Dwyer Instruments, 160S-36, Michigan City, Indiana) attached by flexible tubing to a slant-tube manometer (Dwyer Instruments, 400-5) and a protractor plate attached to the sampling port as shown in Figure 3.3. For this test, the Pitot tube was rotated so that the planes of the two openings at the tip of the tube were parallel to the flow in the duct. The protractor plate (metal plate and pointer in Figure 3.3a) indicates angles using markings at every degree from -30 degrees to +30 degrees. When the pressures on both tubes of the S-type Pitot tube were equal (as indicated by the manometer), the Pitot tube was perpendicular to the flow. The measured flow angle for each point is the average of the three readings. These measured values were used to calculate the mean absolute value of the flow angle across the duct. Testing was conducted in accordance with EMS-JAG-05 and TI-WTPSP-099.

3.2.3 Gaseous Tracer Uniformity

The gaseous contaminant concentration uniformity was demonstrated using the tracer gas sulfur hexafluoride (SF₆). A compressed gas cylinder and a flow controller were used to deliver a constant stream of SF₆ into the duct. For this testing the gaseous tracer was injected into the duct through Injection Point 2 (WTP prototypic location) downstream of the fans. Figure 3.4 shows the injection locations with an injection probe positioned in the port. For separate test runs, the injection probe was positioned at one of five different locations in the duct cross-section as illustrated in Figure 3.4. For some tests, only the centerline position was used. The remaining four injection locations were within a specified distance of the duct wall. For a nominally 12-in. diameter duct, the four wall injection locations are within 2.4 in. of the wall.

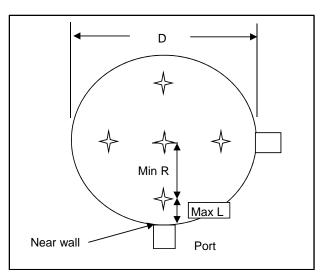


Figure 3.4. Illustration of Five Injection Points in a Circular Duct. Note: Max L is the maximum distance from the wall, which is 20 percent of the radius. Therefore, Min R, the minimum radius from the duct center, is 80 percent of the hydraulic radius. In the case of a round duct, the hydraulic diameter is equal to the physical diameter (D).

For each test run, the tracer concentration was read three times at each measurement point. The measured concentration for each point is the average of the three readings. These measured concentrations were used to calculate the overall mean, standard deviation, and %COV. These calculations were also performed just for the measurement points in the center two-thirds of the duct. The qualification criteria for the gaseous tracer test are that 1) the %COV should be ≤ 20 within the center two-thirds of the duct, and 2) the concentration at any measurement point should not deviate from the overall mean by more than 30 percent.

A photoacoustic gas analyzer (Brüel & Kjær, Model 1302, Ballerup, Denmark) was used to measure tracer gas concentrations. Because concentration variation is the important result for this test, calibration bias is not important. However, the analyzer response was checked against calibration standards before testing, on a weekly basis during testing, and after all tests were completed to verify adequate instrument response. The response was considered acceptable if the concentration from the instrument was within 10 percent of the calibration standard.

A simple probe was used to extract samples and deliver them to the gas analyzer. A small pump drew air from within the stack through the probe. The gas analyzer samples the air from the sample line for analysis.

Figure 3.6 shows the equipment setup for this test. Testing was conducted in accordance with EMS-JAG-01 and TI-WTPSP-100.

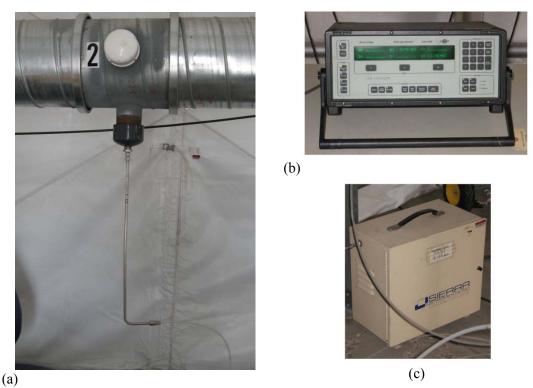


Figure 3.5. Equipment Used for the Gaseous Tracer Sampling: (a) example showing sampling probe installed in a port, (b) gas analyzer, and (c) sampling pump

3.2.4 Particle Tracer Uniformity

Particulate contaminant concentration uniformity was tested using polydisperse pump oil particles as a particle tracer. Vacuum pump oil was drawn into a spray nozzle (driven by compressed air) housed in a plastic chamber. The aerosol particles were injected into Injection Port 2 (downstream of the fans) as shown in Figure 3.6. Collectively, the plastic chamber and spray nozzle assembly are referred to as the aerosol generator. The aerosol was injected at the centerline of the duct. Some test runs were replicated to determine reproducibility.

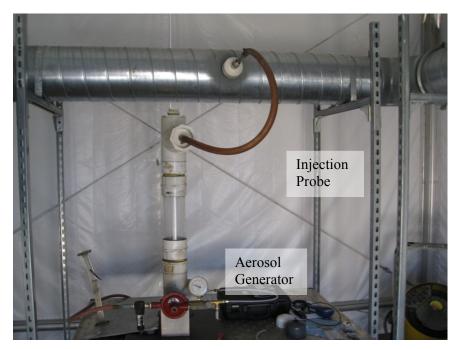


Figure 3.6. Equipment Used for Particle Injection

The concentration of the particles was measured at the sampling grid points with a calibrated optical particle counter (OPC, Hach, Met-One Model 3415, Loveland, Colorado). A simple probe was used to extract the sample and deliver it to the OPC. Figure 3.7a and b show the sampling setup with the sample probe connected to an OPC at the Particle Count Reference Port and Test Port 1, respectively. Figure 3.8 shows the sampling probe used. For the LB-S1 testing only the L-shaped probe was used. The OPC sorts the particles into eight size channels. As mentioned in Section 1.1, the particles of interest have an aerodynamic diameter of 10 μ m. Therefore, only data in the 9- to 11- μ m channel of the OPC were used.

The particle concentration was measured three times at each of the measurement points across the cross-section of the duct. The measured concentration for each point is the average of the three readings. From these measurements, the overall mean standard deviation and %COV were calculated for all of the points and also just for those within the center two-thirds of the duct. The qualification criterion for the particle tracer test is that the %COV should be ≤ 20 within the center two-thirds of the duct. Testing was conducted in accordance with EMS-JAG-02 and TI-WTPSP-101.



Figure 3.7. Particle Counters Used for the Particle Sampling: (a) Reference Measurement Installed in Particle Count Reference Port, and (b) Sample Measurement Installed at Test Port 1



Figure 3.8. Sampling Probe Used for Particle Sampling

4.0 Stack Testing Results

This section summarizes the results of the stack testing activities for LB-S1. The primary, reportable results are the data and data calculations used to confirm that the requirements of the ANSI/HPS N13.1-1999 standard have been met. Independent reviews were performed to verify the data transcription and calculations. Calculations were performed using Microsoft Excel and documented in computer-assisted calculation packages (CCPs) in accordance with WTPSP procedures. The final data sheets are included in Appendix A. Tables summarizing test results are presented in the following sections.

4.1 LB-S1 Velocity Uniformity

Test results used to determine the fan frequency setting for the LB-S1 model are included in Appendix A.1. Table 4.1 lists the results for the velocity uniformity tests performed on the model LB-S1 stack (VT-1 through VT-20). In all cases the results were well within the criterion of %COV values \leq 20. The mean velocity during testing ranged from 2573 to 4319 afpm (with corresponding flow rates of 2007 to 3375 scfm). The completed data sheets from these tests are included in Appendix A.2.

Table 4.1 also lists the targeted velocity range. The lower bound of the range meets both the Reynolds number and DV value criteria and the upper bound of the range corresponds to expected velocities in the stack under normal, maximum, and minimum flow conditions. The mean velocity tested was approximately 1 percent lower than the targeted range for fans AB, minimum flow conditions (i.e., VT-9 through VT-12). All other maximum, normal, and minimum flow conditions tested were within the targeted velocity range. The broader velocity range tested for fans AB met the %COV criteria. Further, the targeted velocity range was met with fans AC and BC, which also met the %COV criteria. The data, in totality, indicate the acceptability of the Test Port 1 location based on the velocity uniformity criteria.

The radial orientation of the test port in the actual LB-S1 stack had not been finalized as of this testing. To evaluate possible impacts due to changes in test port orientation, Runs V-19 and V-20 were conducted with the test port rotated 45°, which is the maximum possible angular deviation from the baseline. Table 4.1 indicates that V-19 and V-20 were in line with other measurements and well within 20 %COV. Therefore, changes in test port orientation are not expected to impact %COV and should not alter the conclusions of this report.

Table 4.2 summarizes the velocity uniformity %COV results as a function of operating fan and flow condition. In general, the %COV decreased with decreasing flow rate for all fan configurations, which is consistent with results for other stack configurations reported by Glissmeyer (2011). The %COV for fans AC are comparatively high for all flow conditions. This is likely an artifact of higher wind speeds during this testing (VT-13 through VT-15 were carried out in the same afternoon with wind speeds approaching the limit for testing). Nevertheless the %COV values are far below the qualification criterion of 20, regardless of any possible impacts due to wind speed. Results indicate that Test Port 1 is an acceptable location based on the %COV criterion.

Operating Fan(s)	Flow Condition	Run No.	Targeted Velocity (afpm)	Mean Velocity (afpm)	%COV	
		VT-1	3816-4580	4274	5.9	
	Maximum	VT-2	3816-4580	4319	7.6	
	(~120%)	VT-3	3816-4580	4154	5.2	
		VT-4	3816-4580	4220	5.6	
		VT-19 ^(a)	3816-4580	4247	4.0	
	_	VT-20 ^(a)	3816-4580	4232	4.3	
4.0	Normal	VT-5	3187-3824	3596	3.9	
AB	(100%)	VT-6	3187-3824	3612	3.4	
		VT-7	3187-3824	3585	4.2	
		VT-8	3187-3824	3566	4.2	
	Minimum	VT-9	2647-3177	2573	3.5	
	(~83%)	VT-10	2647-3177	2614	3.3	
		VT-11	2647-3177	2614	3.3	
		VT-12	2647-3177	2616	3.1	
	Maximum	VT-13	3816-4580	4210	7.2	
	(~120%)	VT-14	3816-4580	4146	7.4	
AC	Minimum (~83%)	VT-15	2647-3177	2939	6.4	
	Maximum	VT-16	3816-4580	4071	3.4	
BC	(~120%)	VT-17	3816-4580	4221	4.0	
БС	Minimum (~83%)	VT-18	2647-3177	2934	3.4	
Similar test conditions are alternately shaded and unshaded. (a) Test Port 1 was rotated 45 degrees.						

Table 4.1. Summary of LB-S1 Velocity Uniformity Tests

Table 4.2. LB-S1 Velocity Uniformity (%COV) as a Function of Operating Fans and Nominal Flow Rate

Flow Rate Regime	Fan AB	Fan AC	Fan BC
Max (~120%)	6.1	7.3	3.7
Normal (100%)	3.9		
Min (~83%)	3.3	6.4	3.4

Entries for a specific combination of flow regime and operating fans are average results from multiple tests when available; otherwise, the entries are the results from single tests. Although averaging is not the traditional statistical way to combine %COV values, it suffices for data summary purposes.

4.2 LB-S1 Flow Angle

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Table 4.3 lists the results for the flow angle tests performed on the model LB-S1 stack. Results for all tests were well within the criterion of mean flow angle values $\leq 20^{\circ}$. Overall, mean absolute flow angle ranged between 3 and 7°. Individual mean flow angle measurements from specific locations were more

variable ranging between -14 and $+19^{\circ}$. Each measurement point was measured three times with an average standard deviation of 1.7°. The standard deviation is an indication of the precision in the flow angle measurement as well as the actual variability within the stack at a particular point. Run FA-10 had the highest uncertainty in individual measurements with a standard deviation of 4.6°, almost 3 times the average. Winds during this test approached 18 mph. FA-10 conditions were repeated (with lighter wind conditions) in FA-11 and FA-12 and the standard deviation at each measurement point decreased to near the average (1.9 and 1.7°, respectively).

Operating Fans	Flow Regime	Run No.	Approximate Air Velocity (sfpm)	Mean Absolute Flow Angle (°)	
	Maximum	FA-1	4407	5.2	
	(~120%)	FA-2	4573	5.2	
		FA-10 ^(a)	4273	4.7	
		FA-11 ^(a)	4324	3.5	
AB		FA-12 ^(a)	4257	4.2	
	Normal (100%)	FA-3	3789	5.9	
		FA-4	3820	6.6	
	Minimum	FA-5	3140	5.7	
	(~83%)	FA-6	2931	6.8	
10	Maximum	FA-7	4361	6.9	
AC	(~120%)	FA-8	4468	6.4	
BC	Maximum (~120%)	FA-9	4455	6.0	
Similar test conditions are alternately shaded and unshaded. (a) Test Port 1 was rotated 45 degrees.					

Table 4.3. Summary of LB-S1 Flow Angle Tests

The radial orientation of the test port in the actual LB-S1 stack had not been finalized as of this testing. To evaluate possible impacts due to changes in test port orientation, FA-10, FA-11, and FA-12 were conducted with the test port rotated 45°, which is the maximum possible angular deviation from the baseline. Table 4.3 indicates that the flow angles were in line with other measurements and well within the qualification criterion of $\leq 20^{\circ}$. Therefore, changes in test port orientation are not expected to impact flow angle and should not alter the conclusions of this report.

Table 4.4 summarizes the flow angle results at the flow regimes tested for each of the three fan configurations. Results indicate that the Test Port 1 is an acceptable location based on the flow angle criterion. The completed data sheets from these tests are available in Appendix A.3.

Table 4.4. LB-S1 Mean Flow Angle (°) at Three Flow Regimes as a Function of Operating Fan

Flow Rate Regime	Fan AB Fan AC		Fan BC			
Max (~120%)	4.6	6.7	6.0			
Normal (100%)	6.3					
Min (~83%)	6.3					
Entries for a specific combination of flow regime and fans are average results from multiple tests when available; otherwise, the entries are the results from single tests.						

4.3 LB-S1 Gaseous Tracer Uniformity

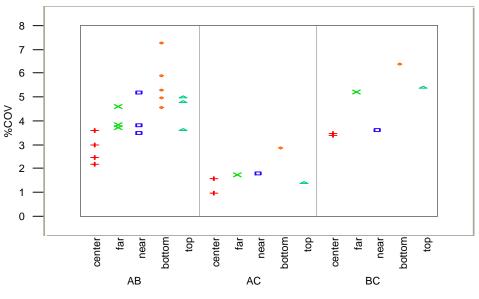
Table 4.5 lists the results for the gaseous tracer uniformity tests performed on the model LB-S1 stack for Test Port 1 and the tracer injection at Injection Port 2. In all cases, the tracer was well mixed, with results well within the criteria of %COV values ≤ 20 and absolute values of maximum deviation ≤ 30 percent. The %COV values ranged from 1.0 to 7.3. The absolute value of the maximum deviation from the mean ranged from 2.0 to 14.9 percent. The completed data sheets from these tests are available in Appendix A.4.

Fans	Injection Port	Test Port	Injections Position	Run Nos.	Target Avg. (fpm)	Approximate Air Velocity (afpm)	% COV	Abs % Max Deviation from Mean
AB Max 2			Center	GT-13		4368	2.2	4.3
		1	Far	GT-14	3816-4580	4379	3.7	7.4
	2		Near	GT-15		4376	3.8	6.3
			Bottom	GT-16		4384	5	8.4
			Тор	GT-17		4166	5	11.1
AB 2 Normal			Тор	GT-18	3187-3824	3686	4.8	11.5
		1	Center	GT-19		3670	3	5.5
	2		Far	GT-20		3644	3.8	7.7
			Near	GT-21		3681	5.2	10.9
			Bottom	GT-22		3691	5.3	9.3
			Bottom	GT-23		2859	7.3	14.9
AB Min 2			Center	GT-24		2924	2.5	5.5
	2	1	Center	GT-25	0(47.0177	2952	3.6	6.1
	2	1	Far	GT-26	2647-3177	2964	4.6	8.8
			Near	GT-27		2923	3.5	11.9
			Тор	GT-28		2915	3.6	10.9
AC Max			Center	GT-7	3816-4580	4491	1.0	2.0
		1	Far	GT-8		4358	1.7	4
	2		Near	GT-9		4523	1.8	4.4
			Bottom	GT-10		4486	2.9	6.5
			Тор	GT-11		4477	1.4	2.9
AC Min	2	1	Center	GT-12	2647-3177	3058	1.6	3.5
BC Max	2	1	Center	GT-1		4386	3.4	7
			Far	GT-2		4398	5.2	12.4
			Near	GT-3	3816-4580	4324	3.6	10
			Bottom	GT-5		4246	6.4	13.4
			Тор	GT-4		4332	5.4	9.9
BC Min	2	1	Center	GT-6	2647-3177	3005	3.5	9.9
AB Min	2	1	Bottom	GT-29	2647-3177	2952	5.9	14.2
repeats			Bottom	GT-30		2933	4.6	11.6
AB Min			Bottom	GT-31		2904	4.1	11.6
45 deg offset	2	1	Bottom	GT-32	2647-3177	2903	5.3	9.1

Table 4.5. Summary of LB-S1 Gas Tracer Uniformity Tests

Figure 4.1 and 4.2 show gas tracer %COV and %maximum deviation from mean, respectively, plotted as a function of operating fans and gas injection location. The plots have similar trends and indicate a correlation between the criteria. Regardless of operating fan, the center injection point had the

least %COV indicating best mixing from a center injection location. Off-center injection points had higher %COV with the bottom injection point having the highest. Fan speed did not significantly impact these trends. Regardless of tracer gas injection location, the gas tracer %COV results were all well below the limit of 20 %COV and the percent absolute value of the deviation from the mean was well below the limit of 30 percent. Results indicate that the Test Port 1 is an acceptable location based on the criterion for gaseous tracers.



Injection Positon by Fans

Figure 4.1. Gas Tracer %COV Displayed as a Function of Injection Location and Operating Fans

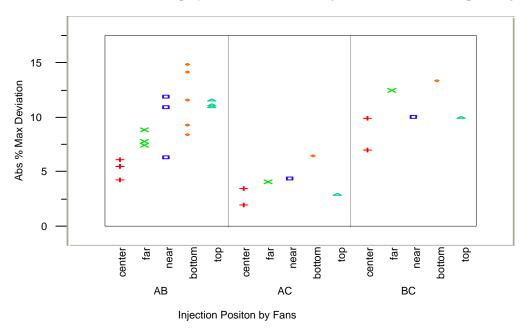


Figure 4.2. Absolute Value of the Maximum Deviation Displayed as a Function of Injection Location and Operating Fans

4.4 LB-S1 Particle Tracer Uniformity

Table 4.6 lists the results for the particle tracer uniformity tests performed on the scale model LB-S1 stack. Tests were conducted with two fans running simultaneously. The completed data sheets from these tests are available in Appendix A.5.

Operating Fans	Injection Port & Location	Test Port	Flow Condition	Run No.	Approximate Air Velocity (sfpm)	%COV	Normalized %COV
		1	Max	PT-3	4399	12.4	11.1
		1	Max	PT-4	4477	7.8	9.2
	2 Center	1	Max	PT-5	4469	13.9	10.1
AB		1	Norm	PT-6	3633	17.6	7.3
		1	Min	PT-7	3089	13.8	11.4
AC	2 Center	1	Max	PT-2	4392	11.3	10.2
	2 Center	1	Max	PT-1	4364	13.8	14.1
BC	1 Center	1	Max	PT-8	4564	19.2	9.7
Similar test conditions are alternately shaded and unshaded.							

Table 4.6. Summary of LB-S1 Particle Tracer Uniformity Tests

Previous testing has shown that particle concentration measurements were usually higher through the bottom port (Glissmeyer et al 2011, 2012). Troubleshooting was unsuccessful in determining a consistent cause for this behavior. However, to mitigate errors, the concentration bias encountered between the two traverse directions at the measurement ports was removed by adjusting the data from the traverse with the lower concentration upward by a factor to match the concentrations at the center of the duct (the common point between the two traverses). These results were then termed "normalized." Figure 4.3 provides an example of variability in the aerosol production and a systematic bias between the bottom and side port measurements. The result of normalization is also illustrated in Figure 4.3 for PT-8 with side traverse data adjusted up by a factor of 1.4.

Table 4.6 shows the %COV values both with and without normalization. The %COV values ranged from 7.8 to 19.2. Although data normalization was not necessary to meet the criteria, the normalized data better match the reference data and the bottom data. This suggests that there is a sampling bias introduced when sampling through the side. Because there is no reason to suspect an actual bias in the horizontal versus vertical traverse, the normalized data are believed to better represent the actual variability and are the reported test results. Normalized %COV ranged from 7.3 to 14.1. In all cases, the results were within the criteria of %COV values ≤ 20 . Results indicate that the Test Port 1 is an acceptable location based on the criterion for particle tracers.

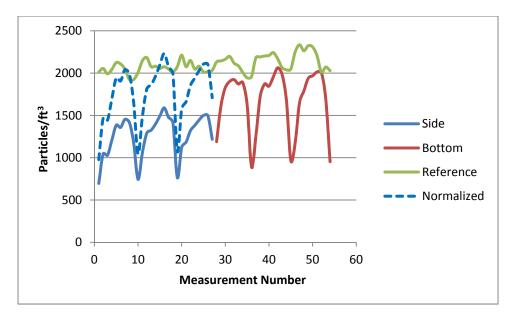


Figure 4.3. Measurement and Reference Particle Test Data from PT-8 on the LB-S1 Stack. The side and bottom lines represent measurement traverses from the side and bottom of Test Port 1, while the reference line represents the concentration at the center point of the Reference Port. This plot is an example of variability in the aerosol production and a systematic bias between the bottom and side port measurements. Normalized data are shown with dotted line. The data collected from the side port have been adjusted up by a factor of 1.4.

5.0 Conclusions

The results of the tests for the LB-S1 model are summarized in Table 5.1. The criteria for sampling probe locations given in ANSI/HPS N13.1-1999 were met in all cases. These criteria address the capability of the sampling probe to extract a sample that represents the effluent stream. Based on these scale model tests, WTP's proposed sampling location for LB-S1 simulated by Test Port 1 meets the air sampling probe requirements of the ANSI/HPS N13.1-1999 standard.

	Acceptance Criteria	Units	LB-S1
Velocity Uniformity	≤ 20	%COV	3.1-7.6
Flow Angle	≤ 20	Degrees	3.5-6.9
Gas Tracer Uniformity	≤20	%COV	1.0-7.3
	≤30	Maximum % Deviation from Mean	2.0-14.9
Particle Tracer Uniformity	≤ 20	%COV	7.3–14.1

Table 5.1. Summary of Results for the LB-S1 Scale Model Stack

The radial orientation of Test Port 1 had not been finalized in the actual LB-S1 stack as of this testing. Velocity uniformity and flow angle tests were conducted with the test port rotated 45°, which is the maximum possible angular deviation from the baseline. Results from these tests were in line with other measurements. Therefore, any change in test port radial orientation in the actual stack should not change the conclusions of this qualification testing.

According to the ANSI standard, velocity uniformity and flow angle tests on the actual stacks will be necessary during cold startup to confirm the validity of the scale model results in representing the actual stacks. Specifically the standard requires that the velocity uniformity test results for the actual stacks must be within 5 %COV of the range of results listed above for the scale model so that scale model results can be said to be representative of the stack. For example, if the actual LB-S1 stack sampling probe is located in a position corresponding to Test Port 1, the measured velocity uniformity %COV should be between 0.0 and 12.6 %COV (non-negative value for 3.1 - 5 = 0.0 and 7.6 + 5 = 12.6). The velocity uniformity test results summarized in Table 5.1 cover a range of flow conditions which are expected to bracket the conditions of the actual stack. For cold startup tests, the DV value and Reynolds number should meet the criteria listed in Section 1 (i.e., DV within a factor of six and Reynolds number >10,000). The velocity uniformity acceptance range would be constructed using the scale model results that correspond to the probe location and fan operating conditions present during the test on the actual stack.

6.0 References

10 CFR 830, Subpart A. "Quality Assurance Requirements," *Code of Federal Regulations*, U.S. Department of Energy, January 10, 2001.

40 CFR 60, Appendix A, Method 1. "Method 1—Sample and Velocity Traverses for Stationary Sources." *Code of Federal Regulations*, U.S. Environmental Protection Agency.

40 CFR 61, Subpart H. "National Emission Standard for Emissions of Radionuclides other than Radon from Department of Energy Facilities." *Code of Federal Regulations*, U.S. Environmental Protection Agency.

American National Standards Institute (ANSI). 1999. Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities. ANSI/HPS N13.1—1999, New York, NY.

American Society of Mechanical Engineers (ASME). 2001. *Quality Assurance Requirements for Nuclear Facility Applications*. NQA-1-2000, New York, NY.

DOE Order 414.1D. "Quality Assurance." U.S. Department of Energy, April 25, 2011.

Glissmeyer JA, JE Flaherty, and GF Piepel. 2011. Assessment of the Group 5-6 (LB-C2, LB-S2, LV-S1) Stack Sampling Probe Locations for Compliance with ANSI/HPS N13.1-1999. PNNL-20154, WTP-RPT-209, Pacific Northwest National Laboratory, Richland, Washington.

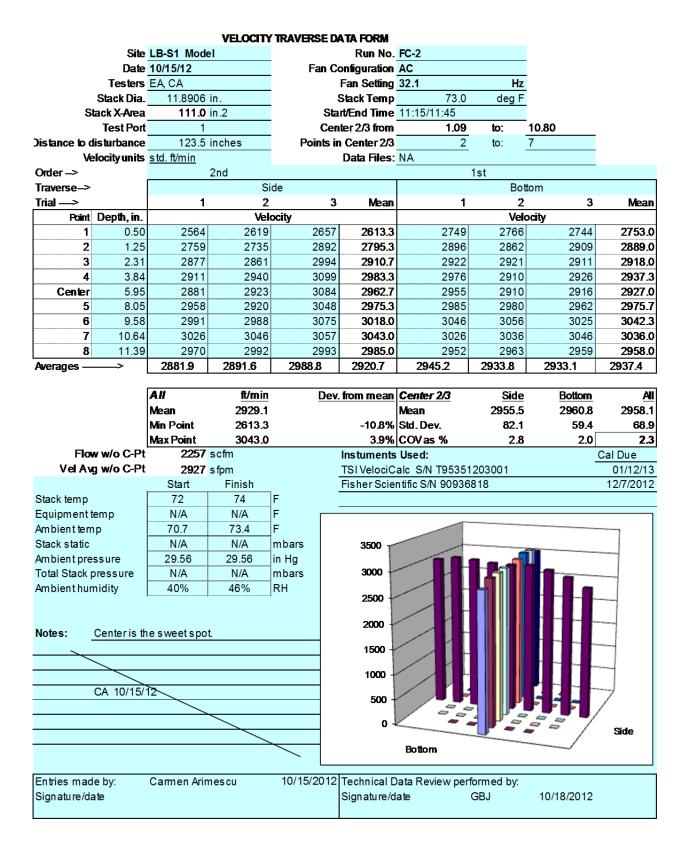
Glissmeyer JA, JE Flaherty, and EJ Antonio. 2012. *Assessment of the Group 3-4 (HV-S1, HV-S2, IHLW-S1) Stack Sampling Probe Locations for Compliance with ANSI/HPS N13.1-1999.* PNNL-21998, WTP-RPT-224, Pacific Northwest National Laboratory, Richland, Washington.

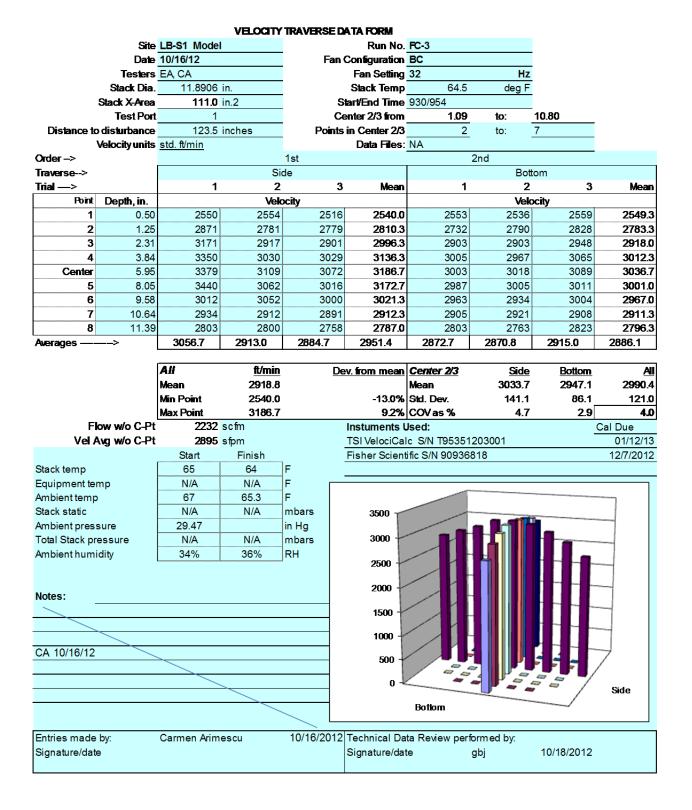
Appendix A

LB-S1 Data Sheets

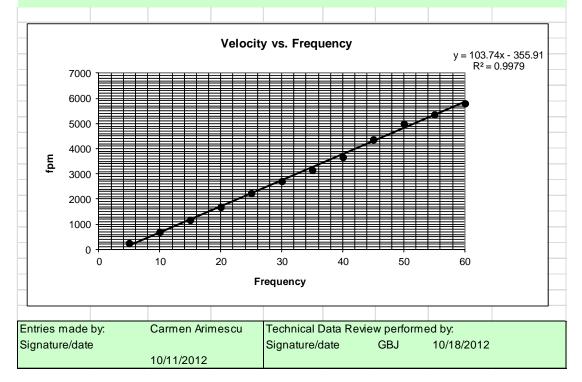
Appendix A.1: LB-S1 Calibration of Ventilation Flow Controller Data Sheets

Site LB-S1 Model Run No. FC-1	
Date <u>10/11/12</u> Fan Configuration AB	
Testers JEF, CA Fan Setting 32.1 Hz	
Stack Dia. 11.8906 in. Stack Temp 76.9 deg F	
Stack X-Area 111.0 in .2 Start/End Time 15:40 / 16:20	
Test Port 1 Center 2/3 from 1.09 to:	10.80
Distance to disturbance 123.5 inches Points in Center 2/3 2 to:	7
Velocity units std. ft/min Data Files: NA	
Order → 2nd 1st	
Traverse-> Side Bott	om
$\underline{\text{Trial}} \longrightarrow 1 2 3 \text{ Mean} 1 2$	3 Mea
Point Depth, in. Velocity Velo	
1 0.50 2089 2581 2708 2459.3 2454 2423	2458 2445
2 1.25 2756 2817 2930 2834.3 2690 2663	2637 2663
3 2.31 2937 3037 3077 3017.0 2785 2762	2761 2769
4 3.84 3056 3085 3091 3077.3 2823 2825	2819 2822 .
Center 5.95 3095 3146 3099 3113.3 2859 2865	2880 2868
5 8.05 3196 3207 3234 3212.3 2909 2932	2915 2918
6 9.58 3289 3084 3243 3205.3 3255 3083	2957 3098 .
7 10.64 3273 2441 3166 2960.0 3174 3029	2953 3052 .
8 11.39 3004 2011 3036 2683.7 2877 2940	2852 2889 .
Averages 2966.1 2823.2 3064.9 2951.4 2869.6 2835.8	2803.6 2836.3
All ft/min Dev. from mean Center 2/3 Side	Bottom A
Mean 2893.9 Mean 3060.0	2884.6 2972
Min Point 2445.0 -15.5% Std. Dev. 135.6	153.4 166.
Max Point 3212.3 11.0% COV as % 4.4	5.3 5.
Flow w/o C-Pt 2222 scfm Instuments Used:	Cal Due
Vel Avg w/o C-Pt 2882 sfpm TSI VelociCalc S/N T95351203001	01/12/1
Start Finish Fisher Scientific S/N 90936818	12/7/201
Stack temp 77.7 76.1 F	
Equipment temp N/A N/A F	
Ambient temp 75.2 75.2 F	
Stack static N/A N/A mbars 3500	
Ambient pressure 29.56 29.53 in Hg	
Total Stack pressure N/A N/A mbars 3000	
Ambient humidity 26% 27% RH	
2500	
2000	
Notes: Bottom 8 is the sweet spot.	
1500	
1000	
CA 10/11/12 500	
CA 10/11/12 500	
500	
	Side
500	Side
Bottom	Side
Entries made by: Carmen Arimescu 10/11/2012 Technical Data Review performed by:	
Bottom	10/18/2012





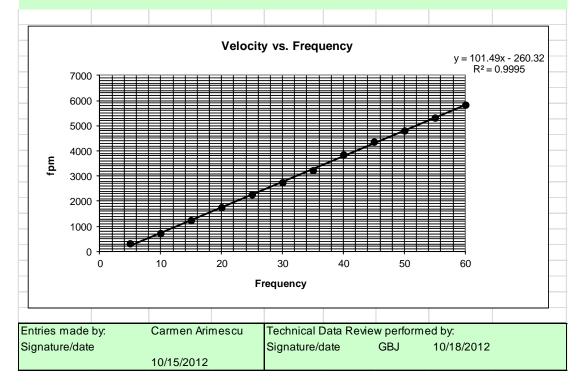
		VELO	CITY vs.	FREQUENC	Y DATA F	ORM		
	Site	LB-S1 I	model		Run No.	VF-1		
	Date	10/11/	2012	Sta	ack Temp	7	5.3	
	Tester	CA,	JEF	Amb	ient RH%	2	9%	
	Stack Dia.	11.8906	in.	Ambi	ent Press	29	9.53	in Hg
Sta	ack X-Area	111.0	in2	Fan Cor	figuration	/	٩B	
	Test Port	1		Start/	End Time	1647	7/1810	
Dist. from d	isturbance	123.5	inches	Reference	point from	velocity to	est VC :	Bottom 8
Velocity Read	dings, units	6 =	fpm					
					Target	Target	Estmtd	
					cfm	fpm	Hz	
					2960	3816	40.2	max
					2472	3187	34.2	normal
		fpi	n		2053	2647	28.9	min
Hz	1	2	3	Mean	StDev	2 StDev	cfm	
5	248	263	253	254.7	7.6	15.3	196.4	
10	694	725	700	706.3	16.4	32.9	544.7	
15	1137	1183	1168	1162.7	23.5	46.9	896.6	
20	1656	1682	1681	1673.0	14.7	29.5	1290.1	
25	2356	2181	2188	2241.7	99.1	198.2	1728.6	
30	2693	2750	2754	2732.3	34.1	68.2	2107.0	
35	3146	3199	3142	3162.3	31.8	63.6	2438.6	
40	3736	3605	3684	3675.0	66.0	131.9	2834.0	
45	4770	4157	4230	4385.7	334.8	669.7	3382.0	
50	5136	5060	4814	5003.3	168.3	336.6	3858.3	
55	5615	5271	5249	5378.3	205.3	410.5	4147.5	
60	5867	5854	5711	5810.7	86.6	173.1	4480.9	
Instuments l							Ca	al Exp. Date:
TSI VelociCalo								01/12/13
Fisher Scienti	fic S/N 9093	36818						12/7/2012



		VELO	CITY vs. I	FREQUENC	Y DATA F	FORM		
	Site	LB-S1 r	nodel		Run No.	VF-2		
	Date	10/15/	2012	Sta	ack Temp		77	
	Tester	CA,	XY	Amb	ient RH%	3	8%	
;	Stack Dia.	11.8906	in.	Ambi	ent Press	29	9.53	in Hg
Sta	ack X-Area	111.0	in2	Fan Cor	figuration	I	AC	
	Test Port	1		Start/	End Time	1:0	0/209	
Dist. from d	isturbance	123.5	inches	Reference	erence point from velocity test		est VC :	Bottom Cent
Velocity Read	dings, units	; =	fpm					
					Target	Target	Estmtd	
					cfm	fpm	Hz	
					2960	3816	40.2	
					2472	3187	34.0	normal
		fpr	n	_	2053	2647	28.6	min
Hz	1	2	3	Mean	StDev	2 StDev	cfm	
5	346	308	335	329.7	19.6	39.1	254.2	
10	736	772	735	747.7	21.1	42.2	576.6	
15	1242	1238	1220	1233.3	11.7	23.4	951.1	
20	1737	1726	1762	1741.7	18.4	36.9	1343.1	
25	2276	2261	2236	2257.7	20.2	40.4	1741.0	
30	2725	2746	2777	2749.3	26.2	52.3	2120.1	
35	3273	3175	3243	3230.3	50.2	100.4	2491.0	
40	3779	3790	3939	3836.0	89.4	178.7	2958.1	
45	4426	4299	4343	4356.0	64.5	129.0	3359.1	
50	4869	4800	4803	4824.0	39.0	78.0	3720.0	
55	5323	5304	5294	5307.0	14.7	29.5	4092.5	
60	5902	5796	5840	5846.0	53.3	106.5	4508.1	
Instuments l							Ca	al Exp. Date:
TSI VelociCalo								01/12/13

Fisher Scientific S/N 90936818





		VELO	CITY vs.	FREQUENC	Y DATA F	ORM		
	Site	_			Run No.			
	Date	10/16/			ack Temp		67	
	Tester	EA,			ient RH%	3	5%	
	Stack Dia.		in.		ent Press		29.47	in Hg
St	ack X-Area		in2		nfiguration		BC	
	Test Port			Start/End Time			1000/1045	
Dist. from d			inches	Reference	point from	velocity to	est VC :	Bttom 7
Velocity Rea	dings, units	6 =	fpm					
					Target	-		
					cfm	fpm	Hz	
					2960	3816		max
					2472			normal
		fpi			2053	-	28.0	min
Hz	1	2	3	Mean	StDev	2 StDev	cfm	
5	324	362	391	359.0	33.6	67.2	276.8	
10	851	839	825	838.3	13.0	26.0	646.5	
15	1385	1271	1274	1310.0	65.0	129.9	1010.2	
20	1860	1697	1807	1788.0	83.1	166.3	1378.8	
25	2373	2233	2234	2280.0	80.5	161.1	1758.2	
30	2934	2845	2782	2853.7	76.4	152.7	2200.6	
35	3441	3194	3292	3309.0	124.4	248.7	2551.7	
40	3969	3832	3791	3864.0	93.2	186.4	2979.7	
45	4508	4343	4353	4401.3	92.5	185.0	3394.1	
50	5055	4868	4971	4964.7	93.7	187.3	3828.5	
55	5473	5412	5372	5419.0	50.9	101.7	4178.8	
60	5881	5815	5899	5865.0	44.2	88.5	4522.8	
netumonte l	lood			1			<u> </u>	al Eva Da

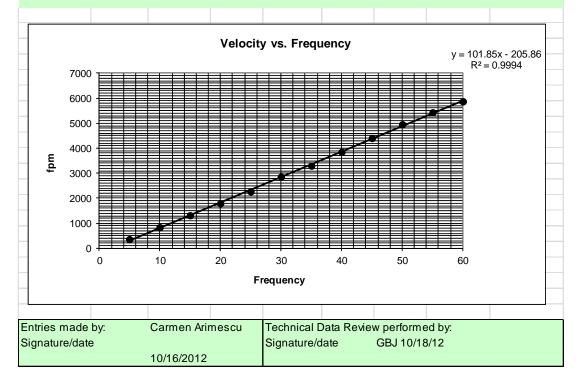
Instuments Used:

Cal Exp. Date:

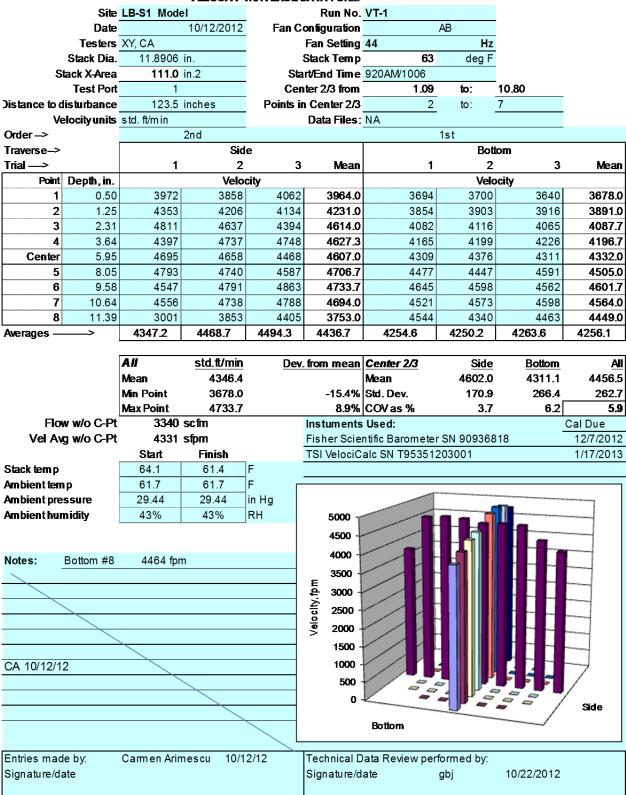
TSI VelociCalc S/N T95351203001 Fisher Scientific S/N 90936818

01/12/13





Appendix A.2: LB-S1 Velocity Uniformity Data Sheets



			VELOCITY	IRAVERSE	da la furm				
	Site	LB-S1 Mode			Run No.				
	Date		10/12/2012	Fan C	onfiguration		AB		
	Testers				Fan Setting	44	Hz		
	Stack Dia.	11.8906	in.		Stack Temp	63	deg F		
S	tack X-Area	111.0	in.2	Sta	rt/End Time	1006/1036			
	Test Port	1		Cer	nter 2/3 from	1.09	to:	10.80	
Distance to c	listurbance	123.5	inches	Points i	n Center 2/3	2	to:	7	
V	elocity units	std.ft/min			Data Files:	NA	-		
Order>			1st				2nd		
Traverse->			Sid	e			Botto	m	
Trial —>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		Velo	city			Veloc	ity	
1	0.50	3888	3882	3814	3861.3	3577	3456	3503	3512.0
2	1.25	4285	4151	4250	4228.7	3813	3833	3806	3817.3
3	2.31	4572	4434	4537	4514.3	4029	3994	3994	4005.7
4	3.64	4889	4690	4787	4788.7	4095	4133	4123	4117.0
Center	5.95	4808	4776	4765		4227	4243	4313	4261.0
5	8.05	4792	4899	4897	4862.7	4300	4470	4504	4424.7
6	9.58	4890	4839	4893	4874.0	4410	4597	4595	4534.0
7	10.64	4868	4850	4591	4769.7	4437	4509	4676	4540.7
8	11.39		4667	4728		4367	4508	4541	4472.0
Averages —	>	4635.7	4576.4	4584.7	4598.9	4139.4	4193.7	4228.3	4187.1
. aciugeo				100111	100010				
		All	std ft/min	Dev	from mean	Center 2/3	Side	Bottom	All
		Mean	4393.0	<u></u>	. nom mean	Mean	4688.7	4242.9	4465.8
		Min Point	3512.0		-20.1%	Std. Dev.	235.3	276.9	338.3
		Max Point	4874.0			COV as %	5.0	6.5	7.6
Flo	w w/o C-Pt				Instuments		0.0		Cal Due
	g w/o C-Pt					n tific Barom eter	SN 909368	-	12/7/2012
	3	Start	Finish			alc SN T953512			1/17/2013
Stack tem p		61.4	64.2	F					
Ambientten	מו	61.7	63.5	F r					
Ambientpre	•	29.44	29.47	in Hg					
Ambienthu		43%	43%	RH	6000 🦟				
Andenthu	many	4070	4070		0000		-		
Notes:	Bottom #8	4261 fpr	2		5000				
Notes.	BUILUIII #0	4201 ipi	1						
<u> </u>					E 4000				
					✓elocity, [†] 0005 - ¹ 1000 - ¹				
	<u> </u>				· : : : : : : : : : : : : : : : : : : :				
	<u> </u>								
		<u> </u>			2000 -				
00.00/10/1		<u> </u>			- 1				
CA 10/12/1	2				1000 -			4 4 4	7
			\searrow		- 1				
					o -4				Side
								/	Olde
						Bottom			
Entries mad	-	Carmen Arin	nescu 10/1	2/12		ata Review per			
Signature/d	ate				Signature/d	ate	gbj	10/22	/2012

			VELOCITY	RAVERSE					
		LB-S1 Mode			Run No.				
	Date		10/12/2012	Fan C	onfiguration		AB		
	Testers				Fan Setting		Hz		
	Stack Dia.				Stack Temp	64	deg F		
S	tack X-Area	111.0	in.2		rt/End Time	1036/1059			
	Test Port	1		Cer	ter 2/3 from	1.09		10.80	
Distance to c			inches	Points i	n Center 2/3	2	to:	7	
Ve	elocity units	std.ft/min			Data Files:	NA			
Order>			2nd				1st		
Traverse->			Sid	е			Botto	m	
Trial —>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		Velo		•		Veloc		
1	0.50	3726	3853	3806	3795.0	3491	3540	3565	3532.0
2	1.25	4035	4042	4046	4041.0	3805	3808	3849	3820.7
3	2.31	4254	4279	4243	4258.7	4008	3996	4064	4022.7
4	3.64	4323	4353	4301	4325.7	4154	4217	4261	4210.7
Center	5.95		4371	4216	4305.0	4342	4330	4416	4362.7
5	8.05	4222	4261	4178		4537	4543	4558	4546.0
6	9.58	4264	4200	4183	4215.7	4639	4624	4665	4642.7
7	10.64	4331	4177	4234	4247.3	4659	4626	4364	4549.7
8	11.39	4166	4170	4172	4169.3	4570	4680	4645	4631.7
Averages —	>	4183.2	4189.6	4153.2	4175.3	4245.0	4262.7	4265.2	4257.6
	All std ft/min D					Center 2/3	<u>Side</u>	Bottom	All
		Mean	4216.5			Mean	4230.5	4307.9	4269.2
		Min Point	3532.0		-16.2%	Std. Dev.	93.0	305.1	220.4
		Max Point	4642.7		10.1%	COV as %	2.2	7.1	5.2
	w w/o C-Pt		scfm		Instuments	Used:		-	Cal Due
Vel Av	g w∕o C-Pt	4202	sfpm		Fisher Scie	n tific Barom eter	SN 909368	18	12/7/2012
		Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013
Stack tem p		64.2	64.2	F					
Am bient terr	np	63.5	63.5	F		~			
Am bient pre		29.44	29.47	in Hg					
Am bient hu	midity	38%	37%	RH	5000 🦵		_	1	
					4500				
					4000				
Notes:	Bottom 8	4535 fpm				<u> </u>			
					3500 - E			H	
					ie 3000 ic 2500 ic 2500 ic 2000			H - 1 - 1	
	<u> </u>				ਿਊ 2500 🚽			H - I - I	
					💐 2000 🚽	/// I		H	
		<u> </u>			1500	/// T			
					- 1				
CA 10/12/1	2				1000 -			4 4 L	$\overline{}$
			\searrow		500 -				
					0 -				Side
								- /	
						D-#		/	
						Bottom			
									
Entries mad	-	Carmen Arin	nescu 10/1	2/12		ata Review per	-		
Entries mad Signature/d	-	Carmen Arin	nescu 10/1	2/12	Technical D Signature/d	ata Review per	formed by: gbj	10/22	/2012

				IKAVEKSE I					
		LB-S1 Mode			Run No.				
	Date		10/12/2012	Fan C	onfiguration		AB		
	Testers				Fan Setting		Hz		
	Stack Dia.	11.8906			Stack Temp	65	deg F		
S	tack X-Area	111.0	in.2		rt/End Time				
	Test Port				ter 2/3 from	1.09		10.80	
Distance to d			inches	Points in	n Center 2/3	2	to:	7	
Ve	elocity units	std.ft/min			Data Files:	NA			
Order>			1st				2nd		
Traverse->			Sid	е			Botto	m	
Trial —>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		Velo	city	•		Veloc	ity	
1	0.50	3698	3647	3666	3670.3	3587	3495	3547	3543.0
2	1.25	4002	4082	4060	4048.0	3790	3857	3823	3823.3
3	2.31	4341	4336	4280	4319.0	4032	3995	3989	4005.3
4	3.64	4509	4534	4259	4434.0	4112	4177	4141	4143.3
Center	5.95	4498	4681	4260	4479.7	4270	4197	4192	4219.7
5	8.05	4628	4850	4426		4291	4333	4285	4303.0
6	9.58	4680	4506	4519	4568.3	4471	4329	4356	4385.3
7	10.64	4723	4401	4634	4586.0	4621	4404	4497	4507.3
8	11.39	4681	4664	4548	4631.0	4594	4595	4500	4563.0
Averages —	>	4417.8	4411.2	4294.7	4374.6	4196.4	4153.6	4147.8	4165.9
						• • •	· · ·		
		All	std ft/min	Dev.	from mean	Center 2/3	Side	Bottom	All
		Mean	4270.2			Mean	4438.5	4198.2	4318.4
		Min Point	3543.0		-17.0%	Std. Dev.	202.3	231.9	243.5
		Max Point	4634.7		8.5%	COV as %	4.6	5.5	5.6
Flor	w w/o C-Pt	3285	scfm		Instuments	Used:			Cal Due
Vel Av	g w/o C-Pt	4260	sfpm		Fisher Scie	n tific Barom eter	SN 909368	18	12/7/2012
		Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013
Stack tem p		65.0	65.0	F					
Am bient tem	пр	63.5	63.5	F					
Am bient pre	ssure	29.47	29.47	in Hg			-		
Am bient hur	nidity	37%	39%	RH	5000 🦵				
					4500				
					4000				
Notes:	Bottom #8	4304 fpm	1			<u> </u>			
<u> </u>					Ξ Ξ				
					4 3000 3000 2500 2500 2000			H - I - I	
	<u> </u>				<u>₹</u> 2500 -			H - L	
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		$\overline{}$			1500 -				
XYY 10/12/	12				1000 -				\rightarrow
					500 -				
					o 4	• •			
								. /	Side
						Bottom			
						Bottom			
Entries mad	le by:	Xiao-Ying Yu	10/12/12		Technical D	Bottom Data Review per	formed by:		
Entries mad Signature/da	-	Xiao-Ying Yu	10/12/12		Technical D Signature/d	ata Review per	formed by: gbj	10/22	/2012

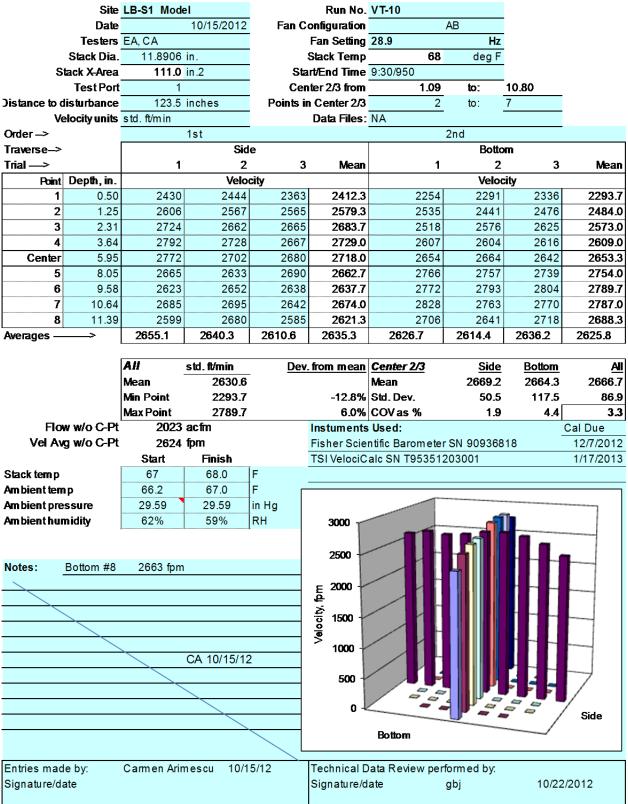
				IRAVERSEI					
		LB-S1 Mode			Run No.	VT-5			
	Date		10/12/2012	Fan C	onfiguration		AB		
	Testers				Fan Setting		Hz		
	Stack Dia.				Stack Temp		deg F		
S	tack X-Area	111.0	in.2	Sta	rt/End Time	1221/1246			
	Test Port	-		Cer	ter 2/3 from	1.09		10.80	
Distance to d			inches	Points in	n Center 2/3	2	to:	7	
Ve	elocity units				Data Files:	NA			
Order>			1st	-			2nd		
Traverse>			Sid	е			Botto	m	
Trial —>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		Velo	city	-		Veloc	ity	
1	0.50	3444	3181	3078	3234.3	3048	3072	3066	3062.0
2	1.25	3552	3541	3728	3607.0	3356	3329	3350	3345.0
3	2.31	3742	3704	3849	3765.0	3541	3475	3526	3514.0
4	3.64	3698	3902	3711	3770.3	3587	3579	3542	3569.3
Center	5.95	3680	3883	3892	3818.3	3614	3669	3630	3637.7
5	8.05	3764	3826	3820	3803.3	3695	3696	3705	3698.7
6	9.58	3758	3887	3705	3783.3	3775	3804	3741	3773.3
7	10.64	3736	3947	3930	3871.0	3709	3872	3762	3781.0
8	11.39	3757	3465	3612	3611.3	3823	3809	3703	3778.3
Averages -	>	3681.2	3704.0	3702.8	3696.0	3572.0	3589.4	3558.3	3573.3
								, ,	ı
		All	std ft/min	Dev	from mean	Center 2/3	Side	Bottom	All
		Mean	3634.6			Mean	3774.0	3617.0	3695.5
		Min Point	3062.0		-15.8%	Std. Dev.	82.0	155.6	144.6
		Max Point	3871.0		6 6 14	COVerW	22	4.3	3.9
		Max Point	3011.0		0.570	COV as %	22	4.0	
Flo	w w/o C-Pt				Instuments				Cal Due
	w w/o C-Pt ⁄g w/o C-Pt	2794	scfm		Instuments				
		2794	scfm		Instuments Fisher Scie	Used:	- SN 909368		Cal Due
		2794 3623	scfm sfpm Finish	F	Instuments Fisher Scie	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av	∕g w/o C-Pt	2794 3623 Start	scfm sfpm Finish 66.8	F	Instuments Fisher Scie	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p	∧gw/oC-Pt np	2794 3623 Start 65.5	scfm sfpm Finish 66.8 65.3		Instuments Fisher Scie	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient tem	kg w∕o C-Pt np essure	2794 3623 Start 65.5 65.3	scfm sfpm Finish 66.8 65.3 29.50	F	Instuments Fisher Scie	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack temp Am bient tem Am bient pre	kg w∕o C-Pt np essure	2794 3623 Start 65.5 65.3 29.50	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack temp Am bient tem Am bient pre	kg w∕o C-Pt np essure	2794 3623 Start 65.5 65.3 29.50	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient tem Am bient pre Am bient hur	kg w∕o C-Pt np essure	2794 3623 Start 65.5 65.3 29.50	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient tem Am bient pre Am bient hur	∧g w/o C-Pt np essure midity	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient tem Am bient pre Am bient hur	∧g w/o C-Pt np essure midity	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient tem Am bient pre Am bient hur	∧g w/o C-Pt np essure midity	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient tem Am bient pre Am bient hur	∧g w/o C-Pt np essure midity	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 ⊑ 2500 2500	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient tem Am bient pre Am bient hur	∧g w/o C-Pt np essure midity	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 5 2500	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient terr Am bient pre Am bient hur Notes:	/g w/o C-Pt np essure midity Bottom 8	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 ⊑ 2500 2500	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient tem Am bient pre Am bient hur	/g w/o C-Pt np essure midity Bottom 8	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 € 2500 2000 3000 1500 1000	Used: ntific Barometer	- SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient terr Am bient pre Am bient hur Notes:	/g w/o C-Pt np essure midity Bottom 8	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 € 2500 2000 5 2000 8 1500	s Used: ntific Barometer alc SN T953512	SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient terr Am bient pre Am bient hur Notes:	/g w/o C-Pt np essure midity Bottom 8	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 € 2500 2000 3000 1500 1000	Used: ntific Barometer	SN 909368		Cal Due 12/7/2012 1/17/2013
Vel Av Stack tem p Am bient terr Am bient pre Am bient hur Notes:	/g w/o C-Pt np essure midity Bottom 8	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 3500 3000 ⊑ 2500 2500 1500 1000 500	alc SN T953512	SN 909368		Cal Due 12/7/2012
Vel Av Stack tem p Am bient terr Am bient pre Am bient hur Notes:	/g w/o C-Pt np essure midity Bottom 8	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50	F in Hg	Instuments Fisher Scie TSI VelociC 3500 3000 ⊑ 2500 2500 1500 1000 500	s Used: ntific Barometer alc SN T953512	SN 909368		Cal Due 12/7/2012 1/17/2013
Vel Av Stack temp Am bient tem Am bient pre Am bient hur Notes:	Ag w/o C-Pt	2794 3623 Start 65.5 65.3 29.50 36% 3828fpm	scfm sfpm Finish 66.8 65.3 29.50 36%	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 <u>E</u> 2500 2000 1500 1000 500 0	Bottom	SN 909368		Cal Due 12/7/2012 1/17/2013
Vel Av Stack tem p Am bient terr Am bient pre Am bient hur Notes:	Ag w/o C-Pt	2794 3623 Start 65.5 65.3 29.50 36%	scfm sfpm Finish 66.8 65.3 29.50 36%	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 <u>E</u> 2500 2000 1500 1000 500 0	alc SN T953512	SN 909368		Cal Due 12/7/2012 1/17/2013
Vel Av Stack temp Am bient tem Am bient pre Am bient hur Notes:	Ag w/o C-Pt	2794 3623 Start 65.5 65.3 29.50 36% 3828fpm	scfm sfpm Finish 66.8 65.3 29.50 36%	F in Hg	Instuments Fisher Scie TSI VelociC 4000 3500 3000 <u>E</u> 2500 2000 1500 1000 500 0	bused: ntific Barometer alc SN T953512 buttom bottom Data Review per	SN 909368		Cal Due 12/7/2012 1/17/2013

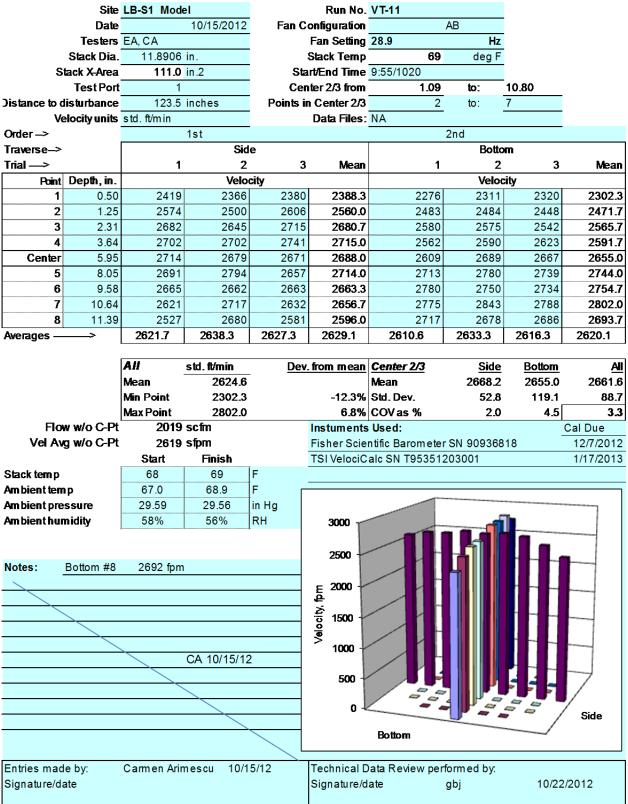
				IRAVERSE I					
		LB-S1 Mode			Run No.				
	Date		10/12/2012	Fan C	onfiguration		AB		
	Testers				Fan Setting		Hz		
	Stack Dia.				Stack Temp	67	deg F		
S	tack X-Area		in.2		rt/End Time	1247/116			
	Test Port	-			ter 2/3 from	1.09	_	10.80	
Distance to a			inches	Points in	n Center 2/3	2	to:	7	
Ve	elocity units	std.ft/min			Data Files:	NA			
Order>			2nd				1st		
Traverse>			Sid	е			Botto	m	
Trial —>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		Velo	city	-		Veloc	ity	
1	0.50	3316	3239	3236	3263.7	3222	2978	3171	3123.7
2	1.25	3538	3707	3479	3574.7	3410	3384	3378	3390.7
3	2.31	3701	3719	3683	3701.0	3540	3521	3511	3524.0
4	3.64	3718	3673	3745	3712.0	3651	3644	3701	3665.3
Center	5.95	3675	3707	3689	3690.3	3748	3709	3846	3767.7
5	8.05	3649	3695	3712	3685.3	3849	3815	3887	3850.3
6	9.58	3712	3660	3825	3732.3	3790	3832	3893	3838.3
7	10.64	3746	3628	3836	3736.7	3781	3753	3829	3787.7
8	11.39	3811	3842	3764	3805.7	3751	3758	3717	3742.0
Averages -	>	3651.8	3652.2	3663.2	3655.7	3638.0	3599.3	3659.2	3632.2
		All	std.ft/min	Dev.	from mean	Center 2/3	Side	Bottom	All
	$\frac{An}{Mean} = \frac{sta.tomin}{3644.0}$					Mean	3690.3	3689.1	3689.7
		Min Point	3123.7		-14.3%	Std. Dev.	54.6	173.7	123.7
		Max Point	3850.3		5.7%	COV as %	1.5	4.7	3.4
Flo	w w/o C-Pt	2802	scfm		Instuments	Used:			Cal Due
Vel Av	∕gw/oC-Pt	3633	sfpm		Fisher Scie	ntific Barometer	SN 909368	18	12/7/2012
		Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013
Stack tem p		66.8	66.4	F					
Am bient ten	np	65.3	65.5	F					
Am bient pre	essure	29.50	29.50	in Hg					
Am bient hu	midity	36%	37%	RH	4000 🦟				
		5							
					3500 -				
Notes:	Bottom 8 i	s 3770 fpr	n		3000			H	
$\overline{}$					£ 2500 - 2500 - 2000 - 000 - 000 - 000 -				
					ੇਂ 2000 -				
					> 1500 +				
		<u> </u>	XYY 10/12/1	2	1000				
		$\overline{}$			1000				\mapsto
					500 +			5 5 5	
			$\overline{}$		o -				
								- /	Side
						Bottom			
Entries mad	le by:	Carmen Arin	nescu 10/1	2/12	Technical D		formed by:		
Entries mad Signature/d	-	Carmen Arin	nescu 10/1	2/12		ata Review per	-	10/22	/2012
Entries mac Signature/d	-	Carmen Arin	nescu 10/1	2/12	Technical D Signature/d	ata Review per	formed by: gbj	10/22	/2012

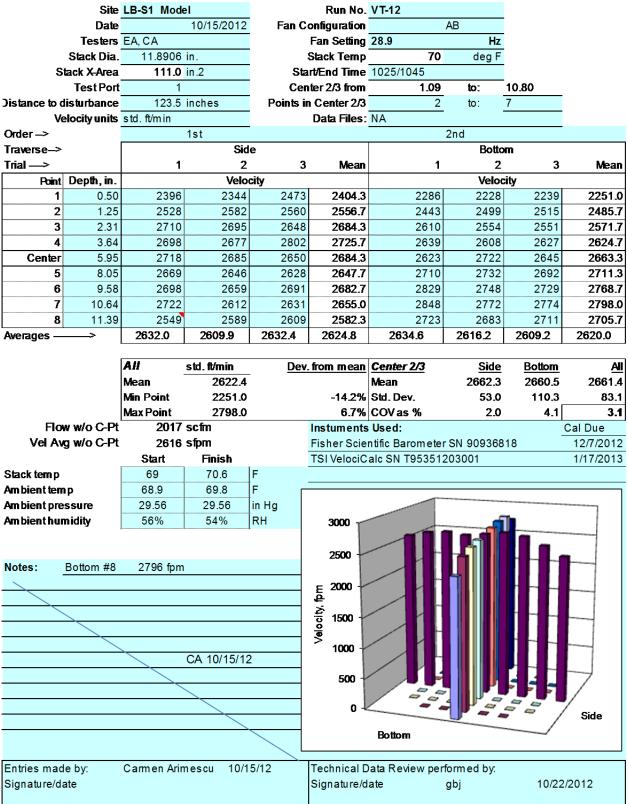
			VELOCITY	IRAVERSE I	DA TA FORM				
	Site	LB-S1 Mode			Run No.				
	Date		10/12/2012	Fan C	onfiguration		AB		
	Testers	CA, XY			Fan Setting	39	Hz		
	Stack Dia.	11.8906			Stack Temp	67	deg F		
S	itack X-Area	111.0	in.2	Sta	rt/End Time	117/140			
	Test Port	1		Cen	ter 2/3 from	1.09	to:	10.80	
Distance to c	disturbance	123.5	inches	Points in	n Center 2/3	2	to:	7	
Ve	elocity units	std.ft/min			Data Files:	NA			
Order>			1st				2nd		
Traverse>			Sid	е			Botto	m	
Trial —>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		Velo	city			Veloc	ity	
1	0.50	3345	3355	3194	3298.0	2906	2986	2940	2944.0
2	1.25	3554	3492	3537	3527.7	3290	3301	3262	3284.3
3	2.31	3664	3659	3689	3670.7	3464	3457	3464	3461.7
4	3.64	3734	3734	3766	3744.7	3551	3560	3586	3565.7
Center	5.95	3773	3660	3710	3714.3	3632	3636	3659	3642.3
5	8.05	3892	3693	3695	3760.0	3703	3694	3739	3712.0
6	9.58	3900	3850	3793	3847.7	3756	3770	3735	3753.7
7	10.64	3869	3647	3862	3792.7	3739	3818	3726	3761.0
8	11.39	3747	3752	3984	3827.7	3654	3722	3818	3731.3
Averages -	>	3719.8	3649.1	3692.2	3687.0	3521.7	3549.3	3547.7	3539.6
_		,,						,	
		All	std.ft/min	Dev.	from mean	Center 2/3	Side	Bottom	All
		Mean	3613.3			Mean	3722.5	3597.2	3659.9
		Min Point	2944.0		-18.5%	Std. Dev.	102.6	175.0	152.4
		Max Point	3847.7		6.5%	COV as %	2.8	4.9	4.2
Flo	w w/o C-Pt	2780	scfm		Instuments	Used:			Cal Due
Vel Av	∕g w/o C-Pt	3605	sfpm		Fisher Scie	n tific Barom eter	SN 909368	18	12/7/2012
		Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013
Stack tem p		66.4	67.6	F					
Am bient terr	np	65.3	64.4	F					
Am bient pre	essure	29.47	29.47	in Hg				-	
Am bient hu	midity	37%	40%	RH	4000 🥣			1	
		\$			1				
					3500 -				
Notes:	Bottom 8 i	s 3671 fpn	n		3000 -	< µn			
Rain started	d while testin	ng was going	on.						
					ູ <u>ຣ</u> 2500 -				
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			XYY 10/12/1	12					
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			XYY 10/12/1	12					$\frac{1}{2}$
			XYY 10/12/1	12	1000 -				Ħ
			XYY 10/12/1	2	1000 - 500 -				Side
			XYY 10/12/1	12	1000 - 500 -	Bottom			Side
Entries mad	de by:		<u> </u>	12	1000 - 500 - 0 -	Bottom			Side
Entries mad	-	Xiao-Ying Yu	<u> </u>	12	1000 - 500 - 0 -	Bottom Pata Review per	form ed by:		
Entries mad Signature/di	-		<u> </u>	12	1000 - 500 - 0 -	Bottom Pata Review per			Side

			VELOCITY	IRAVERSE I	DA TA FORM				
	Site	LB-S1 Mode	el		Run No.	VT-8			
	Date		10/12/2012	Fan C	onfiguration		AB		
	Testers	XY, CA			Fan Setting	39	Hz		
	Stack Dia.	11.8906	in.		Stack Temp	69	deg F		
S	tack X-Area	111.0	in.2	Sta	rt/End Time	145/230			
	Test Port	1		Cen	ter 2/3 from	1_09	to:	10.80	
Distance to c	listurbance	123.5	inches	Points ir	n Center 2/3	2	to:	7	
Ve	elocity units	std.ft/min			Data Files:	NA	-		
Order>			2nd				1st		
Traverse->			Sid	e			Botto	m	
Trial>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		Velo	city			Veloc	ity	
1	0.50	3184	3144	3167	3165.0	3030	2946	2994	2990.0
2	1.25	3488	3474	3449	3470.3	3280	3344	3280	3301.3
3	2.31	3714	3663	3638	3671.7	3472	3478	3459	3469.7
4	3.64	3991	3794	3754	3846.3	3573	3596	3542	3570.3
Center	5.95	3903	3853	3825	3860.3	3621	3626	3625	3624.0
5	8.05		3693	3827	3702.3		3691	3688	3682.7
6	9.58		3647	3684	3681.7	3721	3744	3695	3720.0
7	10.64		3757	3717	3755.7	3682	3731	3715	3709.3
8	11.39		3802	3708		3674	3688	3646	3669.3
Averages —	>	3681.3	3647.4	3641.0	3656.6	3524.7	3538.2	3516.0	3526.3
···· ·									
		All	std.ft/min	Dev	from mean	Center 2/3	Side	Bottom	All
		Mean	3591.4			Mean	3712.6	3582.5	3647.5
		Min Point	2990.0		-16.7%	Std. Dev.	131.0	152.0	152.2
		Max Point	3860.3		7.5%	COV as %	3.5	4.2	4.2
Flo	w w/o C-Pt	2755	scfm		Instuments				Cal Due
Vel Av	g w/o C-Pt	3573	sfpm		Fisher Scie	n tific Barom eter	SN 909368	- 18	12/7/2012
	-	Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013
Stack tem p		67.7	69.4	F					
Am bient terr	пр	65.3	68.0	F r					
Am bient pre	ssure	29.50	29.47	in Hg			-6	-	
Am bient hu	nidity	39%	36%	RH	4000 🛩				
	-	L							
					3500				
Notes:	Bottom #8	3652 fpm			3000 -				
$\overline{}$					<u><u><u></u></u><u></u><u></u><u></u><u>2500</u> - <u>→</u> <u>→</u> <u>→</u> <u>→</u> <u>→</u> <u>→</u> <u>→</u> <u>→</u> <u>→</u> <u>→</u></u>				
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			XYY 10/12/1	2					$\overline{\mathcal{A}}$
			XYY 10/12/1	2	1000 - 500 -				7
			XYY 10/12/1	2	1000				Side
			XYY 10/12/1	2	1000 - 500 -	Bottom			Side
			XYY 10/12/1	2	1000 - 500 -	Bottom			Side
Entries mad	le by:	Carmen Arin		2/12	1000 - 500 - 0 -		formed by:		Side
Entries mad	-				1000 - 500 - 0 -)ata Review per		10/22	
Entries mad Signature/d	-				1000 - 500 - 0 -)ata Review per	formed by: gbj	10/22	Side /2012

		LB-S1 Mode			Run No.					
	Date		10/15/2012	Fan C	onfiguration		AB			
	Testers				Fan Setting	28.9	Hz			
	Stack Dia.				Stack Temp		deg F			
S	tack X-Area	111.0	in.2	Sta	rt/End Time	9:00/923				
	Test Port	1		Cer	ter 2/3 from	1.09		10.80		
Distance to d	disturbance	123.5	inches	Points in	n Center 2/3	2	to:	7		
Ve	elocity units	std.ft/min			Data Files:	NA	-			
Order>			2nd				1st			
Traverse->			Sid	e			Botto	m		
Trial —>		1	2	3	Mean	1	2	3	Mean	
Point	Depth, in.		Velo	city			Veloc	ity		
1	0.50	2416	2377	2303	2365.3	2283	2318	2296	2299.0	
2	1.25	2375	2585	2628	2529.3	2422	2464	2484	2456.7	
3	2.31	2684	2646	2777	2702.3	2577	2546	2546	2556.3	
4	3.64	2757	2737	2850	2781.3	2580	2577	2604	2587.0	
Center	5.95	2712	2708	2723	2714.3	2661	2655	2615	2643.7	
5	8.05	2622	2672	2645	2646.3	2694	2679	2681	2684.7	
6	9.58	2668	2630	2674	2657.3	2774	2746	2817	2779.0	
7	10.64	2664	2614	2609	2629.0	2767	2694	2693	2718.0	
8	11.39	2622	2592	2589	2601.0	2630	2627	2678	2645.0	
Averages -	>	2613.3	2617.9	2644.2	2625.1	2598.7	2589.6	2601.6	2596.6	
•		II				· · · · · · · · · · · · · · · · · · ·		Į	J	
		All	std.ft/min	Dev	from mean	Center 2/3	Side	Bottom	All	
		Mean	2610.9			Mean	2665.7	2632.2	2649.0	
		Min Point	2299.0		-11.9%	Std. Dev.	79.0	108.3	92.7	
		Max Point	2781.3		6.5%	COV as %	3.0	4.1	3.5	
Flo	w w/o C-Pt	2007	scfm		Instuments	Used:		1	Cal Due	
Vel Av	g w/o C-Pt	2602	sfpm		Fisher Scientific Barometer SN 90936818 12/7/2012					
		Start	Finish		TSI VelociCalc SN T95351203001 1/17/2013					
Stack tern p		61.6	66.1	F						
-										
Am bient terr	np	65.3	65.3	F						
Arm bient terr Arm bient pre	•	65.3 29.56	65.3 29.59							
Am bient pre	ssure			in Hg	3000 🖌					
	ssure	29.56	29.59		3000			1		
Am bient pre	ssure	29.56	29.59	in Hg				1.		
Am bient pre Am bient hur	ssure	29.56	29.59	in Hg	3000	I		 ,		
Am bient pre Am bient hur	essure midity	29.56 63%	29.59	in Hg	2500 -	I				
Am bient pre Am bient hur	essure midity	29.56 63%	29.59	in Hg	2500 - E 2000 -	I				
Am bient pre Am bient hur	essure midity	29.56 63%	29.59	in Hg	2500 - E 2000 -	I				
Am bient pre Am bient hur	essure midity	29.56 63%	29.59	in Hg	2500 - E 2000 -	I				
Am bient pre Am bient hur	essure midity	29.56 63%	29.59	in Hg	2500 - بو 2000 - بو 1500 - ای ا					
Am bient pre Am bient hur	essure midity	29.56 63% 2664 fpm	29.59	in Hg RH	2500 - E 2000 -					
Am bient pre Am bient hur	essure midity	29.56 63% 2664 fpm	29.59 62%	in Hg RH	2500 <u>e</u> 2000 <u>2000</u> 2000 1500 1000					
Am bient pre Am bient hur	essure midity	29.56 63% 2664 fpm	29.59 62%	in Hg RH	2500 - بو 2000 - بو 1500 - ای ا					
Am bient pre Am bient hur	essure midity	29.56 63% 2664 fpm	29.59 62%	in Hg RH	2500 = 2000 - 2000					
Am bient pre Am bient hur	essure midity	29.56 63% 2664 fpm	29.59 62%	in Hg RH	2500 <u>e</u> 2000 <u>2000</u> 2000 1500 1000				Side	
Am bient pre Am bient hur	essure midity	29.56 63% 2664 fpm	29.59 62%	in Hg RH	2500 = 2000 - 2000	Bottom			Side	
Am bient pre Am bient hur	essure midity	29.56 63% 2664 fpm	29.59 62%	in Hg RH	2500 = 2000 - 2000				Side	
Am bient pre Am bient hur	Bottom 8	29.56 63% 2664 fpm	29.59 62% CA 10/15/12	in Hg RH	2500 <u>2000</u> <u>2000</u> 1500 1000 500 0	Bottom	formed by:		Side	
Ambient pre Ambient hur Notes:	Bottom 8	29.56 63% 2664 fpm	29.59 62% CA 10/15/12	in Hg RH	2500 2000 2000 2000 1500 500 0 Technical D	Bottom Data Review per	-			
Am bient pre Am bient hur	Bottom 8	29.56 63% 2664 fpm	29.59 62% CA 10/15/12	in Hg RH	2500 <u>2000</u> <u>2000</u> 1500 1000 500 0	Bottom Data Review per	form ed by: gbj		Side	







			VELOCITY	IRAVERSE I						
		LB-S1 Mode			Run No.					
	Date		10/15/2012	Fan C	onfiguration		AC			
	Testers				Fan Setting	42	Hz			
	Stack Dia.	11.8906	in.		Stack Temp	74	deg F			
S	tack X-Area	111.0	in.2	Sta	rt/End Time	235/257				
	Test Port	1		Cer	ter 2/3 from	1.09	to:	10.80		
Distance to c	listurbance	123.5	inches	Points in	n Center 2/3	2	to:	7		
Ve	elocity units	std.ft/min			Data Files:	NA				
Order>			2nd				1st			
Traverse>			Sid	e			Botto	m		
Trial —>		1	2	3	Mean	1	2	3	Mean	
Point	Depth, in.		Velo	city			Veloc	ity		
1	0.50	3406	3518	3398	3440.7	3521	3585	3617	3574.3	
2	1.25	3867	3853	3626	3782.0	3748	3784	3820	3784.0	
3	2.31	4157	4109	3852	4039.3	3835	3866	3888	3863.0	
4	3.64	4388	4280	4127	4265.0	4028	4082	3951	4020.3	
Center	5.95	4475	4437	4303	4405.0	4125	4108	4154	4129.0	
5	8.05	4605	4564	4408	4525.7	4331	4339	4270	4313.3	
6	9.58	4501	4517	4588	4535.3	4536	4577	4464	4525.7	
7	10.64	4610	4311	4680	4533.7	4648	4681	4612	4647.0	
8	11.39	4410	4333	4511	4418.0	4609	4563	4549	4573.7	
Averages -	>	4268.8	4213.6	4165.9	4216.1	4153.4	4176.1	4147.2	4158.9	
-		,i				μι		Į	1	
		All	std.ft/min	Dev	from mean	Center 2/3	Side	Bottom	All	
		Mean	4187.5			Mean	4298.0	4183.2	4240.6	
		Min Point	3440.7		-17.8%	Std. Dev.	291.4	326.8	303.3	
		Max Point	4647.0		11.0%	COV as %	6.8	7.8	7.2	
Flo	w w/o C-Pt	3221	scfm		Instuments	Used:		I	Cal Due	
Vel Av	g w/o C-Pt	4178	sfpm		Fisher Scientific Barometer SN 90936818 12/7/2012					
		Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013	
Stack tem p		74.5	73.9	F						
Am bient ten	пр	74.3	72.5	F						
Am bient pre	ssure	29.50	29.50	in Hg			ŕ			
Ambienthu	midity	42%	42%	RH	5000 🦟					
	-				4500					
							HAI			
Notes:	Bottom #8	4525 fpm			4000					
	Fairly big w	ind.			E 3500					
					·튣 3000 년					
					ie 3000 ≥ 2500 ≥ 2500 ≥ 2000					
					₹ 2000 -	//D h				
		<			-					
		$\overline{}$	CA 10/15/12	2	1500 -					
		$\overline{}$			1000 -				\rightarrow	
					500 -					
			$\overline{}$		o 4				/	
			\sim					/	Side	
						Bottom				
Entries mad	le by:	Carmen Arin	nescu 10/1	5/12	Technical D	ata Review per	formed by:			
Signature/d	ate				Signature/d	ata	abi	10/22	/2012	
					Olginature/u	ale	gbj	10/22	12012	
					olghatare/a		gb]	10/22	12012	

			VELOCITY	IRAVERSE I						
	Site	LB-S1 Mode			Run No.					
	Date		10/15/2012	Fan C	onfiguration		AC			
	Testers	XY, CA			Fan Setting	42	Hz			
	Stack Dia.	11.8906	in.		Stack Temp	74	deg F			
St	tack X-Area	111.0	in.2	Sta	rt/End Time	300/315				
	Test Port			Cer	ter 2/3 from	1.09	to:	10.80		
Distance to d	listurbance	123.5	inches	Points in	n Center 2/3	2	to:	7		
Ve	elocity units	std.ft/min			Data Files: NA					
Order>			1st				2nd			
Traverse->			Sid	e			Botto	m		
Trial —>		1	2	3	Mean	1	2	3	Mean	
Point	Depth, in.		Velo	city			Veloc	ity		
1	0.50	3331	3318	3309	3319.3	3613	3622	3598	3611.0	
2	1.25	3660	3637	3740	3679.0	3709	3760	3766	3745.0	
3	2.31	3796	3983	4121	3966.7	3815	3813	3860	3829.3	
4	3.64	4031	4128	4401	4186.7	3895	3865	3883	3881.0	
Center	5.95	4299	4415	4490	4401.3	4177	3986	3983	4048.7	
5	8.05	4475	4599	4368	4480.7	4509	4195	4290	4331.3	
6	9.58	4696	4497	4091	4428.0	4571	4384	4349	4434.7	
7	10.64	4630	4513	4558	4567.0	4473	4473	4481	4475.7	
8	11.39	4562	4598	4481	4547.0	4454	4307	4301	4354.0	
Averages —	>	4164.4	4187.6	4173.2	4175.1	4135.1	4045.0	4056.8	4079.0	
						• • •	,		ı	
		All	std.ft/min	Dev	from mean	Center 2/3	Side	Bottom	All	
		Mean	4127.0			Mean	4244.2	4106.5	4175.4	
		Min Point	3319.3		-19.6%	Std. Dev.	321.0	304.5	309.0	
		Max Point	4567.0		10.7%	COV as %	7.6	7.4	7.4	
		2472	a a fra						O al Dua	
Flow w/o C-Pt 3173 scfm					Instuments	SUsed:			Cal Due	
	g w/o C-Pt					s Used: ntific Barom eter	SN 909368	-	12/7/2012	
					Fisher Scie			-		
		4115	sfpm Finish	F	Fisher Scie	ntific Barometer		-	12/7/2012	
Vel Av	g w/o C-Pt	4115 Start	sfpm Finish	F F	Fisher Scie	ntific Barometer		-	12/7/2012	
Vel Av Stack tem p	g w/o C-Pt Ip	4115 Start 73.9	sfpm Finish 73.6		Fisher Scie	ntific Barometer		-	12/7/2012	
Vel Av Stack tem p Am bient tem	g w/o C-Pt ip ssure	4115 Start 73.9 72.5	sfpm Finish 73.6 71.5	F	Fisher Scie	ntific Barometer		-	12/7/2012	
Vel Av Stack tem p Am bient tem Am bient pres	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47	F in Hg	Fisher Scie TSI VelociC	ntific Barometer		-	12/7/2012	
Vel Av Stack tem p Am bient tem Am bient pres	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47	F in Hg	Fisher Scie TSI VelociC 5000 4500	ntific Barometer		-	12/7/2012	
Vel Av Stack tem p Am bient tem Am bient pres	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47	F in Hg	Fisher Scie TSI VelociC 5000 4500 4000	ntific Barometer		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47	F in Hg	Fisher Scie TSI VelociC 5000 4500 4000 3500	ntific Barometer		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47	F in Hg	Fisher Scie TSI VelociC 5000 4500 4000 5500	ntific Barometer		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47	F in Hg	Fisher Scie TSI VelociC 5000 4500 4000 5500	ntific Barometer		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47	F in Hg	Fisher Scie TSI VelociC 5000 4500 4000 5500	ntific Barometer		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 ₩ 3500 2500 2500 2000	ntific Barometer		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 € 2500 2500 3500 € 2500 1500	ntific Barometer		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 ₩ 3500 2500 2500 2000	ntific Barometer		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 € 2500 2500 3500 € 2500 1500	ntific Barometer alc SN T953512		-	12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 4500 4500 4500 3500 2500 2500 1500 1000	ntific Barometer	203001	-	12/7/2012 1/17/2013	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 ₩ 3500 2500 2500 1500 1000 500	ntific Barometer alc SN T953512	203001		12/7/2012	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 ₩ 3500 2500 2500 1500 1000 500	ntific Barometer alc SN T953512	203001		12/7/2012 1/17/2013	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt ip ssure	4115 Start 73.9 72.5 29.50	sfpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 ₩ 3500 2500 2500 1500 1000 500	ntific Barometer alc SN T953512	203001		12/7/2012 1/17/2013	
Vel Aw Stack tem p Am bient tem Am bient pre Am bient hum	g w/o C-Pt	4115 Start 73.9 72.5 29.50	stpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 2500 22000 1500 1000 500 0	ntific Barometer alc SN T953512			12/7/2012 1/17/2013	
Vel Av	g w/o C-Pt sp ssure nidity	4115 Start 73.9 72.5 29.50 43%	stpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 5000 4500 4000 3500 2500 22000 1500 1000 500 0	ntific Barometer alc SN T953512			12/7/2012 1/17/2013	
Vel Av Stack tem p Am bient tem Am bient pre- Am bient hun Notes:	g w/o C-Pt sp ssure nidity	4115 Start 73.9 72.5 29.50 43%	stpm Finish 73.6 71.5 29.47 45%	F in Hg RH	Fisher Scie TSI VelociC 4500 4500 3500 2500 3500 1500 1000 500 0	ntific Barometer alc SN T953512	203001		12/7/2012 1/17/2013	

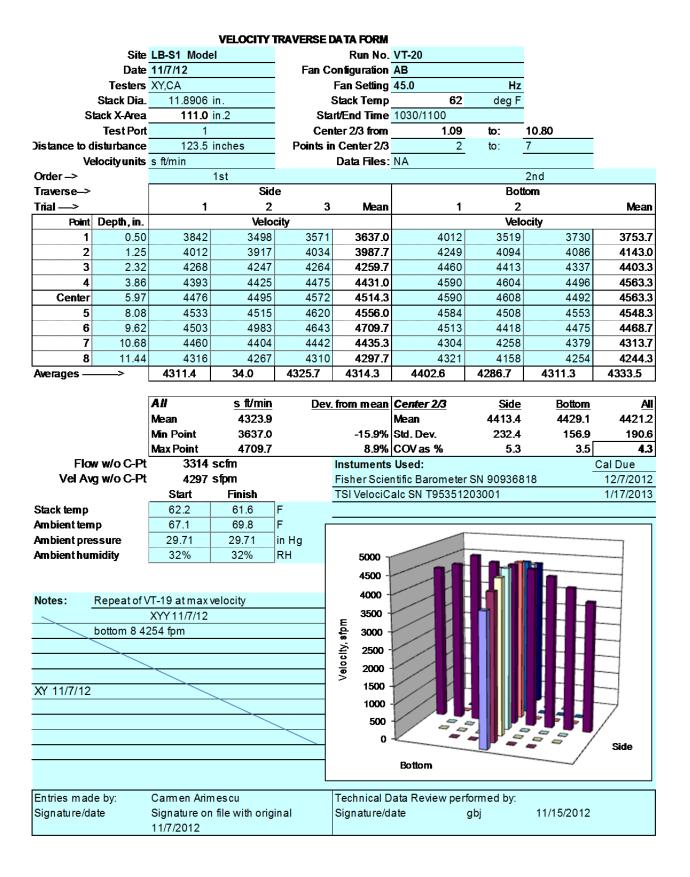
				IRAVERSEI						
		LB-S1 Mode			Run No.					
	Date		10/15/2012	Fan C	onfiguration		AC			
	Testers	XY, GBG, CA			Fan Setting		Hz			
	Stack Dia.	11.8906			Stack Temp	72	deg F			
S	tack X-Area	111.0	in.2		rt/End Time					
	Test Port				ter 2/3 from	1.09		10.80		
Distance to d	disturbance	123.5	inches	Points in	n Center 2/3	2	to:	7		
Ve	elocity units	std.ft/min			Data Files:	NA				
Order>			2nd	-			1st			
Traverse>			Sid	e			Botto	m		
Trial —>		1	2	3	Mean	1	2	3	Mean	
Point	Depth, in.		Velo	city	•		Veloc	ity		
1	0.50	2576	2406	2440	2474.0	2673	2646	2651	2656.7	
2	1.25	2639	2644	2666	2649.7	2800	2780	2761	2780.3	
3	2.31	2757	2725	2753	2745.0	2838	2836	2820	2831.3	
4	3.64	2872	2805	2770	2815.7	2855	2836	2825	2838.7	
Center	5.95	2942	3000	2859	2933.7	2940	2809	2921	2890.0	
5	8.05	3238	3164	2927	3109.7	3059	3044	3048	3050.3	
6	9.58	3360	3228	3062	3216.7	3188	3186	3135	3169.7	
7	10.64	3232	3004	3052	3096.0	3281	3193	3192	3222.0	
8	11.39	3132	3025	3045	3067.3	3110	3141	3140	3130.3	
Averages —	>	2972.0	2889.0	2841.6	2900.9	2971.6	2941.2	2943.7	2952.1	
									-	
		All	std.ft/min	Dev.	from mean	Center 2/3	Side	Bottom	All	
		Mean	2926.5	-		Mean	2938.0	2968.9	2953.5	
		Min Point	2474.0		-15.5%	Std. Dev.	211.1	177.3	188.0	
		Max Point	3222.0		10.1%	COV as %	72	6.0	6.4	
Flo	w w/o C-Pt	2258	scfm		Instuments	Used:			Cal Due	
Vel Av	g w∕o C-Pt	2928	sfpm		Fisher Scientific Barometer SN 90936818 12/7/2012					
		Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013	
Stack tern p		72.4	71.1	F						
Am bient terr	np	71.6	72	F						
Am bient pre	essure	29.47	29.47	in Hg						
Am bient hur	midity	46%	48%	RH	3500 🦵					
					1					
					3000					
Notes:	Bottom #8	3113 fpm.			0500				_ /	
					2500 E					
					2000 -					
					요 조 이 1500					
					ੂ 1500					
		<			-			H		
		$\overline{}$	CA 10/15/12	2	1000 -					
		$\overline{}$			500 -				\rightarrow	
					500 T					
									/	
								/		
					0 4				Side	
					0	Bottom			Side	
Entries mad	le by:	Carmen Arin	nescu 10/1	5/12			formed by:		Side	
Entries mad Signature/da	-	Carmen Arin	nescu 10/1	5/12	Technical D	ata Review per	-	10/22		
Entries mad Signature/da	-	Carmen Arin	nescu 10/1	5/12		ata Review per	formed by: gbj	10/22	/2012	

				IRAVERSEI						
		LB-S1 Mode	el		Run No.					
		10/17/12		Fan Configuration						
		CA, JEF			Fan Setting		Hz			
	Stack Dia.			-	Stack Temp	51	deg F			
S	tack X-Area	111.0	in.2	•	art/End Time	8:32 / 8:52				
	Test Port	-			nter 2/3 from	1.09	to:	10.80		
Distance to disturbance			inches	Points i	n Center 2/3	2	to:	7		
Ve	elocity units				Data Files:					
Order ->		2nd				1st				
Traverse->			Sic	le			Botto	m		
Trial>	,	1	2	3	Mean	1	2	3	Mean	
Point	Depth, in.		Velo		-		Veloc			
1		3833	3550	3823		3691	3733	3698	3707.3	
2	\$	4140	4071	4115		4080	4048	4008	4045.3	
3	Į	4342	4321	4310		4300	4280	4206	4262.0	
4	3.64	4439	4600	4536	4525.0	4348	4439	4357	4381.3	
Center		4570	4582	4545		4437	4380	4353	4390.0	
5	8.05	4477	4554	4464	4498.3	4460	4370	4361	4397.0	
6	9.58	4498	4470	4385	4451.0	4388	4304	4382	4358.0	
7	10.64	4246	4466	4261	4324.3	4251	4219	4243	4237.7	
8	11.39	4170	4179	4155	4168.0	4098	4002	3979	4026.3	
Averages —	>	4301.7	4310.3	4288.2	4300.1	4228.1	4197.2	4176.3	4200.6	
		All	std.ft/min	Dev	. from mean	Center 2/3	Side	Bottom	All	
		Mean	4250.3			Mean	4399.6	4295.9	4347.8	
		Min Point	3707.3		-12.8%	Std. Dev.	159.0	127.5	148.5	
		Max Point	4565.7		7.4%	COV as %	3.6	3.0	3.4	
Flo	w w/o C-Pt	3256	scfm		Instuments	Used:			Cal Due	
Vel Av	/gw/oC-Pt	4222	sfpm		Fisher Scientific Barometer SN 90936818 12/7/2012					
		Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013	
Stack temp		51.0	51.0	F						
Am bient terr	np	59.9	53.6	F _						
Am bient pre		29.88	29.91	in Hg						
Ambienthu	midity	33%	39%	RH	5000 🦵		-			
					4500 -					
Notes:	Bottom 7 =	4300 fpm			4000 -					
				/	E 3500					
					E 3000 - 2:0 2500 - 0 2000 -					
					· 문 2500 -					
					€ 2000 -					
					-					
					1500 -					
CA 10/17/2012					1000 -					
		CA 10/17/20								
		CA 10/17/20			500 -					
	/	CA 10/17/20			500 - 0 -					
		CA 10/17/20							Side	
		CA 10/17/20				Bottom			Side	
		CA 10/17/20				Bottom			Side	
Entries mad	de by:	CA 10/17/20	nescu		o 4	Bottom Pata Review per	formed by:		Side	
Entries mad Signature/da	-		nescu	10/17/2012	o 4	ata Review per	formed by: gbj	10/22	Side	
	-		nescu	10/17/2012	o 🕹	ata Review per		10/22		

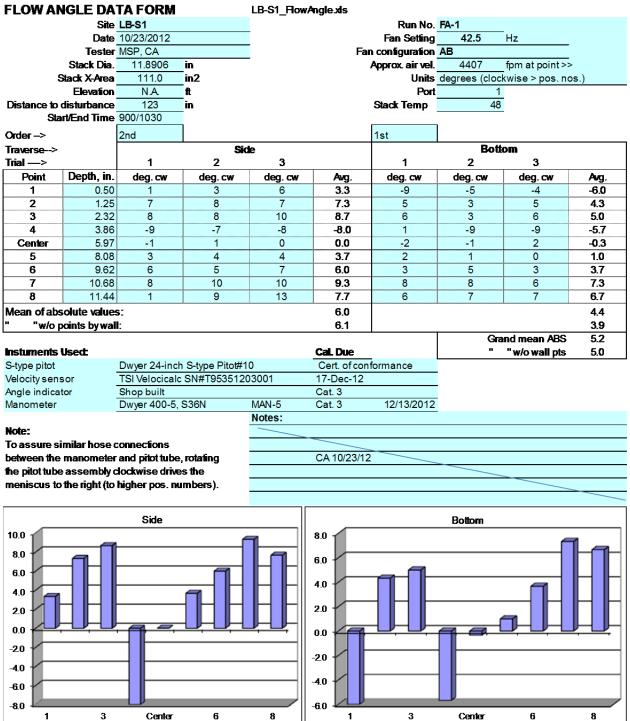
				IRAVERSEL						
		LB-S1 Mode		Run No.						
		10/17/12		Fan C	onfiguration					
		CA, JEF	-		Fan Setting		Hz			
_	Stack Dia.				Stack Temp		deg F			
S	tack X-Area	111.0	in.2	Start/End Time						
	Test Port				nter 2/3 from	1.09	-	10.80		
Distance to d			inches	Points i	n Center 2/3		to:	7		
	elocityunits				Data Files:					
Order>		1st				2nd				
Traverse>			Sic				Botto			
Trial —>		1	2	3	Mean	1	2	3	Mean	
Point			Velo				Veloc			
1	0.50	3433	4008	3882			3840	3688	3768.7	
2	1.25	4179	4148	4092			4209	4100	4103.0	
3	2.31	4580	4474	4420			4371	4364	4383.0	
4	3.64	4782	4623	4523			4804	4599	4662.3	
Center	5.95	4605	4815	4517		4577	4567	4578	4574.0	
5	8.05	4722	4644	4461	4609.0		4587	4533	4576.7	
6	9.58	4636	4752	4503			4586	4312	4580.0	
7	10.64	4544	4324	4653			4305	4280	4419.3	
8	11.39	4389	4075	4151	4205.0	4426	4254	4148	4276.0	
Averages —	>	4430.0	4429.2	4355.8	4405.0	4433.8	4391.4	4289.1	4371.4	
		All Mean	std.ft/min 4388.2	Dev	from mean	<u>Center 2/3</u> Mean	<u>Side</u> 4523.7	Bottom 4471.2	<u>All</u> 4497.4	
		Min Point	3768.7		-14.1%	Std. Dev.	181.0	189.8	180.2	
		Max Point	4662.3			COV as %	4.0	4.2	4.0	
Flo	ww/oC−Pt				Instuments				Cal Due	
Vel Av	g w/o C-Pt	4361	sform		Fisher Scientific Barometer SN 90936818 12/7/2012					
·		Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013	
Stack temp		51.0	54.0	F						
Am bient tem	ID.	53.6	54.5	F						
Am bient pre	ssure	29.91	29.91	in Hg						
Am bient hur	nidity	39%	42%	RH	5000 🦟		-	D		
Notes:	-	L			4500 - 4000 -	T				
-					_ 3500 -					
			/		≝ 3000 2:00 2:00 2:00 2:000					
			/		· 2500 -					
	JEF 10/17/	12								
					-					
		/			1500 -	//nH				
	/	/			1000 -					
					500 -		▝▐▋▕▐▀▋	555		
/					o - k					
					Ū			- /	Side	
						Bottom				
Entries mad Signature/da		Julia Flahert	/	10/17/2012	Technical D Signature/d	ata Review per ate	formed by: gbj	10/22	/2012	

			VELOCITY	IRAVERSE I	DATA FORM				
		LB-S1 Mode	el		Run No.				
		10/17/12		Fan C	onfiguration	BC			
	Testers	JEF, CA			Fan Setting	32.0	Hz		
	Stack Dia.	11.8906	in.		Stack Temp	57	deg F		
S	tack X-Area	111.0	in.2	Sta	rt/End Time	945/1000			
	Test Port	1		Cen	ter 2/3 from	1.09	to:	10.80	
Distance to d	listurbance	123.5	inches	Points in	n Center 2/3	2	to:	7	
Ve	elocity units	std.ft/min			Data Files:	NA	-		
Order>	-		2nd				1st		
Traverse>			Sid	e			Botto	m	
Trial —>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		Velo	city			Veloc		
1	0.50	2717	2837	2673	2742.3	2741	2639	2607	2662.3
2	1.25	2952	2881	2937	2923.3	2898	2865	2891	2884.7
3	2.31	3158	3170	3076	3134.7	3034	3052	3039	3041.7
4	3.64	3199	3147	3071	3139.0	3090	3066	3094	3083.3
Center		3250	3192	3348	3263.3	3062	3126	3101	3096.3
5	8.05	3212	3145	3321	3226.0	3097	3106	3119	3107.3
6	9.58	3139	3179	3176		3088	3048	3073	3069.7
7	10.64	3062	3166	3129	3119.0	2986	2976	3023	2995.0
		2954	2864	3098		2852	2868	2854	2858.0
Averages —	>	3071.4	3064.6	3092.1	3076.0	2983.1	2971.8	2977.9	2977.6
Avelages —		3071.4	5004.0	3032.1	5010.0	2903.1	2311.0	2311.3	2311.0
		All	std.ft/min	Πον	from mean	Contor 2/3	Side	Bottom	All
		Mean	3026.8		. itom mean	<u>Center 2/5</u> Mean	3138.6	3039.7	3089.1
		Min Point	2662.3		-12.0%	Std. Dev.	108.5	78.1	104.3
		Max Point	3263.3			COV as %	3.5	2.6	3.4
Flo	w w/o C-Pt				Instuments		3.0		Cal Due
	grw/oC-Pt					ntific Barometer	SN 000368	-	12/7/2012
10170	g moort	Start	Finish			alc SN T953512		10	1/17/2013
Stack tem p		57.0	57.0	F					1/11/2010
Ambientter	n n	56.3	57.2	, F –					
Ambientpre	•	29.91		in Hg					
Ambienthu		41%	39%	RH	9500		_		
Ampleman	many	41/0	3970		3500				
					3000				
Notes:		Bottom #7	3087		5000				
Notes.		Bollom #7	3067		2500	< µn			
	~				E I				
	\rightarrow				2000				
					2000 2:0 0 0 0 1500				
Ca 10/17/1:	2	<u> </u>			₩ 1500				
	2	<u> </u>			1000 -				
					1000				
			<u> </u>		500 -			5 5 -	
					1				
					0 –4				0:4-
							_	- /	Side
						Bottor			Side
						Bottom			Side
En tria e ma		0							Side
Entries mad	-	Carmen Arin	nescu			ata Review per	formed by:		Side
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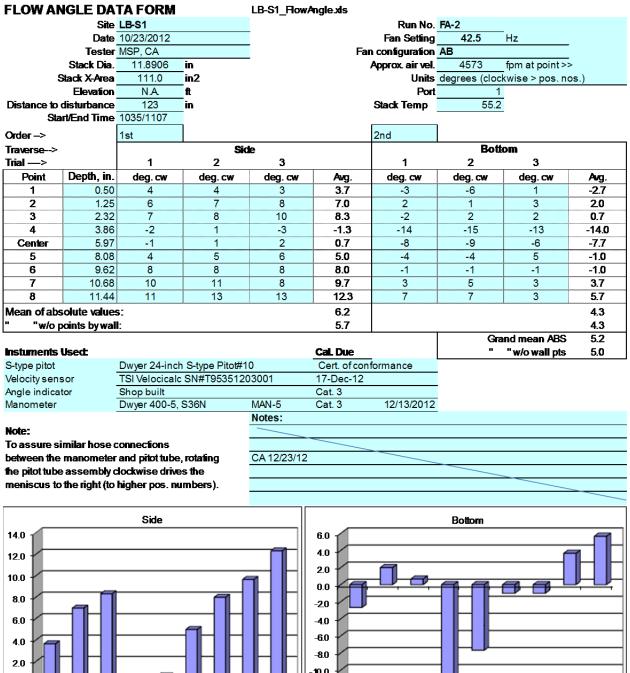
			VELOCITY 1	RAVERSE I	DATA FORM				
	Site	LB-S1 Mode	el		Run No.	VT-19			
	Date	11/7/12		Fan C	onfiguration	AB			
	Testers	XY,CA			Fan Setting	45.0	Hz		
	Stack Dia.	11.8906	in.		Stack Temp	61	deg F		
S	tack X-Area	111.0	in.2	Sta	rt/End Time	930/1030			
	Test Port	1			ter 2/3 from	1.09	to:	10.80	
Distance to d		-	inches		n Center 2/3	2	to:	7	
	elocityunits				Data Files:				
Order ->	aoony amo		2nd		Dun Inco.			1st	
Traverse->			Sid	<u>م</u>			Bott		
Trial ->		1	2	3	Mean	1	2		Mean
Point	Depth, in.	•	Velo	_	INCOL	•	 Velo	ait.	INCOLI
1	0.50	3829	3451	3472	3584.0	3781	3881	3771	3811.0
2		4035	3989	3988	4004.0	4244	4212	4205	4220.3
	1.25								
3	2.32	4323	4298	4242	4287.7	4634	4471	4472	4525.7
4	3.86	4511	4407	4463	4460.3	4418	4622	4648	4562.7
Center	5.97	4622	4543	4475	4546.7	4624	4619	4686	4643.0
5	8.08	4711	4532	4509	4584.0	4541	4606	4669	4605.3
6	9.62	4702	4501	4525	4576.0	4512	4559	4543	4538.0
7	10.68	4563	4401	4441	4468.3	4402	4402	4335	4379.7
8	11.44	4386	4327	4295	4336.0	4187	4118	4202	4169.0
Averages —	>	4409.1	34.0	4267.8	4316.3	4371.4	4387.8	4392.3	4383.9
		All	std.ft/m in	Dev.	from mean	Center 2/3	Side	Bottom	All
		Mean	4350.1			Mean	4418.1	4496.4	4457.3
		Min Point	3584.0		-17.6%	Std. Dev.	208.9	147.3	178.3
		Max Point	4643.0		6.7%	COV as %	4.7	3.3	4.0
Flo	n w/o C-Pt	3331	scfm		Instuments	Used:			Cal Due
Vel Av	g w/o C-Pt	4320	sfpm		Fisher Scier	n tific Barom eter	SN 909368	18	12/7/2012
	-	Start	Finish		TSI VelociC	alc SN T953512	203001		1/17/2013
Stack temp		59.2	62.2	F					
Ambient tem	ID	64.4	67.1	F r					
Ambient pre	ssure	29.71	29.71	in Hg					
Ambienthur		35%		RH	5000 🚽				
	····· ·	L							
					4500 -				
Notes:	45 degree	turn	XY 11/7/12		4000 -				
					3500 -				
	bottom 8 44	467 fpm			E 3000 -				
					- <u>-</u>				
					<u>≩</u> 2500 -				
		<u> </u>			ම 2000 -				
XY 11/7/12					1500 -				
XY 11///12					1000 -			₽┨╌┨╌╢	
								444	
				<u> </u>	500 -				
					0 -		· · · · · ·	- /	Side
						D-#		/	
						Bottom			
Entries mad	o hyr								
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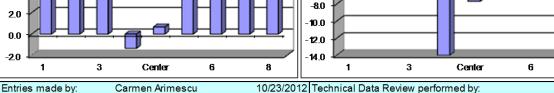


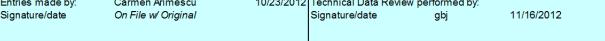
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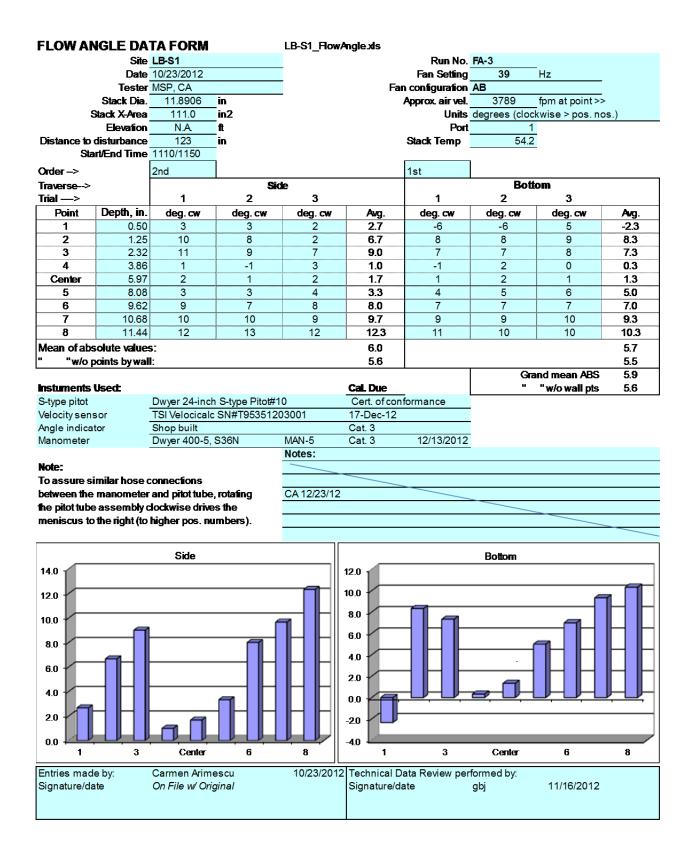


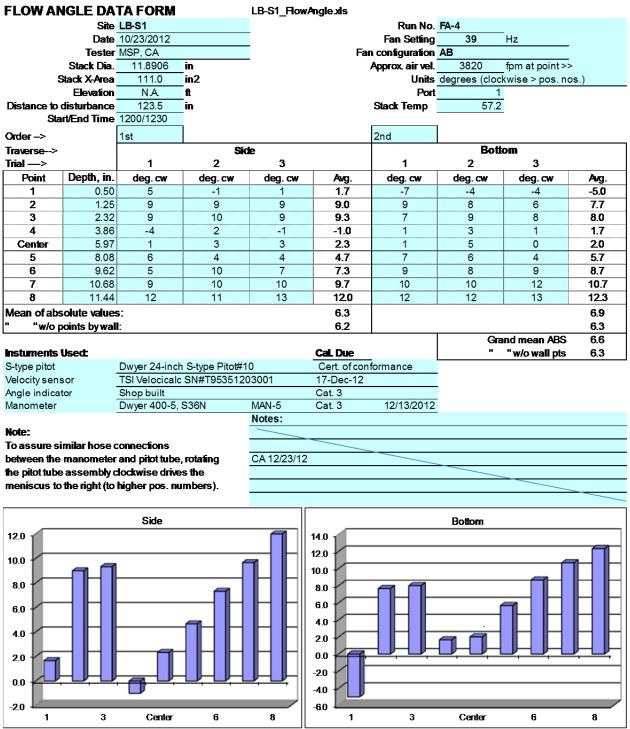




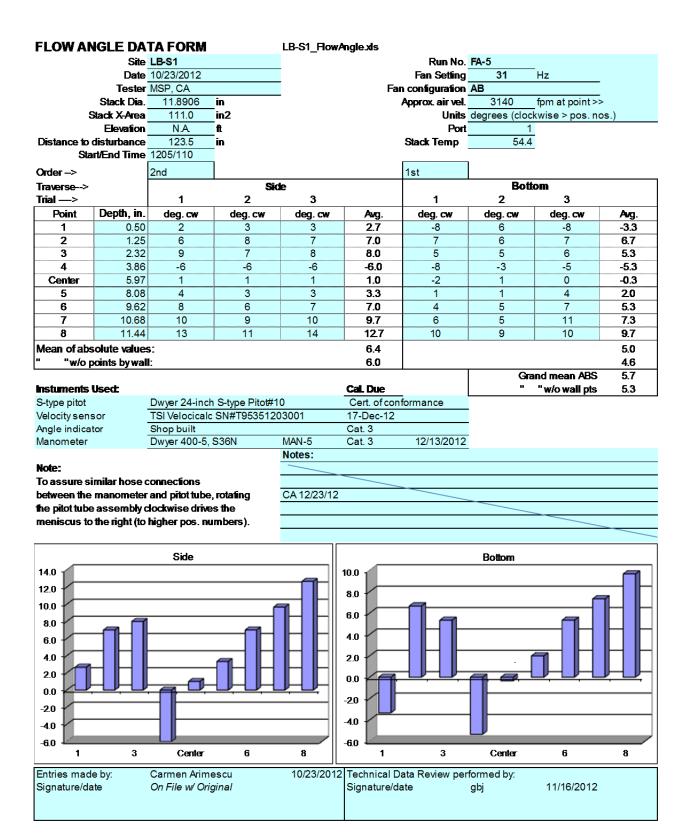


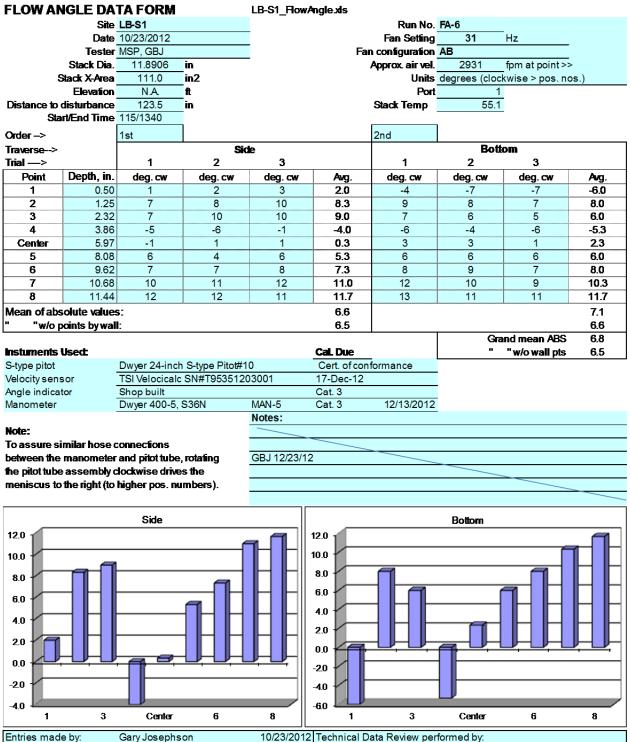
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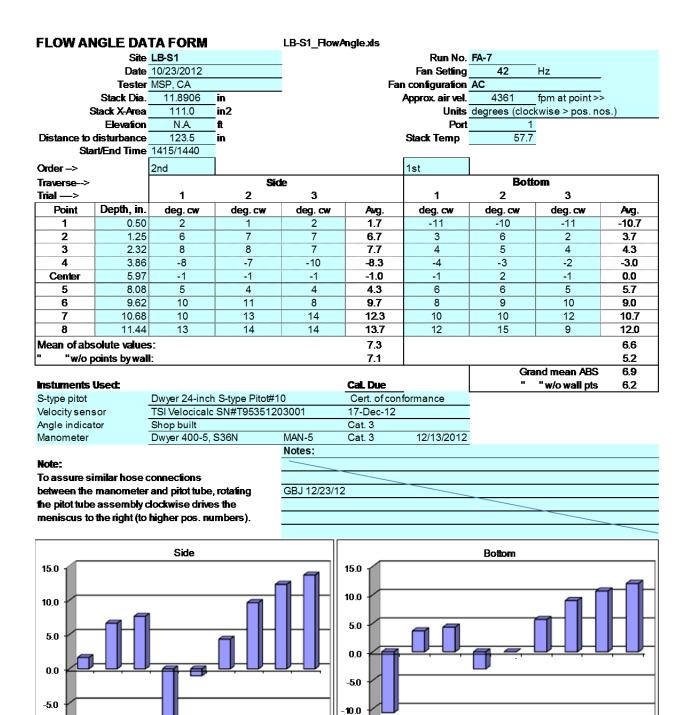


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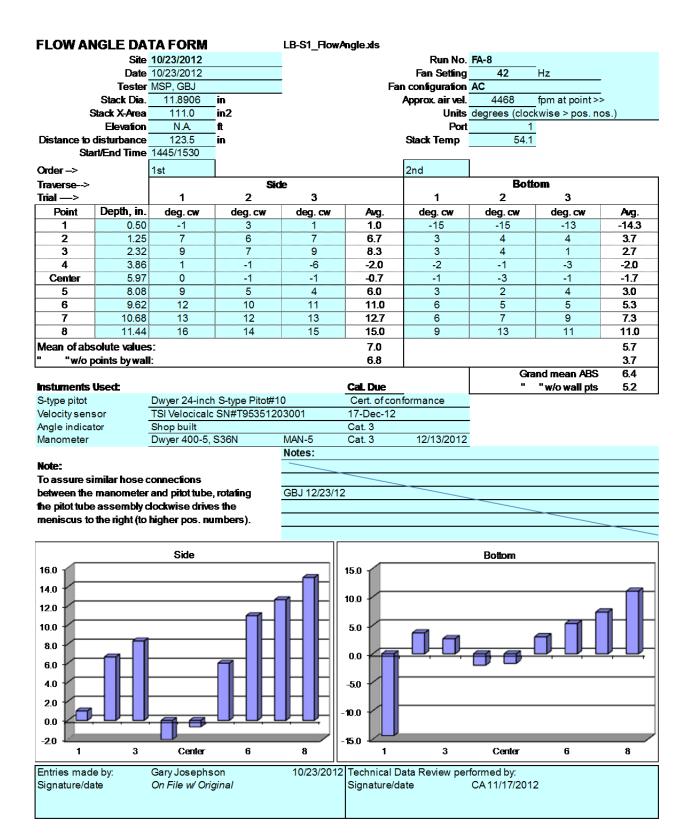
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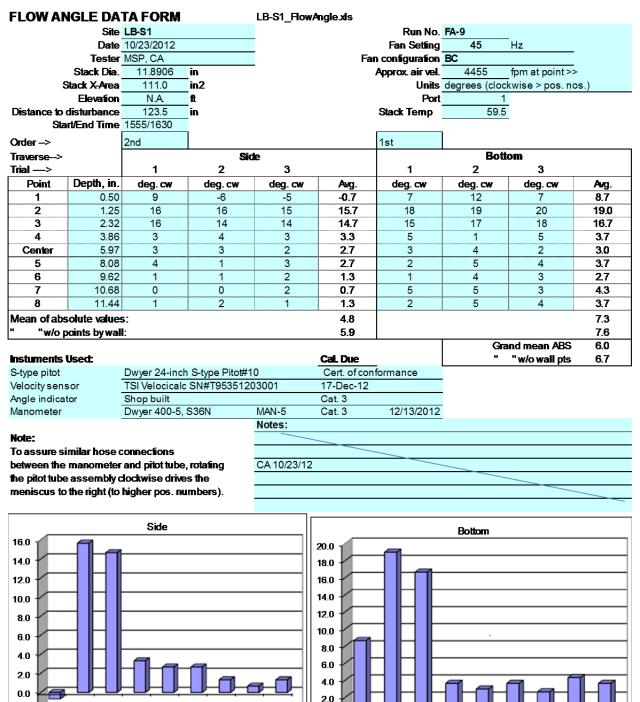
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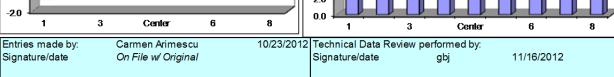
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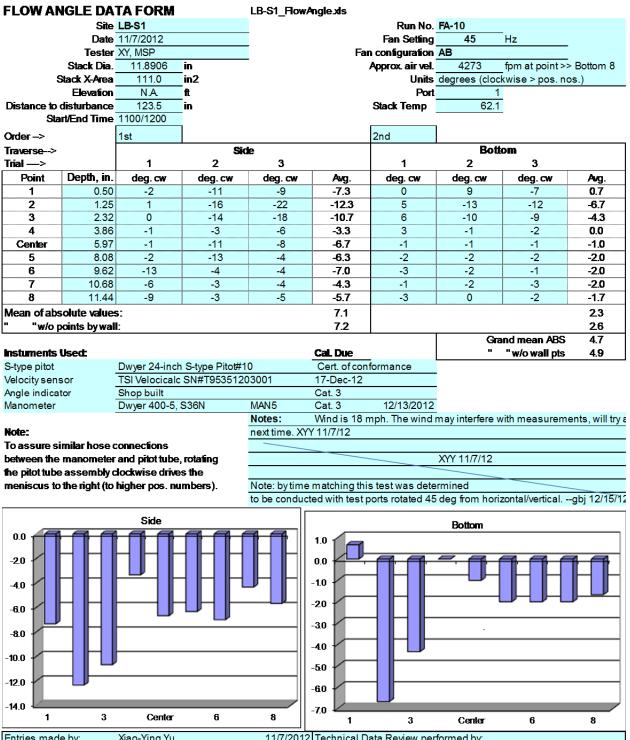
Gary Josephson

6

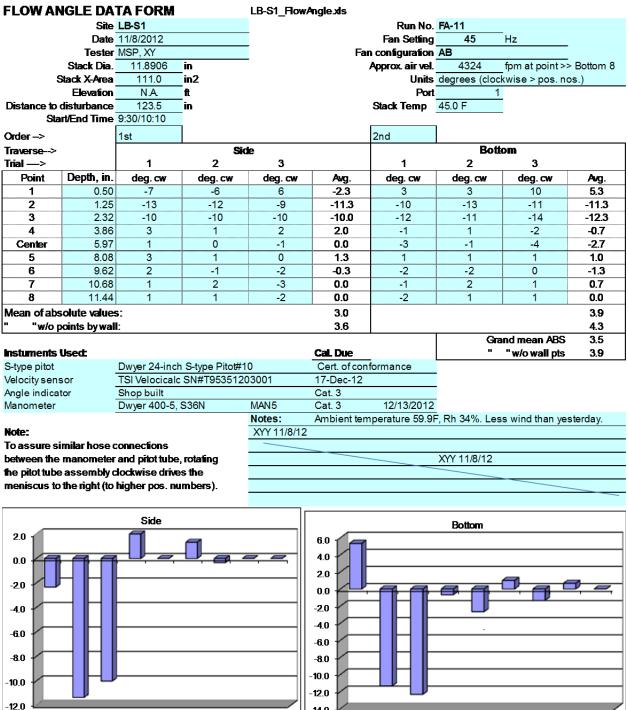


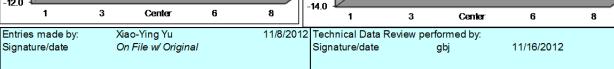


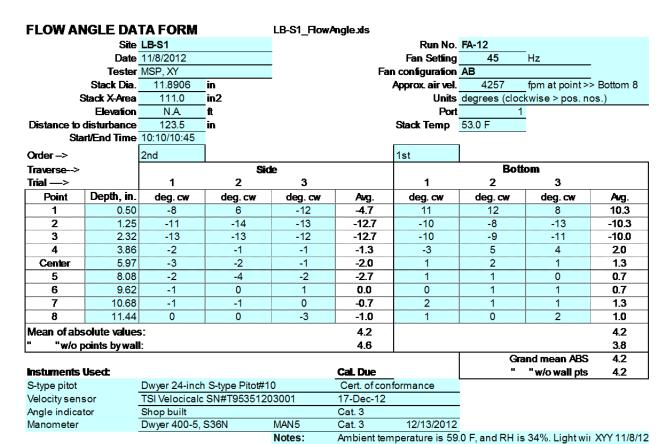




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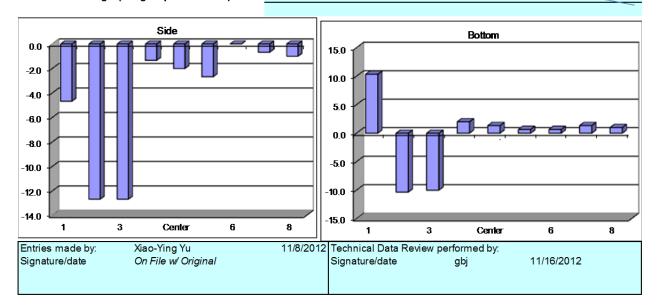






Note:

To assure similar hose connections between the manometer and pitot tube, rotating the pitot tube assembly clockwise drives the meniscus to the right (to higher pos. numbers).



XYY 11/8/12

Appendix A.4: LB-S1 Tracer Gas Uniformity Data Sheets

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
		10/25/2012	-	Fan C	onfiguration				
	Testers	MSP,CA, XY			Fan Setting		Hz	•	
	Stack Dia.	11.89	in.	-	Stack Temp			-	
	Stack X-Area	111.0		St	art/End Time		3-	Ī	
	Test Port	1		-	nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	in Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Center			
Order>		2nd					1st		
Traverse>			Si	de			Both	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		pp	b			рр	b	
1	0.50	631	614	639	628.0	596	605	594	598.3
2	1.24	658	631	644	644.3	587	600	592	593.0
3	2.29	632	629	644	635.0	597	611	602	603.3
4	3.82	627	626	642	631.7	596	613	591	600.0
Center	5.91	624	607	607	612.7	627	608	610	615.0
5	8.00	602	581	596	593.0	592	610	603	601.7
6	9.52	575	565	590	576.7	609	606	615	610.0
7	10.57	576	565	570	570.3	604	619	605	609.3
8	11.31	558	558	571	562.3	604	591	617	604.0
Averages —	>	609.2	597.3	611.4	606.0	601.3	607.0	603.2	603.9
				•					
		All	ppb	Dev	/. from mean	Center 2/3	<u>Side</u>	Bottom	ᆁ
		Mean	604.93			Mean	609.10	604.62	606.86
		Min Point	562.33		-7.0%	Std. Dev.	29.58	7.37	20.84
		Max Point	644.33		6.5%	COV as %	4.9	1.2	3.4
Arm Cone	603.813								
Avg. Conc.	003.013	ррб			Instuments				
Avg. Conc.	003.613				B&K 1302 G	as Analyzer SN	1788615		Cat2 M&TE
5		Start	Finish	1.	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p	pressure	Start 20	100	psig	B&K 1302 G TSI VelociC	as Analyzer SN			
Tracer tank p Injection flow	pressure	Start 20 50	100 50	sccm	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p Injection flow Stack Temp	oressure vm eter	Start 20 50 46.7	100 50 52.8	sccm °F	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack y	pressure vm eler velocity	Start 20 50 46.7 4572	100 50 52.8 4548	sccm °F Ipm	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo	oressure vm eler velocity owm eler	Start 20 50 46.7 4572 5	100 50 52.8 4548 5	sccm °F fpm Ipm	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres	oressure vm eler velocity owm eter ssure	Start 20 50 46.7 4572 5 1016	100 50 52.8 4548 5 1017	sccm °F fpm Ipm mbar	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203 htific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum	oressure vm eler velocity owm eler ssure nidity	Start 20 50 46.7 4572 5 1016 43%	100 50 52.8 4548 5 1017 23%	sccm °F fpm Ipm mbar RH	B&K 1302 G TSI VelociC Fisher Scier	as Analyzer SN alc SN T95351203 htific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum	oressure vm eler velocity owm eler ssure n idity np	Start 20 50 46.7 4572 5 1016 43% 59.0	100 50 52.8 4548 5 1017 23% 70.7	sccm °F fpm Ipm mbar RH °F	B&K 1302 G TSI VelociC Fisher Scier	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	oressure vm eter velocity owm eter ssure nidity np orrection	Start 20 50 46.7 4572 5 1016 43%	100 50 52.8 4548 5 1017 23%	sccm °F Ipm Ipm mbar RH °F Y/N	B&K 1302 G TSI VelociC: Fisher Scier	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum	oressure vm eter velocity owm eter ssure nidity np orrection	Start 20 50 46.7 4572 5 1016 43% 59.0 Y	100 50 52.8 4548 5 1017 23% 70.7 Y	sccm °F fpm Ipm mbar RH °F	B&K 1302 G TSI VelociC: Fisher Scier	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	oressure vm eler velocity owm eter ssure nidity np orrection	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 500	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	oressure vm eler velocity owm eter ssure nidity np orrection	Start 20 50 46.7 4572 5 1016 43% 59.0 Y	100 50 52.8 4548 5 1017 23% 70.7 Y	sccm °F Ipm Ipm mbar RH °F Y/N	B&K 1302 G TSI VelociC: Fisher Scier 700 600	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	oressure vm eter ssure nidity orrection s am ples	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5 5	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	oressure vm eter ssure nidity orrection s am ples	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem Bakk vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eler velocity owm eter ssure nidity np orrection s am ples r checked:	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 P 40 P b 30	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem Bakk vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eter ssure nidity orrection s am ples	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem Bakk vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eler velocity owm eter ssure nidity np orrection s am ples r checked:	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eter velocity owm eter ssure nidity np orrection s amples r checked:	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30	Bas Analyzer SN alc SN T95351203 htific SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem Bakk vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eter velocity owm eter ssure nidity np orrection s amples r checked:	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30	Bas Analyzer SN alc SN T95351203 htific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eter velocity owm eter ssure nidity np orrection s amples r checked:	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30	as Analyzer SN alc SN T95351203 httffc SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eter velocity owm eter ssure nidity np orrection s amples r checked:	Start 20 50 46.7 4572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30	as Analyzer SN alc SN T95351203 htific SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	oressure wreter ssure nidity np orrection s amples r checked:	Start 20 50 46.7 572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012 = Bottom7	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5 XY10/25/12	sccm °F fpm lpm mbar RH °F Y/N ppb n	B&K 1302 G TSI VelociC: Fisher Scier 700 600 9 40 9 50 9 40 9 20 10	as Analyzer SN alc SN T95351203 httffc SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient nem Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze Notes: CA 10/25/12	e by:	Start 20 50 46.7 572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012 = Bottom7 Carmen Arim	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5 XY10/25/12 1es cu	sccm °F fpm lpm mbar RH °F Y/N ppb n	B&K 1302 G TSI VelociC: Fisher Scier 700 600 9 40 9 30 20 10 10 10 10 10 10 10 10 10 10 10 10 10	as Analyzer SN alc SN T95351203 httfic SN 90936818	001		
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient nem Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	e by:	Start 20 50 46.7 572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012 = Bottom7 Carmen Arim	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5 XY10/25/12	sccm °F fpm lpm mbar RH °F Y/N ppb n	B&K 1302 G TSI VelociC: Fisher Scier 700 600 9 40 9 50 9 40 9 20 10	as Analyzer SN alc SN T95351203 httfic SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	e by:	Start 20 50 46.7 572 5 1016 43% 59.0 Y 5,3,4,3,5 5 10/24/2012 = Bottom7 Carmen Arim	100 50 52.8 4548 5 1017 23% 70.7 Y 9,5,6,10,7 5 XY10/25/12 1es cu	sccm °F fpm lpm mbar RH °F Y/N ppb n	B&K 1302 G TSI VelociC: Fisher Scier 700 600 9 40 9 30 20 10 10 10 10 10 10 10 10 10 10 10 10 10	as Analyzer SN alc SN T95351203 httfic SN 90936818	001		

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM					
31-Jul-06	Site	LB-S1 Mode			Run No.					
	Date	10/25/2012		Fan C	onfiguration	BC			-	
	Testers	XY, CA			Fan Setting		I	Hz	•	
	Stack Dia.	11.89	in.		Stack Temp		54.5 c	deg F	-	
	Stack X-Area	111.0	in . ²	Sta	art/End Time	1140/1300				
	Test Port	1		Cei	nter 2/3 from		1.09	to:	10.80	
Distance t	o disturbance	123.5	inches	Points i	n Center 2/3		2	to:	7	
Measu	urem ent units	ppb SF6		ln,	jection Point	Port 2 Far				
Order>			1st				2	2nd		
Traverse>			Sie	le				Both	om	
Trial>		1	2	3	Mean		1	2	3	Mean
Point	Depth, in.		PP					pp	Y	
1	0.50	566	581	564	570.3		607	622	577	602.0
2	1.24	572	592	552	572.0		627	642	629	632.7
3	2.29	566	561	568	565.0		623	598	643	621.3
4	3.82	563	564	583	570.0		599	587	614	600.0
Center	5.91	596	580	595	590.3		593	596	585	591.3
5	8.00	534	617	618	589.7		591	619	606	605.3
6 7	9.52 10.57	655 654	663 696	660 655	659.3 668.3		597 607	611 609	624 649	610.7 621.7
8		696	701	663	686.7		692	609	626	644.3
Averages —	11.31 >	600.2	617.2	606.4	608.0	615.1	092	611.0	617.0	614.4
Averages -		0002	017.2	000.4	000.0	013.1		011.0	017.0	014.4
		All	ppb	Dev	form mean	Center 2/3		Side	Bottom	All
		Mean	611.17			Mean		602.10		606.98
		Min Point	565.00		-7.6%	Std. Dev.		43.34	14.29	31.41
		Max Point	686.67			COV as %		7.2	Г	5.2
Avg. Conc.	613.708	ppb			Instuments	lleed:				
						0360.				
					B&K 1302 G		SN	1788615		Cat2 M& TE
		Start	Finish		B&K 1302 G					Cat2 M&TE 12/17/2012
Tracer tank p	ressure	Start 100	Finish 100	psig	B&K 1302 G TSI VelociCa	as Analyzer	12030			
Tracer tank p Injection flow				sccm	B&K 1302 G TSI VelociCa	as Analyzer alc SN T9535	12030			12/17/2012
Injection flow Stack Temp	meter	100 50 52.6	100 50 56.4		B&K 1302 G TSI VelociCa	as Analyzer alc SN T9535	12030			12/17/2012
Injection flow Stack Temp Mean stack v	rm eter relocity	100 50 52.6 4552	100 50 56.4 4509	sccm °F 1pm	B&K 1302 G TSI VelociCa	as Analyzer alc SN T9535	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow	rm eter elocity wm eter	100 50 52.6 4552 5	100 50 56.4 4509 5	sccm °F fpm Ipm	B&K 1302 G TSI VelociCa	as Analyzer alc SN T9535	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient pres	rm eter relocity wm eter ssure	100 50 52.6 4552 5 1017	100 50 56.4 4509 5 1017	sccm °F fpm Ipm mbar	B&K 1302 G TSI VelociCa	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient hum	rm eter relocity wm eter ssure 1 idity	100 50 52.6 4552 5 1017 23%	100 50 56.4 4509 5 1017 42%	sccm °F fom Ipm mbar RH	B&K 1302 G TSI VelociCa Fisher Scier	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient hum Ambient Tem	rm eter relocity wm eter ssure 1 idity 1 p	100 50 52.6 4552 5 1017 23% 70.7	100 50 56.4 4509 5 1017 42% 56.3	sccm °F forn Iom mbar RH °F	B&K 1302 G TSI VelociCa Fisher Scier	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient pres Ambient hum Ambient Tem B&K vapor co	meter elocity wmeter ssure idity ip prection	100 50 52.6 4552 5 1017 23%	100 50 56.4 4509 5 1017 42%	sccm °F Ipm Ipm RH °F Y/N	B&K 1302 G TSI VelociCa Fisher Scier 700 600	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient hum Ambient Tem	meter elocity wmeter ssure idity ip prection	100 50 52.6 4552 5 1017 23% 70.7 Y	100 50 56.4 4509 5 1017 42% 56.3 Y	sccm °F forn Iom mbar RH °F	B&K 1302 G TSI VelociCa Fisher Scier 700	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient num Ambient Tem B&K vapor co Back-Gd gas	meter elocity wmeter ssure hidity prection	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient pres Ambient hum Ambient Tem B&K vapor co	meter elocity wmeter ssure hidity prection	100 50 52.6 4552 5 1017 23% 70.7 Y	100 50 56.4 4509 5 1017 42% 56.3 Y	sccm °F Ipm Ipm RH °F Y/N	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	meter elocity wmeter asure hidity prection amples	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient num Ambient Tem B&K vapor co Back-Gd gas	meter elocity wmeter asure hidity prection amples	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p	as Analyzer alc SN T9535 httfic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	meter elocity wmeter asure hidity porrection amples r checked:	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p	as Analyzer alc SN T9535 httffic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	meter elocity wmeter asure hidity prection amples	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 20	as Analyzer alc SN T9535 httific SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	meter elocity wmeter asure hidity porrection amples r checked:	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 20	as Analyzer alc SN T9535 httffic SN 9093	12030			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	meter elocity wmeter asure hidity porrection amples r checked:	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 20	as Analyzer alc SN T9535 httffic SN 9093	12030			
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	meter elocity wmeter asure hidity porrection amples r checked:	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 20	as Analyzer alc SN T9535 httific SN 9093	51203(6818			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	meter elocity wmeter asure hidity porrection amples r checked:	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 20	as Analyzer alc SN T9535 httffic SN 9093	6818			
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	meter elocity wmeter asure hidity porrection amples r checked:	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 20	as Analyzer alc SN T9535 httffic SN 9093	51203(6818			
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	meter elocity wmeter ssure hidity pporrection amples r checked: Mean velocity	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/25/12	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 20 10	as Analyzer alc SN T9535 httffic SN 9093	6818			
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes: M CA 10/25/12	meter elocity wmeter ssure hidity pporrection amples r checked: Mean velocity	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012 = Bottom7 Carmen Arim	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5 5	sccm *F fpm Ipm mbar RH *F Y/N ppb n CA 10/25/12 10/25/2012	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 20 10	as Analyzer alc SN T9535 httffic SN 9093	6812033 66818			
Injection flow Stack Temp Mean stack w Sampling flow Ambient press Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes: M CA 10/25/12 Entries made	meter elocity wmeter ssure hidity pporrection amples r checked: Mean velocity	100 50 52.6 4552 5 1017 23% 70.7 Y 9,5,6,10,7 5 10/24/2012 = Bottom7 Carmen Arim	100 50 56.4 4509 5 1017 42% 56.3 Y 10,7,8,9,5 5 	sccm *F fpm Ipm mbar RH *F Y/N ppb n CA 10/25/12 10/25/2012	B&K 1302 G TSI VelociCa Fisher Scier 700 600 P 40 P 30 20 10 Technical D	as Analyzer alc SN T9535 httffic SN 9093	6812033 66818	DO1		

Rev. 0			TRACER GAS	S TRAVERSE		1				
31-Jul-06	Site	LB-S1 Mode			Run No.					
		10/26/2012	-	Fan C	onfiguration					
	Testers	MSP, CA			Fan Setting		Hz	2		
	Stack Dia.	11.89	in.		Stack Temp		45.9 de			
	Stack X-Area	111.0		St	art/End Time			3.	-	
	Test Port			•	nter 2/3 from		1.09	to:	10.80	
Distance	to disturbance		inches		n Center 2/3		2	to:	7	
	urem ent units					Port 2 Near				
Order>			1st		•		2n	nd		
Traverse>			Sic	de				Botte	om	
Trial>		1	2	3	Mean	r	1	2	3	Mean
Point	Depth, in.		pp	b				рр	b	
1	0.50	590	576	593	586.3		569	597	592	586.0
2	1.24	604	612	611	609.0		590	621	598	603.0
3	2.29	613	595	604	604.0		590	584	583	585.7
4	3.82	588	608	604	600.0		591	604	603	599.3
Center	5.91	612	586	561	586.3		610	607	600	605.7
5	8.00	599	575	574	582.7		587	603	597	595.7
6	9.52	550	568	560	559.3		588	566	567	573.7
7	10.57	512	536	551	533.0		569	593	571	577.7
8	11.31	539	506	525	523.3		554	560	557	557.0
Averages —	>	578.6	573.6	575.9	576.0	583.1		592.8	585.3	587.1
				D		0		0:4-	Detterr	
		A <i>ll</i> Mean	<u>ppb</u> 581.54	Dev	/. from mean	<u>Cerner 2/3</u> Mean		<u>Side</u> 582.05	⁶ <u>Bottom</u> 591.52	<u>All</u> 586.79
		Min Point	523.33		10.0%	Std. Dev.		27.30	12.62	21.01
		Max Point	523.33 609.00			COV as %		4.7	2.1	3.6
Avg. Conc.	579.729		005.00		Instuments	1		4.7	2.1	5.0
	0101120	FF-			B&K 1302 G		SN	1788615		Cat2 M&TE
		Start	Finish			alc SN T9535				12/17/2012
Tracer tank p	pressure	100	100	psig	Fisher Scier	ntific SN 90936	6818			12/7/2012
Injection flow	/meter	50	50	sccm						
Stack Temp		45.1	46.7	°F						
Mean stack v	elocity	4500	4566	1pm						
Sampling fo	wmeter	5	5	lpm 🛛						
Am bient pres	sure	1012	1011	mbar	700	-	-			
Am bient hun	nidity	46%	40%	RH						
Ambient Ten	ıp	53.6	58.1	۴F	600)				
B&K vapor co	orrection	Y	Y	Y/N						
Back-Gd gas	5			ppb	50					
		11,15,8,12,6								
No. Bk-Gd sa	amples	5	5	n	р ⁴⁰					
					Р					
Gas analyze	r checked:	10/24/2012		CA 10/26/12	<u>ь 30</u>					
N-4		D - 11 7			20		ΥL.			
Notes:	Mean velocity	= Bottom/					41		▐₽₽₽₽	
					10	ю / 🖊			╵╴╡╶┥╶╴	/
CA 10/26/12						4	55			
UA 10/20/12						0 -	-	-		Side
				<u> </u>		I	Bottom			
Entries mad	e by:	Carmen Arim		10/26/2012	Technical D			by:		
Entries mad		Carmen Arim Signature on				ata Review per	rform ed		11/27/2012	
Entries mad Signature/da			nescu i file with origi		Technical D Signature/da	ata Review per			11/27/2012	
						ata Review per	rform ed		11/27/2012	

Rev. 0			TRACER GAS	S TRAVERSE		1			
31-Jul-06	Site	LB-S1 Mode			Run No.				
		10/26/2012	-	Fan C	onfiguration				
	Testers	MSP, CA			Fan Setting		Hz	•	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0	in. ²	St	art/End Time		<u> </u>	-	
	Test Port	1		Ce	nter 2/3 from	1.09	to:	10.80	
Distance 1	to disturbance	123.5	inches	Points i	in Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Center Top			
Order>			2nd				1st		
Traverse>			Sie	de			Both	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		pp	b			рр	b	
1	0.50	648	641	646	645.0	617	626	615	619.3
2	1.24	632	667	654	651.0	609	609	602	606.7
3	2.29	619	630	648	632.3	617	611	641	623.0
4	3.82	613	609	637	619.7	600	593	620	604.3
Center	5.91	606	614	595	605.0	602	613	605	606.7
5	8.00	566	573	565	568.0	574	594	593	587.0
6	9.52	546	546	552	548.0	587	566	569	574.0
7	10.57	543	544	525	537.3	583	577	577	579.0
8	11.31 >	533 589.6	541	534 595.1	536.0 593.6	569 595.3	557	560	562.0 595.8
Averages —	>	0.600	596.1	595.1	093.0	595.5	594.0	598.0	595.6
		All	ppb	Dev	/. from mean	Contor 2/3	Side	Bottom	All
		Mean	594.69	<u></u>		Mean	594.48	597.24	595.86
		Min Point	536.00		-9.9%	Std. Dev.	43.78	17.65	32.10
		Max Point	651.00			COV as %	7.4	r	5.4
Avg. Conc.	593.292	ppb			Instuments		1.4		
Avg. Conc.	593.292	ppb				Used:	1788615	Į	Cat2 M&TE
Avg. Conc.	593.292	ppb Start	Finish		Instuments B&K 1302 G	Used:	1788615	Į	
Avg. Conc. Tracer tank p			Finish 100	psig	Instuments B&K 1302 G TSI VelociCa	Used: as Analyzer SN	1788615	Į	Cat2 M&TE
-	pressure	Start		psig sccm	Instuments B&K 1302 G TSI VelociCa	Used: as Analyzer SN alc SN T95351203	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p	pressure	Start 100	100	· -	Instuments B&K 1302 G TSI VelociCa	Used: as Analyzer SN alc SN T95351203	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow	oressure vmeter	Start 100 50 46.7 4566	100 50 46.3 4501	sccm	Instuments B&K 1302 G TSI VelociCa	Used: as Analyzer SN alc SN T95351203	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp	pressure vmeter velocity	Start 100 50 46.7 4566 5	100 50 46.3 4501 5	sccm °F fpm Ipm	Instuments B&K 1302 G TSI VelociCa	Used: as Analyzer SN alc SN T95351203	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack y	oressure Im eler velocity wm eter	Start 100 50 46.7 4566 5 1011	100 50 46.3 4501 5 1011	sccm °F fpm Ipm mbar	Instuments B&K 1302 G TSI VelociCa	Used: as Analyzer SN alc SN T95351203 htific SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum	oressure vm eter velocity wm eter ssure hidity	Start 100 50 46.7 4566 5 1011 39%	100 50 46.3 4501 5 1011 38%	sccm °F fom Ipm mbar RH	Instuments B&K 1302 G TSI VelociCa Fisher Scier	Used: as Analyzer SN alc SN T95351203 htific SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem	oressure vm eter velocity wm eter ssure hidity 1p	Start 100 50 46.7 4566 5 1011 39% 58.1	100 50 46.3 4501 5 1011 38% 58.1	sccm °F fom Iom mbar RH °F	Instuments B&K 1302 G TSI VelociCa Fisher Scier	Used: ias Analyzer SN alc SN T95351203 httffic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	oressure vm eter velocity wm eter ssure hidity 1p orrection	Start 100 50 46.7 4566 5 1011 39%	100 50 46.3 4501 5 1011 38%	sccm °F fom Iom mbar RH °F Y/N	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem	oressure vm eter velocity wm eter ssure hidity 1p orrection	Start 100 50 46.7 4566 5 1011 39% 58.1 Y	100 50 46.3 4501 5 1011 38% 58.1 Y	sccm °F fom Iom mbar RH °F	Instuments B&K 1302 G TSI VelociCa Fisher Scier	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter vm eter ssure hidity porrection	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter vm eter ssure hidity porrection	Start 100 50 46.7 4566 5 1011 39% 58.1 Y	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F fom Iom mbar RH °F Y/N	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	vm eter vm eter ssure hidity porrection amples	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter vm eter ssure hidity porrection amples	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vineter velocity weneter ssure hidity porrection amples r checked:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter vm eter ssure hidity porrection amples	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p b 30	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vineter velocity weneter ssure hidity porrection amples r checked:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 P 40 P 30 20	Used: as Analyzer SN alc SN T95351203 httfic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter vm eter ssure hidity porrection amples r checked:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 P 40 P 30 20	Used: as Analyzer SN alc SN T95351203 httific SN 90936818	1788615	Į	Cat2 M& TE 12/17/2012 12/7/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	vm eter vm eter ssure hidity porrection amples r checked:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 P 40 P 30 20	Used: as Analyzer SN alc SN T95351203 httffic SN 90936818	1788615	Į	Cat2 M&TE 12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	vm eter vm eter ssure hidity porrection amples r checked:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 P 40 P 30 20	Used: as Analyzer SN alc SN T95351203 httffic SN 90936818		Į	Cat2 M& TE 12/17/2012 12/7/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	vm eter vm eter ssure hidity porrection amples r checked:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 P 40 P 30 20	Used: as Analyzer SN alc SN T95351203 httific SN 90936818		Į	Cat2 M& TE 12/17/2012 12/7/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	vm eter vm eter ssure hidity porrection amples r checked:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/26/12	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 p 40 p 40 p 30 20 10	Used: as Analyzer SN alc SN T95351203 httffic SN 90936818		Į	Cat2 M& TE 12/17/2012 12/7/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor cc Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	e by:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012 = Bottom7 Carmen Arin	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1 5	sccm °F fpm lpm mbar RH °F Y/N ppb n CA 10/26/12	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 p 40 p 40 p 30 20 10	Used: as Analyzer SN alc SN T95351203 httffic SN 90936818		Į	Cat2 M& TE 12/17/2012 12/7/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor cc Back-Gd gas No. Bk-Gd sa Gas analyzee Notes: CA 10/26/12	e by:	Start 100 50 46.7 4566 5 1011 39% 58.1 Y 6,9,3,5,7 5 10/24/2012 = Bottom7 Carmen Arin	100 50 46.3 4501 5 1011 38% 58.1 Y 5,4,5,5,1 5 	sccm °F fpm lpm mbar RH °F Y/N ppb n CA 10/26/12	Instuments B&K 1302 G TSI VelociCa Fisher Scier 700 600 p 40 p 30 20 10 10 Technical D	Used: as Analyzer SN alc SN T95351203 httffic SN 90936818	1788615 001		Cat2 M& TE 12/17/2012 12/7/2012

Rev. 0			TRACER GAS	S TRAVERSE		1			
31-Jul-06	Site	LB-S1 Mode			Run No.				
		10/26/2012	-	Fan C	onfiguration	BC			
		MSP, CA			Fan Setting		Hz		
	Stack Dia.	11.89	in.	-	Stack Temp		dea F	-	
	Stack X-Area	111.0		St	art/End Time		3-	-	
	Test Port				nter 2/3 from	1.09	to:	10.80	
Distance t	to disturbance	-	inches		in Center 2/3		to:	7	
	urement units		monoc	-		Port 2 center Bott			
Order ->		<u>ppp 010</u>	1st	1			2nd		
Traverse>				de			Both		
Trial>		1	2		Меал	1	2		Mean
Point	Depth, in.	•	2		ITRACE	•	pp		inc an
1	0.50	527	רא 526	518	523.7	584	547	572	567.7
2	1.24	592	523	567	560.7	556	578	580	571.3
3	2.29	515	577	597	563.0	546	576	583	568.3
4	3.82	596	573	546	571.7	540	590	561	577.0
Center	5.91	603	601	611	605.0		573	608	609.0
5	5.91	603	651	611	642.7	581	614	583	592.7
6	9.52			<u> </u>					
7	9.52	607	647 673	708	654.0 660.0	655	659	644 615	652.7
		635	693	672 681			655 627	615	650.0
8	11.31	675			683.0				627.0
Averages —	>	598.4	607.1	615.7	607.1	605.7	602.1	597.4	601.7
		All		De		Cantas 2/2	Cida	Battan	
			ppb	Det	/. from mean		Side		
		Mean	604.41		40.40	Mean	608.14	603.00	605.57
		Min Point	523.67			Std. Dev.	44.00	35.82	38.64
		Max Point	683.00		13.0%	COV as %	7.2	5.9	6.4
Ave Cono	604 092	nnh			Inchancete	llaadi			
Avg. Conc.	604.083	ppb			Instuments		1788615		Cat2 M& TE
Avg. Conc.	604.083		Enich		B&K 1302 G	as Analyzer SN	1788615	•	Cat2 M&TE
-		Start	Finish	bsia	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203		·	12/17/2012
Tracer tank p	Dressure	Start 100	100	psig	B&K 1302 G TSI VelociC	as Analyzer SN			
Tracer tank p Injection flow	Dressure	Start 100 50	100 50	sccm	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p Injection flow Stack Temp	oressure vmeter	Start 100 50 47	100 50 46.3	sccm °F	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack y	pressure vm eter velocity	Start 100 50 47 4412	100 50 46.3 4472	sccm °F Ipm	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo	oressure vm eler velocity vwm eter	Start 100 50 47 4412 5	100 50 46.3 4472 5	sccm °F 1pm Ipm	B&K 1302 G TSI VelociCi Fisher Scier	as Analyzer SN alc SN T95351203 htific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	oressure vm eter velocity vwm eter ssure	Start 100 50 47 4412 5 1010	100 50 46.3 4472 5 1011	sccm °F fprm Iprm mbar	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203 htific SN 90936818		1	12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hurr	oressure vm eter velocity vwm eter ssure nidity	Start 100 50 47 4412 5 1010 40%	100 50 46.3 4472 5 1011 39%	sccm °F fom Ipm mbar RH	B&K 1302 G TSI VelociC: Fisher Scier 700	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hurr Ambient Terr	pressure vm eler velocity vwm eler ssure nidity np	Start 100 50 47 4412 5 1010 40% 50	100 50 46.3 4472 5 1011 39% 60.8	sccm °F fom Iom Iom RH °F	B&K 1302 G TSI VelociCi Fisher Scier	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hurr Ambient Terr B&K vapor co	oressure vm eter velocity owm eter ssure nidity np orrection	Start 100 50 47 4412 5 1010 40%	100 50 46.3 4472 5 1011 39%	sccm °F Ipm Ipm Mbar RH °F Y/N	B&K 1302 G TSI VelociC: Fisher Scier 700 600	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hurr Ambient Terr	oressure vm eter velocity owm eter ssure nidity np orrection	Start 100 50 47 4412 5 1010 40% 50 Y	100 50 46.3 4472 5 1011 39% 60.8 Y	sccm °F fom Iom Iom RH °F	B&K 1302 G TSI VelociC: Fisher Scier 700	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	oressure vm eter velocity wwm eter ssure nidity np orrection	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hurr Ambient Terr B&K vapor co	oressure vm eter velocity wwm eter ssure nidity np orrection	Start 100 50 47 4412 5 1010 40% 50 Y	100 50 46.3 4472 5 1011 39% 60.8 Y	sccm °F Ipm Ipm Mbar RH °F Y/N	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	vm eter velocity wwm eter ssure hidity hp omection s am ples	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wwm eter ssure hidity hp omection s am ples	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eter ssure hidity orrection amples r checked:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p b 30	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure hidity hp omection s am ples	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	oressure vm eter ssure hidity orrection amples r checked:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30 20	as Analyzer SN alc SN T95351203 httfic SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	oressure vm eter ssure hidity porrection amples r checked:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30 20	as Analyzer SN alc SN T95351203 htific SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	oressure vm eter ssure hidity orrection amples r checked:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30 20	Bas Analyzer SN alc SN T95351203 htific SN 90936818			12/17/2012
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	oressure vm eter ssure hidity porrection amples r checked:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30 20	as Analyzer SN alc SN T95351203 httffc SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	oressure vm eter ssure hidity porrection amples r checked:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 50 p 40 p 30 b 30 20	as Analyzer SN alc SN T95351203 htific SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient press Ambient num Ambient Tem B&K vapor cc Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter vm eter ssure nidity np orrection amples r checked: Mean velocity CA 10/26/12	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/26/12	B&K 1302 G TSI VelociC: Fisher Scier 700 600 9 40 9 30 20 10	as Analyzer SN alc SN T95351203 httfic SN 90936818			
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient press Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter vm eter ssure nidity np orrection s amples r checked: Mean velocity CA 10/26/12 e by:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012 = Bottom7 Carm en Arin	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/26/12 10/26/2012	B&K 1302 G TSI VelociC: Fisher Scier 700 600 9 40 9 30 20 10 10 10 10 10 10 10 10 10 10 10 10 10	as Analyzer SN alc SN T95351203 httfic SN 90936818	001		
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient press Ambient num Ambient Tem B&K vapor cc Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter vm eter ssure nidity np orrection s amples r checked: Mean velocity CA 10/26/12 e by:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012 = Bottom7 Carm en Arin	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/26/12 10/26/2012	B&K 1302 G TSI VelociC: Fisher Scier 700 600 9 40 9 30 20 10	as Analyzer SN alc SN T95351203 httfic SN 90936818		11/27/2012	
Tracer tank p Injection flow Stack Temp Mean stack v Sampling to Ambient press Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter vm eter ssure nidity np orrection s amples r checked: Mean velocity CA 10/26/12 e by:	Start 100 50 47 4412 5 1010 40% 50 Y 2,6,3,0,3 5 10/24/2012 = Bottom7 Carm en Arin	100 50 46.3 4472 5 1011 39% 60.8 Y 5,7,8,3,2 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/26/12 10/26/2012	B&K 1302 G TSI VelociC: Fisher Scier 700 600 9 40 9 30 20 10 10 10 10 10 10 10 10 10 10 10 10 10	as Analyzer SN alc SN T95351203 httfic SN 90936818	001		

Rev. 0			TRACER GAS	S TRAVERSE		l			
31-Jul-06	Site	LB-S1 Mode			Run No.				
		10/29/2012		Fan C	onfiguration	BC			
	Testers	EA, CA			Fan Setting		Hz	-	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0	in. ²	St	art/End Time			-	
	Test Port	1		Cei	nter 2/3 from	1.09) to:	10.80	
Distance	to disturbance	123.5	inches	Points i	n Center 2/3	2	to:	7	
Meas	urement units	ppb SF6		In	jection Point	Port 2 Center	-		
Order ->			2nd				1st		
Traverse>			Sic	le			Boti	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		рр	b			pp	b	
1	0.50	928	949	918	931.7	848	830	829	835.7
2	1.24	801	932	897	876.7	832	842	806	826.7
3	2.29	870	879	886	878.3	807	832	805	814.7
4	3.82	879	870	880	876.3	827	840	844	837.0
Center	5.91	832	846	862	846.7	838	865	856	853.0
5	8.00	807	795	830	810.7	832	860	865	852.3
6	9.52	813	802	802	805.7	841	833	833	835.7
7	10.57	814	782	782	792.7	897	875	874	882.0
8	11.31	801	812	830	814.3	872	891	889	884.0
Averages —	>	838.3	851.9	854.1	848.1	843.8	852.0	844.6	846.8
		All	ppb	Dev	from mean		Side		<u> </u>
		Mean	847.44			Mean	841.00	843.05	842.02
		Min Point	792.67			Std. Dev.	37.53	21.86	29.53
		Max Point	931.67			COV as %	4.5	2.6	3.5
Avg. Conc.	847.146	ppb			Instuments				
					B&K 1302 G		1788615		Cat2 M& TE
		Start	Finish			alc SN T9535120			12/17/2012
Tracer tank p		100		psig	Fisher Scier	ntific SN 90936818	3		12/7/2012
Injection flow	vm eter	50	50	sccm					
Stack Temp		65	72.3	°F					
Mean stack v	-	3023	3009	form In an					
Sampling fo		5	5	lpm 					
Ambientpres		998	1001	mbar	1000			-1	
Ambienthun	-	69%	44%	RH ⁰F	900		-		
Ambient Ten	•	64.4	71.6 Y	•					
B&K vapor co	onection	Y 1,-0.1,-2,-3,	Y	Y/N	800				
Back-Gd gas		-5	9.6.5.51	ppb	700				
Dack-Ou gas	,	-5	3,0,3,5,-1	PPD					
No. Bk-Gd sa	amples	5	5	n	P 600				
NO. DR CO SI	ampico			••	р 500				
Gas analyze	r checked:	10/24/2012		CA 10/29/12	b ₄₀₀				
Gas analyze	GREGREG.	10/24/2012		0410/23/12	•				
Notes:	Mean velocity	= Bottom7			300				
	incuit velocity	Dottoini			200				
					100				
CA 10/29/12		_			•				
51(10/20/12							~	/	Side
						D-#			
						Botte			
Entrine month	o hyr	0		40/00/0040	Technical D		and by:		
Entries mad		Carmen Arin	nescu	10/29/2012	Technical L	ata Review perforn			
Entries mad Signature/da	•	Carmen Arin Signature or				ata Review perforn ate		11/27/2012	
Signature/da	•		n escu n file with origi		Signature/da		gbj	11/27/2012	
	•							11/27/2012	

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM	1			
31-Jul-06	Site	LB-S1 Mode			Run No.				
		10/30/2012		Fan C	onfiguration				
	Testers	CA, XY			Fan Setting		Hz	•	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0	in. ²	St	art/End Time				
	Test Port	1		Ce	nter 2/3 from	1.09) to:	10.80	
Distance	to disturbance	123.5	inches	Points i	in Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Center	_		
Order>			1st			2nd			
Traverse>			Sic	de			Both	om	
Trial —->		1	2	3	Mean	r 1	2	3	Mean
Point	Depth, in.		рр	b			рр	b	
1	0.50	591	627	641	619.7	644	4 626	629	633.0
2	1.24	632	626	627	628.3	635	604	611	616.7
3	2.29	630	624	613	622.3	639	611	640	630.0
4	3.82	609	621	620	616.7	611	I 615	613	613.0
Center	5.91	603	612	631	615.3	615	610	615	613.3
5	8.00	652	616	628	632.0	621	615	625	620.3
6	9.52	638	624	625	629.0	604	622	621	615.7
7	10.57	622	618	622	620.7	616	609	629	618.0
8	11.31	612	616	620	616.0	611	618	619	616.0
Averages —	>	621.0	620.4	625.2	622.2	621.8	614.4	622.4	619.6
		All	ppb	Dev	/. from mean		Side		All
		Mean	620.89			Mean	623.48		620.81
		Min Point	613.00			Std. Dev.	6.44		6.51
		Max Point	633.00			COV as %	1.0	0.9	1.0
Avg. Conc.	621.708	рро			Instuments				
		Start	Finish			as Analyzer SN alc SN T9535120			Cat2 M&TE
Tracer tank o	onessure	Start 100	Finish 100	psia	TSI VelociCa	alc SN T9535120	3001		12/17/2012
Tracer tank p Injection flow		100	100	psig	TSI VelociCa		3001		
I njection flow		100 50	100 50	sccm	TSI VelociCa	alc SN T9535120	3001		12/17/2012
injection flow Stack Temp	vm eter	100 50 59	100 50 61.2	sccm °F	TSI VelociCa	alc SN T9535120	3001		12/17/2012
injection flow Stack Temp Mean stack v	vm eter velocity	100 50	100 50 61.2 4540	sccm °F form	TSI VelociCa	alc SN T9535120	3001		12/17/2012
injection flow Stack Temp Mean stack v Sampling flo	vm eter velocity owm eter	100 50 59 4468	100 50 61.2 4540 5	sccm °F	TSI VelociCa Fisher Scier	alc SN T9535120	3001		12/17/2012
injection flow Stack Temp Mean stack v	vm eter velocity owm eter ssure	100 50 59 4468 5	100 50 61.2 4540 5	sccm °F fpm Ipm	TSI VelociCa	alc SN T9535120	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	vmeter velocity owmeter ssure nidity	100 50 59 4468 5 1001	100 50 61.2 4540 5 1000	sccm °F fpm Ipm mbar	TSI VelociCa Fisher Scier 700	alc SN T9535120	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient press Ambient hum	vm eter velocity owm eter ssure nidity np	100 50 59 4468 5 1001 44%	100 50 61.2 4540 5 1000 50%	sccm °F fpm Ipm mbar RH	TSI VelociCa Fisher Scier	alc SN T9535120	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling to Ambient pres Ambient hum Ambient Tem	vm eter velocity owm eter ssure nidity np orrection	100 50 59 4468 5 1001 44% 69.8 Y	100 50 61.2 4540 5 1000 50% 67.1	sccm *F fpm Ipm mbar RH *F Y/N	TSI VelociCa Fisher Scier 700 600 500	aic SN 19535120 httfic SN 9093681	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling too Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wwm eter ssure nidity np orrection	100 50 59 4468 5 1001 44% 69.8 Y	100 50 61.2 4540 5 1000 50% 67.1 Y	sccm *F fpm Ipm mbar RH *F Y/N	TSI VelociCa Fisher Scier 700 600 500 p 400	aic SN 19535120 httfic SN 9093681	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa	velocity www.eter ssure nidity np orrection s amples	100 50 59 4468 5 1001 44% 69.8 Y 8,3,1,1,0	100 50 61.2 4540 5 1000 50% 67.1 Y -2,-2,-5,-3,-2	sccm °F Ipm Ipm mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 P b 300	aic SN 19535120 httfic SN 9093681	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 59 4468 5 1001 44% 69.8 Y 8,3,1,1,0 5 10/24/2012	100 50 61.2 4540 5 1000 50% 67.1 Y -2,-2,-5,-3,-2 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 P b 300	aic SN T9535120 httfic SN 9093681	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	velocity www.eter ssure nidity np orrection s amples	100 50 59 4468 5 1001 44% 69.8 Y 8,3,1,1,0 5 10/24/2012	100 50 61.2 4540 5 1000 50% 67.1 Y -2,-2,-5,-3,-2 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 P b 300	aic SN T9535120 httfic SN 9093681	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 59 4468 5 1001 44% 69.8 Y 8,3,1,1,0 5 10/24/2012	100 50 61.2 4540 5 1000 50% 67.1 Y -2,-2,-5,-3,-2 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 P b 300	alc SN T9535120 httfic SN 9093681	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity owm eter ssure nidity np orrection s amples er checked: Mean velocity	100 50 59 4468 5 1001 44% 69.8 Y 8,3,1,1,0 5 10/24/2012	100 50 61.2 4540 5 1000 50% 67.1 Y -2,-2,-5,-3,-2 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 p b 300 200	alc SN T9535120 httfic SN 9093681	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity owm eter ssure nidity np orrection s amples er checked: Mean velocity	100 50 59 4468 5 1001 44% 69.8 Y 8,3,1,1,0 5 10/24/2012	100 50 61.2 4540 5 1000 50% 67.1 Y -2,-2,-5,-3,-2 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 p b 300 200 100	alc SN T9535120 httfic SN 9093681	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity owm eter ssure nidity np orrection s amples er checked: Mean velocity	100 50 59 4468 5 1001 44% 69.8 Y 8,3,1,1,0 5 10/24/2012	100 50 61.2 4540 5 1000 50% 67.1 Y -2,-2,-5,-3,-2 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 p b 300 200 100	alc SN T9535120 httfic SN 9093681	3001 B		
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient tem Back vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	wm eter welocity owm eter ssure nidity np orrection a amples er checked: Mean velocity	100 50 59 4468 5 1001 44% 69.8 Y 8,3,1,1,0 5 10/24/2012 = Center	100 50 61.2 4540 5 1000 50% 67.1 Y -2,-2,-5,-3,-2 5 nescu n file with origin	sccm °F fpm lpm mbar RH °F Y/N ppb n CA 10/30/12	TSI VelociCa Fisher Scier 700 600 500 p 400 p b 300 200 100 0	alc SN T9535120 httfic SN 9093681	3001 B	11/27/2012	

			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode	I		Run No.	GT-8			
	Date	10/30/2012		Fan C	onfiguration	AC			
	Testers	XY, CA, MSP			- Fan Setting	43	Hz	•	
	Stack Dia.	11.89	in.	-	Stack Temp	62.45	deg F	-	
	Stack X-Area	111.0	in . ²	St	art/End Time	1115/1217	_		
	Test Port	1		Ce	nter 2/3 from	1.09	to:	10.80	
Distance	b disturbance	123.5	inches	Points i	n Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Far			
Order>			2nd				1st		
Traverse>			Sie	de			Both	om	
Trial>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		рр	b			рр	b	
1	0.50	619	662	595	625.3	606	608	619	611.0
2	1.24	633	634	668	645.0	628	656	630	638.0
3	2.29	639	670	652	653.7	609	620	619	616.0
4	3.82	608	640	646	631.3	628	628	636	630.7
Center	5.91	618	646	653	639.0	633	615	613	620.3
5	8.00	625	621	631	625.7	639	617	642	632.7
6	9.52	621	617	632	623.3	623	618	626	622.3
7	10.57	618	627	617	620.7	638	643	634	638.3
8	11.31	634	618	607	619.7	646	635	595	625.3
Averages —	>	623.9	637.2	633.4	631.5	627.8	626.7	623.8	626.1
		All	ppb	Dev	. from mean		Side	Bottom	셴
		Mean	628.80			Mean	634.10	628.33	631.21
		Min Point	611.00			Std. Dev.	12.25	8.85	10.69
		Max Point	653.67			COV as %	1.9	1.4	1.7
Avg. Conc.	628.688	ррь			Instuments				
		Otart	Caish		B&K 1302 G	as Analyzer SN alc SN T95351203	1788615		Cat2 M& TE
Tracor tank n		Start 100	Finish						
Tracer tank p	nessuie		100	noia	Figher Saler		001		12/17/2012
	um ofor		100	psig seem	Fisher Scier	ntific SN 90936818	001		12/17/2012 12/7/2012
Injection flow	<i>r</i> meter	50	50	sccm	Fisher Scier		001		
Stack Temp		50 60.7	50 64.2	sccm °F	Fisher Scier				
Stack Temp Mean stack v	elocity	50 60.7 4534	50 64.2 4309	sccm °F fpm	Fisher Scier				
Stack Temp Mean stack v Sampling flo	elocity wm eter	50 60.7 4534 5	50 64.2 4309 5	sccm °F 1pm Ipm		ntific SN 90936818			
Stack Temp Mean stack v Sampling flo Ambient pres	ælocity wm eter ssure	50 60.7 4534 5 1000	50 64.2 4309 5 1000	sccm °F fpm Ipm mbar	Fisher Scier	ntific SN 90936818			
Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum	elocity wmeter ssure nidity	50 60.7 4534 5 1000 48%	50 64.2 4309 5 1000 40%	sccm °F fom Ipm mbar RH	700	ntific SN 90936818			
Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem	elocity wmeter ssure ridity 1p	50 60.7 4534 5 1000 48% 68.0	50 64.2 4309 5 1000 40% 72.5	sccm °F fom Iom Mbar RH °F		ntific SN 90936818			
Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	elocity wmeter ssure hidity 1p porrection	50 60.7 4534 5 1000 48% 68.0 Y	50 64.2 4309 5 1000 40% 72.5 Y	sccm °F Ipm Ipm Mbar RH °F Y/N	700	ntific SN 90936818			
Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem	elocity wmeter ssure hidity 1p porrection	50 60.7 4534 5 1000 48% 68.0	50 64.2 4309 5 1000 40% 72.5	sccm °F fom Iom Mbar RH °F	700	ntific SN 90936818			
Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	elocity wmeter ssure hidity hp prrection	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 500	ntific SN 90936818			
Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	elocity wmeter ssure hidity hp prrection	50 60.7 4534 5 1000 48% 68.0 Y	50 64.2 4309 5 1000 40% 72.5 Y	sccm °F Ipm Ipm Mbar RH °F Y/N	700 600 500 p 40	ntific SN 90936818			
Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa	elocity wmeter ssure hidity porrection s amples	50 60.7 4534 5 1000 48% 68.0 Y -12.446 5	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 500 p 400 P	ntific SN 90936818			
Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	elocity wmeter ssure hidity porrection s amples	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 500 p 400 P	ntific SN 90936818			
Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	elocity wmeter asure hidity pp prection amples r checked:	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 500 p 400 P	ntific SN 90936818			
Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	elocity wmeter ssure hidity porrection s amples	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 400 9 30 0 20				
Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	elocity wmeter asure hidity pp prection amples r checked:	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 500 p 400 p 30				
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	elocity wmeter asure hidity pp prection amples r checked:	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 400 9 30 0 20				
Stack Temp Mean stack v Sampling to Ambient pres Ambient tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	elocity wmeter asure hidity pp prection amples r checked:	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 400 9 30 0 20				
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	elocity wmeter asure hidity pp prection amples r checked:	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 400 9 30 0 20				
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	elocity wmeter asure hidity pp prection amples r checked:	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 400 9 30 0 20				
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	elocity wm eter ssure hidity p p p p p p r ction t m eter t m eter t t t t t t t t t t t t t t t t t	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 400 9 30 20 10				
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	elocity wm eter ssure hidity p p p p p r ction m ter	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012 = Center	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/30/12	700 600 9 400 9 30 20 10	httific SN 90936818		11/27/2012	
Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed Notes: CA 10/30/12 Entries made	elocity wm eter ssure hidity p p p p p r ction m ter	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012 = Center	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/30/12	700 600 9 400 9 50 20 10 10	httific SN 90936818	ed by:		
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes: CA 10/30/12 Entries made	elocity wm eter ssure hidity p p p p p r ction m ter	50 60.7 4534 5 1000 48% 68.0 Y -1,-2,4,-4,-6 5 10/24/2012 = Center Carmen Arim Signature on	50 64.2 4309 5 1000 40% 72.5 Y 3,1,6,4,4 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/30/12	700 600 9 400 9 50 20 10 10	httific SN 90936818	ed by:		

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date	10/30/2012		Fan C	onfiguration	AC			
	Testers	XY, MSP, CA			Fan Setting	43	Hz	-	
	Stack Dia.	11.89	in.		Stack Temp	64.35	deg F	-	
	Stack X-Area	111.0	in. ²	St	art/End Time		-		
	Test Port	1		Ce	nter 2/3 from	1.09	to:	10.80	
Distance	b disturbance	123.5	inches	Points i	n Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Near			
Order>			1st				2nd		
Traverse>			Sic	de			Both	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		pp	b			рр	b	
1	0.50	615	627	654	632.0	636	659	645	646.7
2	1.24	593	599	625	605.7	653	625	642	640.0
3	2.29	622	630	633	628.3	641	632	675	649.3
4	3.82	621	606	626	617.7	649	622	653	641.3
Center	5.91	637	633	639	636.3	646	641	636	641.0
5	8.00	634	647	636	639.0	640	639	637	638.7
6	9.52	647	629	648	641.3	627	624	628	626.3
7	10.57	638	642	641	640.3	603	646	650	633.0
8	11.31	641	628	620	629.7	640	625	600	621.7
Averages —	>	627.6	626.8	635.8	630.0	637.2	634.8	640.7	637.6
		All	ppb	Dev	. from mean		Side		ᆁ
		Mean	633.80			Mean	629.81	638.52	634.17
		Min Point	605.67			Std. Dev.	13.56		11.37
		Max Point	649.33			COV as %	2.2	1.1	1.8
Avg. Conc.	633.188	ррь			Instuments				
		01			B&K 1302 G	as Analyzer SN	1788615		Cat2 M& TE
			F F						
		Start	Finish	L	TSI VelociCa	alc SN T95351203			12/17/2012
Tracer tank p		100	100	psig	TSI VelociCa				
I njection flow		100 50	100 50	sccm	TSI VelociCa	alc SN T95351203			12/17/2012
Injection flow Stack Temp	rm eter	100 50 64.5	100 50 64.2	sccm °F	TSI VelociCa	alc SN T95351203			12/17/2012
injection flow Stack Temp Mean stack v	vm eter velocity	100 50 64.5 4502	100 50 64.2 4493	sccm °F fpm	TSI VelociCa	alc SN T95351203			12/17/2012
injection flow Stack Temp Mean stack v Sampling flo	vm eter velocity wm eter	100 50 64.5 4502 5	100 50 64.2 4493 5	sccm °F 1pm Ipm	TSI VelociCa	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	vm eter velocity wm eter ssure	100 50 64.5 4502 5 1000	100 50 64.2 4493 5 1000	sccm °F fpm Ipm mbar	TSI VelociCa	alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hurr	vm eter velocity wm eter ssure sidity	100 50 64.5 4502 5 1000 40%	100 50 64.2 4493 5 1000 41%	sccm °F fom Ipm mbar RH	TSI VelociCa Fisher Scier 700	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wm eter ssure hidity 1p	100 50 64.5 4502 5 1000 40% 72.5	100 50 64.2 4493 5 1000 41% 73.4	sccm °F fom Iom mbar RH °F	TSI VelociCa Fisher Scier	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity 1p porrection	100 50 64.5 4502 5 1000 40% 72.5 Y	100 50 64.2 4493 5 1000 41% 73.4 Y	sccm °F Ipm Ipm RH °F Y/N	TSI VelociCa Fisher Scier 700 600	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wm eter ssure hidity 1p porrection	100 50 64.5 4502 5 1000 40% 72.5	100 50 64.2 4493 5 1000 41% 73.4	sccm °F fom Iom mbar RH °F	TSI VelociCa Fisher Scier 700	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter assure hidity hp prrection	100 50 64.5 5 1000 40% 72.5 Y -5,2,-5,-3,5	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,-5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter assure hidity hp prrection	100 50 64.5 4502 5 1000 40% 72.5 Y	100 50 64.2 4493 5 1000 41% 73.4 Y	sccm °F Ipm Ipm RH °F Y/N	TSI VelociCa Fisher Scier 700 600 500 p 40	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	rm eter elocity wm eter assure hidity hp porrection s am ples	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 P	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	rm eter elocity wm eter assure hidity hp porrection s am ples	100 50 64.5 5 1000 40% 72.5 Y -5,2,-5,-3,5	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 P	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	rm eter elocity wm eter ssure hidity pp prection s amples r checked:	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 p 400 p 400 p 400 p 400 p 400 p 400 p 400 p 400	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	rm eter elocity wm eter assure hidity hp porrection s am ples	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 p 400 P	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	rm eter elocity wm eter ssure hidity pp prection s amples r checked:	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 P 400 P 30 b 30 20	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	meter elocity wmeter ssure hidity pporection amples r checked: Mean velocity	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 P 400 P 30 b 30 20	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	meter elocity wmeter ssure hidity pporection amples r checked: Mean velocity	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 P 400 P 30 b 30 20	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	meter elocity wmeter ssure hidity pporection amples r checked: Mean velocity	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 P 400 P 30 b 30 20	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	meter elocity wmeter ssure hidity pporection amples r checked: Mean velocity	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 500 P 400 P 30 b 30 20	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	meter elocity wmeter ssure hidity porrection amples r checked: Mean velocity	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012 = Center	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 700 600 9 9 501 9 30 20 10	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes: CA 10/30/12	meter elocity wmeter ssure hidity porrection amples r checked: Mean velocity	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012 = Center	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,-5 5 5 1000 100	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/30/12	TSI VelociCa Fisher Scier 700 600 9 400 9 30 20 10 10 Technical D	alc SN T95351203 httific SN 90936818	001		
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	meter elocity wmeter ssure hidity porrection amples r checked: Mean velocity	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012 = Center Carmen Arin Signature or	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,-5 5 5 1000 100	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/30/12	TSI VelociCa Fisher Scier 700 600 9 9 501 9 30 20 10	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor ca Back-Gd gas No. Bk-Gd sa Gas analyze Notes: CA 10/30/12 Entries mad	meter elocity wmeter ssure hidity porrection amples r checked: Mean velocity	100 50 64.5 4502 5 1000 40% 72.5 Y -5,2,-5,-3,5 5 10/24/2012 = Center	100 50 64.2 4493 5 1000 41% 73.4 Y 5,3,5,5,-5 5 5 1000 100	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/30/12	TSI VelociCa Fisher Scier 700 600 9 400 9 30 20 10 10 Technical D	alc SN T95351203 httific SN 90936818	001		

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
		10/30/2012	-	Fan C	onfiguration				
		MSP, CA			Fan Setting		Hz		
	Stack Dia.		in.		Stack Temp		deg F	-	
	Stack X-Area			St	art/End Time		3-	Ī	
	Test Port				nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	n Center 2/3		to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Bottom			
Order>			2nd		-		1st		
Traverse>			Sic	de			Both	om	
Trial>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		PP	b			рр	b	
1	0.50	645	644	639	642.7	620	587	615	607.3
2	1.24	639	630	619	629.3	618	629	599	615.3
3	2.29	657	660	629	648.7	615	644	633	630.7
4	3.82	682	637	639	652.7	660	625	644	643.0
Center	5.91	578	644	616	612.7	662	704	634	666.7
5	8.00	636	621	641	632.7	627	643	648	639.3
6	9.52	619	600	650	623.0	625	625	614	621.3
7	10.57	633	625	640	632.7	681	653	695	676.3
8	11.31	621	616	646	627.7	630	626	631	629.0
Averages —	>	634.4	630.8	635.4	633.6	637.6	637.3	634.8	636.6
		All	ppb	Dev	from mean	Center 2/3	Side	Bottom	AI
		Mean	635.06			Mean	633.10	641.81	637.45
		Min Point	607.33		-4.4%	Std. Dev.	13.90	22.59	18.58
		Max Point	676.33		6.5%	COV as %	2.2	3.5	2.9
Avg. Conc.	634.479	ppb			Instuments				
					D01/40000				
						Bas Analyzer SN	1788615		Cat2 M& TE
		Start	Finish	1	TSI VelociCa	alc SN T95351203			12/17/2012
Tracer tank p		100	100	psig	TSI VelociCa				
Tracer tank p Injection flow		100 50	100 50	sccm	TSI VelociCa	alc SN T95351203			12/17/2012
injection flow Stack Temp	vm eter	100 50 64.2	100 50 64.5		TSI VelociCa	alc SN T95351203			12/17/2012
I njection flow	vm eter	100 50 64.2 4493	100 50 64.5 4483	sccm	TSI VelociCa	alc SN T95351203			12/17/2012
injection flow Stack Temp	vm eter velocity	100 50 64.2 4493 5	100 50 64.5 4483 5	sccm °F fpm Ipm	TSI VelociCa	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	vmeter velocity wmeter ssure	100 50 64.2 4493 5 1000	100 50 64.5 4483 5 999	sccm °F fpm Ipm mbar	TSI VelociCa	alc SN T95351203			12/17/2012
injection flow Stack Temp Mean stack v Sampling flo	vmeter velocity wmeter ssure	100 50 64.2 4493 5	100 50 64.5 4483 5 999 56%	sccm °F fom Ipm mbar RH	TSI VelociCa Fisher Scier	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	vmeter velocity wmeter ssure nidity	100 50 64.2 4493 5 1000	100 50 64.5 4483 5 999	sccm °F fpm Ipm mbar	TSI VelociCa Fisher Scier	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum	vm eter velocity wm eter ssure nidity 1P	100 50 64.2 4493 5 1000 40%	100 50 64.5 4483 5 999 56% 65.3 Y	sccm °F fom Ipm mbar RH	TSI VelociCa Fisher Scier 800	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity hp porrection	100 50 64.2 4493 5 1000 40% 74.3	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7,	sccm °F fom Iom Mbar RH °F	TSI VelociCa Fisher Scier 800	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wm eter ssure hidity hp porrection	100 50 64.2 4493 5 1000 40% 74.3 Y	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7,	sccm °F fom Iom Mbar RH °F	TSI VelociCa Fisher Scier 800 700 600	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter ssure hidity hp porrection	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity hp porrection	100 50 64.2 4493 5 1000 40% 74.3 Y	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7,	sccm °F fpm Ipm mbar RH °F Y/N	TSI VelociCa Fisher Scier 800 700 600 500 P	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	vm eter velocity wm eter ssure hidity p prection s am ples	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter ssure hidity p prection s am ples	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p prrection am ples r checked:	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300	alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p prection s am ples	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b	alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p prrection am ples r checked:	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300 200	alc SN T95351203 http://www.selfactore.com/selfacto			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter elocity wm eter ssure hidity porrection amples r checked: Mean velocity	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300	alc SN T95351203 http://www.selfactore.com/selfacto			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter elocity wm eter ssure hidity porrection amples r checked: Mean velocity	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300 200 100	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter elocity wm eter ssure hidity porrection amples r checked: Mean velocity	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300 200 100	alc SN T95351203			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter elocity wm eter ssure hidity porrection amples r checked: Mean velocity	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300 200 100	alc SN T95351203			
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter elocity wm eter ssure hidity porrection amples r checked: Mean velocity	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300 200 100	alc SN T95351203			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter elocity wm eter ssure hidity porrection amples r checked: Mean velocity	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13 5	sccm *F forn Iopm mbar RH *F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300 200 100	alc SN T95351203			
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	meter elocity wmeter ssure hidity porrection amples r checked: Mean velocity	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012 = Center Carm en Arin	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/30/12	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300 200 100	alc SN T95351203 httffic SN 90936818		11/27/2012	
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes: CA 10/30/12 Entries made	meter elocity wmeter ssure hidity porrection amples r checked: Mean velocity	100 50 64.2 4493 5 1000 40% 74.3 Y 2,4,-1,-2,-1 5 10/24/2012 = Center Carm en Arin	100 50 64.5 4483 5 999 56% 65.3 Y -5, -3, -4, -7, -13 5 -5 -5 -5 -5 -5 -5 -5 -5 -5	sccm °F fpm Ipm mbar RH °F Y/N ppb n CA 10/30/12	TSI VelociCa Fisher Scier 800 700 600 500 P p 400 b 300 200 100 (100 (100 (100) 100 (100)	alc SN T95351203 httffic SN 90936818	001		

Rev. 0			TRACER GAS	S TRAVERSE		ı				
31-Jul-06	Site	LB-S1 Mode			Run No.					
		10/30/2012		Fan C	configuration					
		MSP, CA			Fan Setting			łz		
	Stack Dia.	11.89	in.		Stack Temp		- 53.35 c			
	Stack X-Area	111.0		St	art/End Time					
	Test Port			-	nter 2/3 from		1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	in Center 2/3		2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Top				
Order>			1st		-	· · ·	2	2nd		
Traverse>			Sic	de				Bott	om	
Trial —->		1	2	3	Mean		1	2	3	Mean
Point	Depth, in.		pp	b	-			pp	b	
1	0.50	633	606	618	619.0		593	623	637	617.7
2	1.24	656	657	633	648.7		625	640	613	626.0
3	2.29	634	646	642	640.7		638	617	644	633.0
4	3.82	639	646	636	640.3		632	623	623	626.0
Center	5.91	633	627	629	629.7		642	641	622	635.0
5	8.00	628	623	628	626.3		610	621	608	613.0
6	9.52	615	636	634	628.3		625	642	643	636.7
7	10.57	649	625	634	636.0		637	617	630	628.0
8	11.31	631	649	633	637.7		618	653	607	626.0
Averages —	>	635.3	635.0	631.9	634.1	624.4		630.8	625.2	626.8
		All	ppb	Dev	/. from mean	Center 2/3		Side	Bottom	All
		Mean	630.44			Mean		635.71	628.24	631.98
		Min Point	613.00		-2.8%	Std. Dev.		8.09	7.98	8.64
		Max Point	648.67			COV as %		1.3	1.3	1.4
Avg. Conc.	630.208	ppb			Instuments	Used:				
•		••			B&K 1302 G	as Analyzer	SN	1788615		Cat2 M& TE
		Start	Finish		TSI VelociCa	alc SN T953	512030	01		12/17/2012
Tracer tank p	pressure	100	100	psig	Fisher Scier	ntific SN 9093	6818			12/7/2012
Injection flow	vm eter	50	50	sccm						
Stack Temp		64.5	62.2	۴F						
Mean stack	elocity	4483	4505	form 🛛						
Sampling fo	wmeter	5	5	lpm						
Am bient pre:		999	999	mbar	700	-	-			
Ambienthun	-	47%	66%	RH						
Ambient Ten	•	71.6	64.4	°F	600		/ f			
B&K vapor c	orrection	Y	Y	Y/N						
Deals Col. and			1,-6,-10,-10, -5		500					
Back-Gd gas	5	6,-5,-1,1,-5	-0	ppb						
No. Bk-Gd sa	amples	5	5	n	p 400					
NU. DK-GU S	ampies	J	J		р					
Gas analyze	r checked:	10/24/2012		CA 10/30/12	b 300					
	- onoonour	10/2 //2012		0/(10/00/12	-					
Notes:	Mean velocity	= Center			- 200					
					. 100					\neg
					. 100		~ a	╕║║Ҏ		
					. (-			Side
CA 10/30/12									/	
CA 10/30/12									- /	
CA 10/30/12							Botton	n		
Entries mad	e by:	Carm en Arim		<u> </u>		ata Review pe				
	e by:	Signature on	nescu file with orig	inal	Technical D Signature/da	•	erform e		11/27/2012	
Entries mad	e by:			inal		•	erform e	ed by:	11/27/2012	

31-Jul-06 Site LB-51 Model Fem No. 67-12 Date 1031/2012 Fan Configuration AC Testars XV.CA Tasser XV.CA Tasser XV.CA Stack KAvas TestPort 1 Stack TestPort Distance to disturbance ppb SF6 TestPort 109 tx Transser> 125.5 Inches 25.6 (Ches Center 2/3 tom) 10.9 tx 7 Distance to disturbance ppb SF6 Point Inc Center 2/3 tom) 20 2 nd 7 Transser> 1 2.5 (Inches TestPort) 1.2 3 Mean 1.2 3 Timel — 1 0.50 673 874 894 8803 931 876 932 913.0 3 2.29 862 863 864 880.7 906 900 905.0 <t< th=""><th></th><th></th><th></th><th>TRACER GAS</th><th>S TRAVERSE</th><th>DATA FORM</th><th></th><th></th><th></th><th></th></t<>				TRACER GAS	S TRAVERSE	DATA FORM					
Date 1031/2012 Fan Configuration AC Stack Dia, Stack X-Area 1110 fm ² 1189 fm. Stack Temp 62.1 deg F Stack X-Area 1123 5 inches 1133 5 inches 10301/200 to: 7 7 Distance to distribunce Coder -> 123 5 inches 1030 1200 to: 7 7 Distance to distribunce Treases-> 151 2 0: 7 7 10.80 Point Dopth, in: 2 0.50 6733 874 995 800.7 900 900 900 900 900 900 900 900 900 900	Rev. 0 31-JuH06	Site	LB-S1 Mode								
Testers X/CA Fan Setting 31 Hz Stack Alva 111.0 in.2 52.1 deg fs. 10.20 Stack Alvas 1 0.21 deg fs. 0.21 deg fs. 10.20 Distance to distinance 123.5 Inches 123.5 Inches 10.20 2 0.7 Distance to distinance 123.5 Inches 164 2 0.7 7 Teserson 131.0 in.2 131.0 in.2 1 2 3 Mean Point in Copth, in. ppb 1 2 3 Mean 1 2 3 Mean 1 0.50 673 874 893 865 664 880.7 908 907 900 905.9 903 907 903 907 903 907 900 905.9 903 893 895 877.2 903 803 807.3 822.4 883.9 890 877.2 903.7 885.6 882.7 882.3 893.6 881.5 882.3 891.5 882.3				-	Fan C						
Stack Dia 11.9 in. Stack X-Avea Test Port Stack Temp 62.1 deg F Distance b dishurbance Measurement unit post post b f Titel						-		Hz			
Stack X-Area 111.0 in.2 Center 2/3 from 10.80 Distance to distributence Injection Point Port 2 Center 2/3 from 10.80 Distance to distributence Injection Point Port 2 Center 2/3 from Injection Point Port 2 Center Distance to distributence Distributence Injection Point Port 2 Center Officer Injection Point Port 2 Center Injection Point Port 2 Center Officer Injection Point Port 2 Center Injection Point Port 2 Center Option International Point Port 2 Center Injection Point Port 2 Center Injection Point Port 2 Center Injection Point Port 2 Center Injection Point Port 2 Center Injection Point Port 2 Center <th co<="" th=""><th></th><th></th><th></th><th>in.</th><th></th><th>-</th><th></th><th></th><th>-</th><th></th></th>	<th></th> <th></th> <th></th> <th>in.</th> <th></th> <th>-</th> <th></th> <th></th> <th>-</th> <th></th>				in.		-			-	
Test Port 1.0.9 to::::::::::::::::::::::::::::::::::::					St	•		3.			
Distance to disturbance 123.5 inches Points in Center 20 2 to 7 Order → 1st ist injection Point Points in Center 20 2 to 7 Traverse → 1st ist 2 2 1 2 3 Mean Point Depth, in ppb 1 2 3 Mean 1 2 3 Mean 1 0.50 873 874 894 880.7 993 990 990.9					-			to:	10.80		
Measurement units Order → ppb injection Point Point 2nd Travense-> 1 2 3 Mean 1 2 3 Mean Point Point Depth, in. 0.50 873 874 894 880.3 931 876 932 913.0 907 900.9 905.0 <td< th=""><th>Distance</th><th></th><th>-</th><th>inches</th><th></th><th></th><th></th><th>-</th><th></th><th></th></td<>	Distance		-	inches				-			
Coter 3ite 2nd Traverse> 1 st 2nd Point Depth, in. ppb 1 2 3 Mean 1 2 3 Mean Point Depth, in. ppb 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 907 900 807 907 802 803 916 907 862 8630 900 8851 877.7 882 882.1 882.1 882.1 882.1 882.1 882.8 891.5 87.3 889.8 891.5 1.4 1.6 882.8 882.1 Mean 871.3 865.4 880.4 872.7 903.7 861.0 882.8 891.5 5.3	Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Center				
Trial i 2 3 Mean 1 2 3 Mean Point Depth, in. ppb	Order>			1st		•		2nd			
Point Depth ppb ppb 1 0.50 873 874 894 880.3 931 676 932 913.0 2 1.24 893 886 865 867 914 860 920 9907 900 9907 900 9907 900 9907 900 9907 900 8907 377 924 833 916 9907 70 66 952 841 894 873.7 924 833 916 9907 66 952 841 894 872.7 905 647 664 872.7 905 847 664 872.7 903 875 882.7 881 875 882.7 881 875 882.7 881 875 882.7 881 875 882.7 881 875 882.7 881 881.7 885.6 883.7 881.6 882.8 891.5 7 841 895 875 865.5 865.3	Traverse>			Sid	de			Both	om		
1 0.50 673 674 694 880.3 931 976 932 913.0 2 1.24 833 866 864 880.7 906 907 900 905.0 3 2.23 862 863 864 880.7 908 907 900 905.0 4 3.82 861 871 889 873.7 924 883 916 907.7 Center 5 8.00 875 847 896 872.7 905 847 864 872.0 6 9.52 841 894 872 905 871.0 882.8 891.5 882.7 Averages 871.3 866.4 880.4 872.7 903.7 881.0 889.8 891.5 Averages 871.3 866.4 880.4 872.7 903.7 881.0 889.8 891.5 Averages 871.3 866.4 880.4 872.7 903.7 881.0 889.8 891.5 Averages 871.3 866.4 880.4 872.7	Trial —->		1	2	3	Mean	1 1	2	3	Mean	
2 1.24 893 885 864 880.7 908 907 900 965.0 3 2.29 862 853 864 859.7 914 860 920 898.0 4 3.82 861 871 868 873.7 924 883 916 907.7 908 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 889.0 7 0.57 865 663.7 862.6 873.7 882.8 891.5 7 865 663.7 863.7 882.6 863.7 882.3 881.5 863.7 865.6 863.7 863.7 882.8 863.7 863.7 863.7 862.4 880.4 872.7 903.7 881.0 889.8 891.5 871.4 865.6 863.7 7.6 <th>Point</th> <th>Depth, in.</th> <th></th> <th>PP</th> <th>b</th> <th></th> <th></th> <th>pp</th> <th>b</th> <th></th>	Point	Depth, in.		PP	b			pp	b		
3 2.29 852 853 864 859.7 914 860 920 880.0 4 3.82 861 871 889 873.7 924 883 916 907.7 Center 5.9 8.00 875 8.47 886 868.0 881 923.8 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 882.0 897 884 877.2 905 871.0 882.7 882.7 882.7 882.7 882.7 882.7 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.7 882.3 882.3 882.3 882.3 882.3 882.3 882.3 </th <th>1</th> <th>0.50</th> <th>873</th> <th>874</th> <th>894</th> <th>880.3</th> <th>931</th> <th>876</th> <th>932</th> <th>913.0</th>	1	0.50	873	874	894	880.3	931	876	932	913.0	
4 3.82 861 871 889 873.7 924 883 916 907.7 Center 5.91 689 877 866 868.0 881 923 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 892.3 873 889.0 875 885 873 889.0 877 905 847 866 879.7 882 891 875 885.0 882.71 887.9 882.71 887.7 882.71 887.7 882.71 887.7 882.71 882.71 882.71 882.71 882.71 882.71 882.71 882.71 882.71 882.71 882.35 882.14 882.71 882.35 882.14 882.71 887.62 882.35 882.14 882.71 887.62 882.74 887.62 882.35 882.14 882.74 882.74 882.74 882.74 882.74 882.74 882.74 882.14 882.14 882.15 88	2	1.24	893	885	864	880.7	908	907	900	905.0	
Centor 5 91 859 877 868 868.0 881 923 873 8923 6 9.52 841 894 897 896 872.7 905 847 864 872.0 7 10.67 901 870 866 879.7 882 991 875 882.7 8 11.31 877 82.7 909 871.0 879 855 865.7 Averages 871.3 866.4 872.7 903.7 881.0 889.5 873 889.0 Marages 871.3 866.4 872.7 903.7 881.0 882.7 885.6 865.7 Averages 871.3 866.4 872.7 903.7 810.0 893.8 892.14 Mara 882.75 7.5 810.0 871.90 892.38 892.14 Mara 882.354 Ppb 913.00 3.5% Frick 81.4 1.6 Tsi VicioCale S N T35351203001 12/17/2012		2.29	862	853	864	859.7	914	860	920	898.0	
5 8.00 875 847 896 872.7 905 847 864 872.0 6 9.52 841 894 872 869.0 909 865 873 889.0 873 889.0 909 865 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 889.0 873 882.1 882.1 Averages 871.3 866.4 880.4 872.7 903.7 881.0 882.1 840 873.7 881.0 882.1 Mean 871.90 892.38 882.1 Mean 871.90 892.38 882.14 Mean 160 160 160 160 160 160 160 160 160 160 160 120 1217/201	4						924	4	916	907.7	
6 9.52 841 894 872 869.0 909 885 873 889.0 7 10.57 901 870 866 879.7 82 891 875 885. 887.7 882. 891 875 885. 887.7 882. 891 875 885. 887.7 882.8 891.5 882.7 885.6 887.7 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.7 885.6 882.7 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 882.8 891.5 892.8 892.8 892.8 892.8 892.8 892.8 892.8 892.8 892.8 892.8 892.8 892.8 892.							4				
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8 11.31 877 827 909 871.0 879 857 855 863.7 Averages 871.3 866.4 880.4 872.7 903.7 881.0 889.8 891.5 Averages Association of the second sec					}						
Averages 871.3 866.4 880.4 872.7 903.7 881.0 889.8 891.5 All ppb Dev. form mean Center 2/3 Side Bottom All Min Point 859.57 -2.5% Sid. Dev. 72.4 12.55 14.48 Avg. Conc. 882.354 ppb Instantents Used: 884.10 884.10 2.25% Sid. Dev. 72.4 12.55 14.48 Avg. Conc. 882.354 ppb Instantents Used: 884.11 B&K1302 Gas Analyzer SN 1788615 Cat 20.81E Tracer tank pressure 100 100 psig scm 12/17/2012 Stack Temp Side 5 5 n 12/17/2012 Fisher Scientific SN 90936818 12/7/2012 Stack Gd gas 995 995 mbar No.444% 98.4.2.0.0 ppb 5 5 n Back-Gd gas 10/31/2012 CA 10/31/12 CA 10/31/12 Fisher Scientific SN 90936818 12/7/2012 CA 10/31/12 <td< th=""><th></th><th></th><th></th><th></th><th>Į</th><th></th><th></th><th></th><th></th><th></th></td<>					Į						
AllppbDev. from meanCenter 2/3StideBeditionAllMean882.11Mean871.90892.38882.14Max Point913.003.5%(COV as %0.81.4Avg. Conc.882.354ppbInstanentsBakt 1302 Gas Analyzer SN1788615Cat 2M& TETracer tank pressure100100psigSccStatk TSU VelociCalc SN T9535120300112/17/2012Fisher Scientific SN 9093681812/7/2012Fisher Scientific SN 9093681812/7/2012Stack Temp55pmMaen stack velocity31003109pmSampling flowmeter995995Mohent Temp6.4.2.0.0ppbBack-Gd gas $6.4.2.0.0$ ppbNo. Bk-Gd samples10/31/2012CA 10/31/12Kotes:Mean velocity = CenterCA 10/31/12Carmen ArimescuSignature/dateSignature on file with original											
Mean 882.11 Mean 871.90 892.33 882.14 Min Point 859.67 -2.5% Std. Dev. 7.24 12.55 14.48 Avg. Conc. 882.354 ppb Instannents Used: 882.14 1.6 Tracer tank pressure injection flowmeter 100 100 psig sccm 5 Cat2 M&TE Stack Temp 5.0 5 5 n Bak 1302 Gas Analyzer N 1788615 Cat2 M&TE Stack Temp 5.0 5 5 pm bm Bak 1302 Gas Analyzer N 12/17/2012 Stack Temp 62.2 62 °F F	Averages —	>	871.3	866.4	880.4	872.7	903.7	881.0	889.8	891.5	
Mean 882.11 Mean 871.90 892.33 882.14 Min Point 859.67 -2.5% Std. Dev. 7.24 12.55 14.48 Avg. Conc. 882.354 ppb Instannents Used: 882.14 1.6 Tracer tank pressure injection flowmeter 100 100 psig sccm 5 Cat2 M&TE Stack Temp 5.0 5 5 n Bak 1302 Gas Analyzer N 1788615 Cat2 M&TE Stack Temp 5.0 5 5 pm bm Bak 1302 Gas Analyzer N 12/17/2012 Stack Temp 62.2 62 °F F			A //	nah	Day		Co	Cida	Bettern	A11	
Min Point Max Point 859.67 913.00 -2.5% 358_ICVa as % Stat 7.24 12.55 14.48 Avg. Conc. 882.354 ppb Instaments Used: I					Dev	/. Tom mean				_	
Max Point 913.00 3.5% COV as % 0.8 1.4 1.6 Avg. Conc. 882.354 ppb Intermental Used: Intermental Use: Intermental Use						2.5%					
Avg. Conc. 882.354 ppb Instaments Used: Tracer tank pressure injection flowmeter Start Finich 50 50 sccm 50 50 sccm 62.2 62 "F Mabient pressure 62.2 62 7 7 F Mabient pressure 995 995 Ambient pressure 8.4.2.0.0 P 9.8.6.1097 So 5 Back-Gd gas 8.4.2.0.0 8.6.1097 n No. Bk-Gd samples 5 5 5 62.2 62 7 Y YN 8.4.2.0.0 P 500 86.1097 n Notes: Mean velocity = Center CA 10/31/12 CA 10/31/12 CA 10/31/12 Carmen Arimescu Entries made by: Carmen Arimescu Signature/date Signature on file with original									r		
Start Finish Tracer tank pressure Start Finish psig Start Finish Start Stare Start <t< th=""><th>Ava Conc</th><th>882 354</th><th></th><th>515.00</th><th></th><th></th><th></th><th>0.0</th><th>1.4</th><th>1.0</th></t<>	Ava Conc	882 354		515.00				0.0	1.4	1.0	
Start Finish Tracer tank pressure injection flowmeter 100 100 psig Stack Temp 50 50 sccm 62.2 62 °F fisher Scientific SN 90936818 12/7/2012 Main stack velocity 3100 3109 pm pm Ambient humidity 5 5 pm pm Ambient Temp 69.8 71.6 °F r Back-Gd gas 8.4.2.0.0 8.4.2.0.0 pp gao 8.4.2.0.0 8.4.2.0.0 9.6 n n Gas analyzer checked: 10/31/2012 CA 10/31/12 CA 10/31/12 CA 10/31/12 Notes: Mean velocity = Center 300 3		0021001	FF-					1788615		Cat2 M& TE	
njection flowmeter Stack Temp Mean stack velocity Sampling flowmeter Ambient pressure Ambient Temp Bak vapor correction Back-Gd gas No. Bk-Gd samples CA 10/31/12 CA 10/31/12 CA 10/31/12 Entries made by: Signature/date Signature/date			Start	Finish				3001		12/17/2012	
Stack Temp 62.2 62 "F Mean stack velocity 3100 3109 "pm Sampling flowmeter 995 995 mbar Ambient numidity 49% 44% RH 995 995 mbar RH Mbient Temp 69.8 71.6 "F Bak vapor correction Y Y YN No. Bk-Gd samples 0/31/2012 CA 10/31/12 Notes: Mean velocity = Center 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center 300 300 CA 10/31/12 Carmen Arimescu Signature/date Signature on file with original	Tracer tank p	pressure	100	100	psig	Fisher Scier	ntific SN 90936818			12/7/2012	
Mean stack velocity 3100 3109 pm Sampling Bowmeter 3100 3109 pm Ambient pressure 995 995 995 Ambient pressure 995 995 995 Ambient Temp 98 71.6 °F Sag analyzer checked: 10/31/2012 CA 10/31/12 No. Bk-Gd samples 0.31/2012 CA 10/31/12 Notes: Mean velocity = Center CA 10/31/12 CA 10/31/12 Entries made by: Carmen Arimescu Signature/date Signature on file with original	Injection flow	/meter	50	50	sccm						
Sampling towmeter 5 5 pm Ambient pressure 995 995 mbar Ambient humidity 49% 44% RH 49% 44% RH * Ambient Temp 69.8 71.6 * Back-Gd gas 8.4.2.0.0 ppb No. Bk-Gd samples 5 5 Gas analyzer checked: 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center 000 CA 10/31/12 CA 10/31/12 Entries m ade by: Carm en Arim escu Signature on file with original Signature/date Signature on file with original Technical Data Review perform ed by:	Stack Temp		62.2	62	°F						
Ambient pressure 995 995 mbar Ambient pressure 49% 44% RH Ambient Temp 69.8 71.6 F Sak vapor correction 8.4.2.0.0 Ppb Back-Gd gas 8.4.2.0.0 Ppb No. Bk-Gd samples 0.6.1097 5 Gas analyzer checked: 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center 000 CA 10/31/12 000 000 Entries m ade by: Carmen Arim escu Technical Data Review performed by: Signature/date Signature on file with original Technical Data Review performed by:	Mean stack v	elocity	3100	3109	1pm						
Ambient humidity Ambient Temp B&K vapor correction Back-Gd gas	Sampling flo	wmeter	5	5	lpm 🛛		and the second se				
Ambient Temp B&K vapor correction Back-Gd gas	Am bient pres	sure	995	995	mbar	1000	1-				
Ambient Temp 69.8 71.6 ° BåK vapor correction ° ° ° Back-Gd gas 8,4,2,0,0 ° ° No. Bk-Gd samples 0/31/2012 CA 10/31/12 Motes: 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center CA 10/31/12 000 CA 10/31/12 000 Entries made by: Carm en Arim escu Signature/date Signature on file with original	Ambienthum	nidity	49%	44%	RH						
Back-Gd gas 8,4,2,0,0 ppb No. Bk-Gd samples 0,31/2012 CA 10/31/12 Gas analyzer checked: 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center CA 10/31/12 CA 10/31/12 Entries made by: Carm en Arim escu Signature/date Signature on file with original		•			۴F						
No. Bk-Gd samples 8,-6,10,-9,-7 5 n Gas analyzer checked: 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center CA 10/31/12 CA 10/31/12 Entries made by: Carm en Arim escu Signature/date Signature on file with original	•		Y	Y	Y/N	80					
No. Bk-Gd samples 5 5 n Gas analyzer checked: 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center CA 10/31/12 CA 10/31/12 Entries made by: Carm en Arim escu Signature/date Signature on file with original	Back-Gd gas	5		8,4,2,0,0	ppb	70				Concession of the local division of the loca	
Gas analyzer checked: 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center CA 10/31/12 CA 10/31/12 Entries made by: Carm en Arim escu Signature/date Signature on file with original					1	70	0 -				
Gas analyzer checked: 10/31/2012 CA 10/31/12 Notes: Mean velocity = Center CA 10/31/12 000000000000000000000000000000000000			La contraction de la contracti								
Notes: Mean velocity = Center CA 10/31/12 300 200 100 0 Entries made by: Carm en Arim escu Signature/date Signature on file with original Technical Data Review performed by: Signature/date	No. Bk-Gd sa	amples	La contraction de la contracti		n	р 60	0				
CA 10/31/12 200 200 100 0		-	5		8	60 Р р 50	0				
CA 10/31/12 Entries made by: Carmen Arimescu Signature/date Signature on file with original Technical Data Review performed by: Signature/date gbj 11/27/2012		-	5		8	60 р р 50	0				
CA 10/31/12 Entries made by: Carmen Arimescu Signature/date Signature on file with original Technical Data Review performed by: Signature/date gbj 11/27/2012	Gas analyze	r checked:	5		8	60 p 50 b 40	0				
CA 10/31/12 Definition Entries made by: Carmen Arimescu Signature/date Signature on file with original Technical Data Review performed by: Signature/date gbj 11/27/2012	Gas analyze	r checked:	5		8	р р50 р50 р30					
Entries made by: Carmen Arimescu Signature/date Signature on file with original Technical Data Review performed by: Signature/date gbj 11/27/2012	Gas analyze	r checked:	5		8	P P 50 D 40 30					
Entries made by: Carmen Arimescu Technical Data Review performed by: Signature/date Signature on file with original Signature/date gbj 11/27/2012	Ges analyze Notes:	r checked: Mean velocity	5		8	P P 50 D 40 30					
Entries made by: Carmen Arimescu Technical Data Review performed by: Signature/date Signature on file with original Signature/date gbj 11/27/2012	Gas analyze	r checked: Mean velocity	5		8	P P 50 D 40 30				Side	
Signature/date Signature on file with original Signature/date gbj 11/27/2012	Ges analyze Notes:	r checked: Mean velocity	5		8	P P 50 D 40 30				Side	
Signature/date Signature on file with original Signature/date gbj 11/27/2012	Ges analyze Notes:	r checked: Mean velocity	5		8	P P 50 D 40 30				Side	
	Gas analyze Notes: CA 10/31/12	r checked: Mean velocity	5 10/31/2012 = Center	5	8	P 50 P 50 b 40 30 20	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0			Side	
	Gas analyze Notes: CA 10/31/12 Entries made	r checked: Mean velocity e by:	5 10/31/2012 = Center Carm en Arim	5 nescu	CA 10/31/12	P 60 P 50 b 40 20 10 Technical D	o o o o o o o o o o o o o o o o o o o	ed by:	11/27/2012	Side	
	Gas analyze Notes: CA 10/31/12 Entries made	r checked: Mean velocity e by:	5 10/31/2012 = Center Carmen Arim Signature on	5 nescu	CA 10/31/12	P 60 P 50 b 40 20 10 Technical D	o o o o o o o o o o o o o o o o o o o	ed by:	11/27/2012	Side	

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
		10/31/2012		Fan C	onfiguration	AB		-	
	Testers	XY, CA,MSP			- Fan Setting	44	Hz	•	
	Stack Dia.	11.89	in.	•	Stack Temp	59.35	deg F	-	
	Stack X-Area	111.0	in . ²	St	art/End Time	1205/1320			
	Test Port	1		Ce	nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	in Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Center			
Order ->			2nd				1st		
Traverse>			Sie	de		L	Both	m	
Trial>		1	2		Mean	1	2	3	Mean
Point	Depth, in.		PP	3			рр	Y	
1	0.50		615	565	589.7	592	574		585.3
2	1.24	585	605	579	589.7	596	590	584	590.0
3	2.29	605	591	612	602.7	610	636		606.3
4 Center	3.82 5.91	604 618	630 635	603 639	612.3 630.7	617 613	617 606	628 602	620.7 607.0
Cemer 5	5.91	618	635	639	630.7		606	602	616.0
5	9.52	587	624	624	605.0		608		626.7
7	10.57	631	650	621	634.0		623		620.7
8	11.31	629	630	642	630.7	620	636	614	623.3
Averages —	>	606.0	620.3	611.2	612.5	610,4	611.9	609.8	610.7
, aong eo	-	000.0	020.0	011.2	012.0	010.1	011.0	000.0	01017
		All	ppb	Dev	. from mean	Center 2/3	Side	Bottom	All
		Mean	611.61			Mean	613.19		612.86
		Min Point	585.33		-4.3%	Std. Dev.	15.78	12.43	13.65
		Max Point	634.00		3.7%	COV as %	2.6	2.0	2.2
Avg. Conc.	610.708	ppb			Instuments	lleed-		•	
						useu.			
					B&K 1302 G	as Analyzer SN	1788615		Cat2 M& TE
		Start	Finish	,	B&K 1302 G TSI VelociCa	as Analyzer SN alc SN T95351203			12/17/2012
Tracer tank p		100	100	psig	B&K 1302 G TSI VelociCa	as Analyzer SN			
I njection flow		100 50	100 50	sccm	B&K 1302 G TSI VelociCa	as Analyzer SN alc SN T95351203			12/17/2012
I njection flow Stack Temp	rmeter	100 50 58	100 50 60.7	sccm °F	B&K 1302 G TSI VelociCa	as Analyzer SN alc SN T95351203			12/17/2012
injection flow Stack Temp Mean stack v	vm eter velocity	100 50 58 4453	100 50 60.7 4462	sccm °F form	B&K 1302 G TSI VelociCa	as Analyzer SN alc SN T95351203			12/17/2012
injection flow Stack Temp Mean stack v Sampling flo	vm eter velocity wm eter	100 50 58 4453 5	100 50 60.7 4462 5	sccm °F 1pm Ipm	B&K 1302 G TSI VelociCa Fisher Scier	as Analyzer SN alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack Sampling flo Ambient pres	vm eter velocity wm eter ssure	100 50 58 4453 5 994	100 50 60.7 4462 5 993	sccm °F fpm Ipm mbar	B&K 1302 G TSI VelociCa	as Analyzer SN alc SN T95351203 htific SN 90936818		สใ	12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum	vmeter velocity wmeter ssure nidity	100 50 58 4453 5 994 44%	100 50 60.7 4462 5 993 42%	sccm °F fom Ipm mbar RH	B&K 1302 G TSI VelociCa Fisher Scier 700	as Analyzer SN alc SN T95351203 httfic SN 90936818		1	12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wm eter ssure hidity 1p	100 50 58 4453 5 994 44% 73.4	100 50 60.7 4462 5 993 42% 74.3	sccm °F fom Iom mbar RH °F	B&K 1302 G TSI VelociCa Fisher Scier	as Analyzer SN alc SN T95351203 httfic SN 90936818		1	12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity 1P porrection	100 50 58 4453 5 994 44% 73.4 Y	100 50 60.7 4462 5 993 42% 74.3 Y	sccm °F Ipm Ipm mbar RH °F Y/N	B&K 1302 G TSI VelociCa Fisher Scier 700 600	as Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wm eter ssure hidity 1P porrection	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9,	100 50 60.7 4462 5 993 42% 74.3	sccm °F fom Iom mbar RH °F	B&K 1302 G TSI VelociCa Fisher Scier 700	as Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter ssure hidity p porrection	100 50 58 4453 5 994 44% 73.4 Y	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1	sccm °F Ipm Ipm mbar RH °F Y/N	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling too Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity p porrection	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter ssure hidity hp porrection s am ples	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p	Bas Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	vm eter velocity wm eter ssure hidity hp porrection s am ples	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 9 40 9 2 b 30	as Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor of Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity hp porrection s am ples	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 500 p 40 p	as Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor of Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity porrection s am ples r checked:	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCi Fisher Scier 700 600 500 P 40 P 2 b 30 20	Bas Analyzer SN alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity porrection s am ples r checked:	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCi Fisher Scier 700 600 500 P 40 P 2 b 30 20	as Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure hidity 1p onrection amples r checked: Mean Velocity	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCi Fisher Scier 700 600 500 P 40 P 2 b 30 20	Bas Analyzer SN alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure hidity 1p onrection amples r checked: Mean Velocity	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCi Fisher Scier 700 600 500 P 40 P 2 b 30 20	as Analyzer SN alc SN T95351203 htific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure hidity 1p onrection amples r checked: Mean Velocity	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCi Fisher Scier 700 600 500 P 40 P 2 b 30 20	as Analyzer SN alc SN T95351203 htific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure hidity porrection amples r checked: Mean Velocity	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012 y at Bottom 8	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5 3	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 2 b 30 20 10	as Analyzer SN alc SN T95351203 httffc SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity 2 2 e by:	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012 y at Bottom 8 Carmen Arim	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5 3 	sccm °F fpm lpm mbar RH °F Y/N ppb n XYY 10/31/1	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 2 b 30 20 10 10	as Analyzer SN alc SN T95351203 httfic SN 90936818	001		
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity 2 2 e by:	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012 y at Bottom & Carmen Arim Signature on	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5 3	sccm °F fpm lpm mbar RH °F Y/N ppb n XYY 10/31/1	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 2 b 30 20 10	as Analyzer SN alc SN T95351203 httfic SN 90936818		11/27/2012	
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity 2 2 e by:	100 50 58 4453 5 994 44% 73.4 Y -4, -5, -8, -9, -2 5 10/31/2012 y at Bottom 8 Carmen Arim	100 50 60.7 4462 5 993 42% 74.3 Y 8,9,3,2,1 5 3 	sccm °F fpm lpm mbar RH °F Y/N ppb n XYY 10/31/1	B&K 1302 G TSI VelociCa Fisher Scier 700 600 9 40 9 30 2 b 30 20 10 10	as Analyzer SN alc SN T95351203 httfic SN 90936818	001		

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date	10/31/2012		Fan C	onfiguration	AB			
	Testers	MSP, CA			Fan Setting	44	Hz	•	
	Stack Dia.	11.89	in.		Stack Temp	60.7	deg F	-	
	Stack X-Area	111.0	in . ²	Sta	art/End Time	1329/1434			
	Test Port	1		Cei	nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	n Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Far			
Order>			1st				2nd		
Traverse>			Sic	le			Botte	D m	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth,in.		pp	b			pp	b	
1	0.50	560	569	601	576.7	629	643	653	641.7
2	1.24	613	608	569	596.7	660	656	624	646.7
3	2.29	608	585	573	588.7	646	656	617	639.7
4	3.82	592	575	596	587.7	599	606	616	607.0
Center	5.91	585	587	600	590.7	611	606	615	610.7
5	8.00	624	637	599	620.0	585	590	598	591.0
6	9.52	633	605	628	622.0	581	608	595	594.7
7	10.57	654	650	667	657.0	594	629	599	607.3
8	11.31	648	617	659	641.3	592	616	576	594.7
Averages —	>	613.0	603.7	610.2	609.0	610.8	623.3	610.3	614.8
		All	ppb	Dev	. from mean	Center 2/3	Side	Bottom	All
		Mean	611.89			Mean	608.95	613.86	611.40
		Min Point	576.67		-5.8%	Std. Dev.	25.66	21.34	22.82
		Max Point	657.00		7.4%	COV as %	4.2		3.7
Avg. Conc.	613.292	ppb			Instuments	Used:		I	
•					B&K 1302 G	as Analyzer SN	1788615		Cat2 M& TE
		Start	Finish		TSI VelociCa	alc SN T95351203	001		12/17/2012
Tracer tank p	pressure	100	100	psig	Fisher Scier	tific SN 90936818			12/7/2012
Injection flow	vmeter	50	50	sccm					
Stack Temp		60.7	60.7	°F					
Mean stack v	elocity	4462	4456	fpm					
Sampling fo	wmeter	5	5	lpm					
Am bient pres	ssure	993	992	mbar	700	-			
Am bient hun	nidity	42%	42%	RH	100			-	
Ambient Ten	np	74.3	75.2	°F	600				
B&K vapor co	orrection	Y	Y	Y/N					
Back-Gd gas	5	0,-1,1,-7,-4	6,1,2,4,-1	ppb	50				
No. Bk-Gd sa	amples	5	5	n	р ⁴⁰				
	-		5	8	P				
Gas analyze	-	5 10/31/2012	5	n CA 10/31/12	P				
Gas analyze	-	10/31/2012		8	P	0			
Gas analyze	r checked:	10/31/2012		8	р b 30	0			
Gas analyze	r checked:	10/31/2012		8	р b 30				7
Gas analyze	r checked: Mean Velocity	10/31/2012		8	р b 30				Side
Gas analyze	r checked: Mean Velocity	10/31/2012		8	р b 30				Side
Gas analyze Notes:	r checked: Mean Velocity	10/31/2012		8	р b 30				Side
Gas analyze Notes: CA 10/31/12	r checked: Mean Velocity	10/31/2012 / at Bottom 8	3	8	р b 30 20	Botton			Side
Gas analyze Notes: CA 10/31/12 Entries mad	r checked: Mean Velocity e by:	10/31/2012 / at Bottom 8 Carmen Arin	3 nescu	CA 10/31/12	P b 30 20 10 Technical D	Bottom ata Review perform	ed by:	11/27/2012	Side
Gas analyze Notes: CA 10/31/12	r checked: Mean Velocity e by:	10/31/2012 y at Bottom 8 Carmen Arin Signature on	3	CA 10/31/12	р b 30 20	Bottom ata Review perform		11/27/2012	Side
Gas analyze Notes: CA 10/31/12 Entries mad	r checked: Mean Velocity e by:	10/31/2012 / at Bottom 8 Carmen Arin	3 nescu	CA 10/31/12	P b 30 20 10 Technical D	Bottom ata Review perform	ed by:	11/27/2012	Side

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM	1				
31-Jul-06	Site	LB-S1 Mode			Run No.					
	Date	10/31/2012		Fan C	onfiguration	AB				
	Testers	MSP, CA			Fan Setting	44	I	Hz		
	Stack Dia.	11.89	in.	-	Stack Temp		60.7	leg F		
	Stack X-Area	111.0	in. ²	St	art/End Time	1436/1546				
	Test Port	1		Ce	nter 2/3 from		1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	in Center 2/3		2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Near				
Order>			1st	1	-			2nd		
Traverse>			Sid	de				Bottic	m	
Trial —->		1	2	3	Mean	r	1	2	3	Mean
Point	Depth, in.		рр	b				ppl	b	
1	0.50	636	657	610	634.3		591	620	593	601.3
2	1.24	665	635	653	651.0		570	587	599	585.3
3	2.29	627	640	622	629.7		593	583	623	599.7
4	3.82	626	646	649	640.3		605	608	620	611.0
Center	5.91	634	614	641	629.7		636	626	607	623.0
5	8.00	611	596	583	596.7		612	624	623	619.7
6	9.52	569	578	587	578.0		653	625	625	634.3
7	10.57	585	570	583	579.3		609	590	651	616.7
8	11.31	578	590	557	575.0		653	615	644	637.3
Averages —	>	614.6	614.0	609.4	612.7	613.6		608.7	620.6	614.3
		All	ppb	Dev	/. from mean	I		Side	Bottom	셴
		Mean	613.46			Mean		614.95	612.81	613.88
		Min Point	575.00			Std. Dev.		29.85	16.12	23.07
		Max Point	651.00			COV as %	_	4.9	2.6	3.8
Avg. Conc.	611.854	ppb			Instuments		0 11	4700045		0 - 10 M0 TT
		~ .			B&K 1302 G		SN	1788615		Cat2 M& TE
Treserterk		Start 100	Finish 100	noia		alc SN T953		101		12/17/2012
Tracer tank p		50	50	psig	Fisher Scier	ntific SN 9093	0010			12/7/2012
Injection flow	meter	60.7	60.7	°F						
Stack Temp Mean stack	nlositu	4456	4453	form						
Sampling to	-	4406 5	4403 5	ipm Ipm						
Ambientpre		992	993	mbar					-	
Ambienthun		43%	46%	RH	700	T .	$ \rightarrow $		1	
Ambient Ten	-	74.3	72.5	۴				1		
B&K vapor c	•	Y Y	72.5 Y	' Y/N	600					
Daix vapor c	Shecton	-16, -7, -2,		1/14						
Back-Gd gas		-4	9.0.0.42	ppb	500					
							L			
No. Bk-Gd sa	amples	5	5	n	р ⁴⁰⁰					
	-			2	P					
Gas analyze	r checked:	10/31/2012		CA 10/31/12	b 300					
					200					
Notes:	Mean Velocity	/ at Bottom 8	3		200					
					. 100					$\overline{}$
							47 0			
							7 0			
CA 10/31/12										Side
CA 10/31/12										Side
CA 10/31/12							Bottor			Side
							Bottor			Side
Entries mad	e by:	Carm en Arin			Technical D	ata Review pe				Side
	e by:	Signature on	nescu file with orig	inal		ata Review pe	erforme		11/27/2012	Side
Entries mad	e by:			inal	Technical D	ata Review pe	erforme	ed by:	11/27/2012	Side

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
		10/31/2012	-	Fan C	onfiguration				
	Testers	MSP, CA			Fan Setting	44	Hz	-	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0	in. ²	St	art/End Time	1548/1703			
	Test Port	1		Ce	nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	in Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Bottom			
Order>			1st				2nd		
Traverse>			Sie	de			Boti	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		pp	b			рр	b	
1	0.50	576	572	584	577.3	675	602	619	632.0
2	1.24	581	525	577	561.0		615		638.3
3	2.29	583	565	591	579.7		611		622.3
4	3.82	588	600	559	582.3		585		595.0
Center	5.91	592	602	612	602.0	4	579		598.3
5	8.00	669	629	645	647.7	571	593		585.7
6	9.52	632	707	617	652.0		634		630.3
7	10.57	649	629	709	662.3		574		605.0
8	11.31	684	684	615	661.0		598		591.0
Averages —	>	617.1	612.6	612.1	613.9	608.6	599.0	625.1	610.9
		All	neh	Day	. from m.con	Contor 2/2	Side	Pottom	
		Mean	<u>ppb</u> 612.41	Det	/ from mean	Mean	612.43		<u>All</u> 611.57
		Min Point	561.00		_8.4%	Std. Dev.	40.89		30.86
		Max Point	662.33			COV as %	40.03	r	5.0
Avg. Conc.	613.938		002.00		Instuments		0.1		010
					I SLUTIELS	Used:			
		••			B&K 1302 G		1788615		Cat2 M& TE
		Start	Finish		B&K 1302 G				Cat2 M&TE 12/17/2012
Tracer tank p	pressure		Finish 100	psig	B&K 1302 G TSI VelociC	as Analyzer SN	001		
Tracer tank p Injection flow		Start		psig sccm	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203	001		12/17/2012
-		Start 100	100	· -	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203	001		12/17/2012
I njection flow	rmeter	Start 100 50	100 50	sccm	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203	001		12/17/2012
I njection flow Stack Temp	vm eter velocity	Start 100 50 60.7	100 50 59	sccm °F	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203	001		12/17/2012
injection flow Stack Temp Mean stack v	vm eter velocity wm eter	Start 100 50 60.7 4453	100 50 59 4487	sccm °F form	B&K 1302 G TSI VelociC	as Analyzer SN alc SN T95351203 htific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo	vm eter velocity wm eter ssure	Start 100 50 60.7 4453 5	100 50 59 4487 5	sccm °F fpm Ipm	B&K 1302 G TSI VelociCi Fisher Scier	as Analyzer SN alc SN T95351203 htific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	vmeter velocity wmeter ssure nidity	Start 100 50 60.7 4453 5 993 45% 73.4	100 50 59 4487 5 994 44% 73.4	sccm °F fpm Ipm mbar	B&K 1302 G TSI VelociCi Fisher Scier	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity 1p porrection	Start 100 50 60.7 4453 5 993 45% 73.4 Y	100 50 59 4487 5 994 44% 73.4 Y	sccm °F fom Ipm mbar RH	B&K 1302 G TSI VelociC: Fisher Scier 700	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wm eter ssure hidity 1p porrection	Start 100 50 60.7 4453 5 993 45% 73.4	100 50 59 4487 5 994 44% 73.4 Y	sccm °F fom Iom mbar RH °F	B&K 1302 G TSI VelociC: Fisher Scier 700	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter ssure hidity hp porrection	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8,2,-4,-4,-6	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 500	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity hp porrection	Start 100 50 60.7 4453 5 993 45% 73.4 Y	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5	sccm °F fom Iom mbar RH °F Y/N	B&K 1302 G TSI VelociC: Fisher Scier 700 600	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	vm eter velocity wm eter ssure hidity hp porrection s am ples	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2,-4,-4,-6 5	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter ssure hidity hp porrection s am ples	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8,2,-4,-4,-6	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity hp porrection s am ples r checked:	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2,-4,-4,-6 5 10/31/2012	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 P 40 P b 30	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity hp porrection s am ples	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2,-4,-4,-6 5 10/31/2012	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scier 700 600 50 p 40 p	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity hp porrection s am ples r checked:	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2,-4,-4,-6 5 10/31/2012	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 9 40 9 30 9 30 20	as Analyzer SN alc SN T95351203 httific SN 90936818	001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure hidity porrection amples r checked: Mean Velocity	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2,-4,-4,-6 5 10/31/2012	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 9 40 9 30 9 30 20	as Analyzer SN alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure hidity porrection amples r checked: Mean Velocity	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2,-4,-4,-6 5 10/31/2012	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 9 40 9 30 9 30 20	as Analyzer SN alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure hidity porrection amples r checked: Mean Velocity	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2,-4,-4,-6 5 10/31/2012	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 9 40 9 30 9 30 20	as Analyzer SN alc SN T95351203 httfic SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure hidity porrection amples r checked: Mean Velocity	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2,-4,-4,-6 5 10/31/2012	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC. Fisher Scier 700 600 9 40 9 30 9 30 20	as Analyzer SN alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wm eter ssure hidity porrection amples r checked: Mean Velocity	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2446 5 10/31/2012 y at Bottom 8	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	B&K 1302 G TSI VelociC: Fisher Scien 700 600 9 40 9 30 20 10	as Analyzer SN alc SN T95351203 httfic SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes: CA 10/31/12	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity e by:	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2446 5 10/31/2012 y at Bottom 8 Carm en Arin	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5 8 8	sccm °F fpm lpm mbar RH °F Y/N ppb n CA 10/31/12	B&K 1302 G TSI VelociC: Fisher Scien 700 600 9 40 9 30 20 10	as Analyzer SN alc SN T95351203 httfic SN 90936818	ed by:		
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity e by:	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2446 5 10/31/2012 y at Bottom 8 Carm en Arin	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5 8 8 1 1 1 1 1 1 1 1 1 1 1 1 1	sccm °F fpm lpm mbar RH °F Y/N ppb n CA 10/31/12	B&K 1302 G TSI VelociC: Fisher Scien 700 600 9 40 9 30 20 10 10 Technical D	as Analyzer SN alc SN T95351203 httfic SN 90936818		11/27/2012	
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes: CA 10/31/12 Entries made	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity e by:	Start 100 50 60.7 4453 5 993 45% 73.4 Y 8.2446 5 10/31/2012 y at Bottom 8 Carm en Arin Signature or	100 50 59 4487 5 994 44% 73.4 Y 1,1,-3,-5,-5 5 8 8 1 1 1 1 1 1 1 1 1 1 1 1 1	sccm °F fpm lpm mbar RH °F Y/N ppb n CA 10/31/12	B&K 1302 G TSI VelociC: Fisher Scien 700 600 9 40 9 30 20 10 10 Technical D	as Analyzer SN alc SN T95351203 httfic SN 90936818	ed by:		

Rev. 0			TRACER GAS	S TRAVERSE		1			
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date			Fan C	onfiguration				
		JEF, CA			Fan Setting		Hz		
	Stack Dia.	11.89	in.		Stack Temp			-	
	Stack X-Area	111.0		St	art/End Time		3.		
	Test Port			-	nter 2/3 from	1.09	to:	10.80	
Distance	lo disturbance	-	inches		in Center 2/3		to:	7	
	urement units		meneo	-	jection Point		10.	1	
Order ->		<u>pps 010</u>	2nd	1			1st		
Traverse>				de			Both		
Trial>		1	2		Mean	1	2		Mean
Point	Depth, in.	•	pp		ITRACIT	•	pp		inc all
1	0.50	616	610	599	608.3	657	659	658	658.0
2	1.24	613	605	601	606.3		637	640	639.7
3	2.29	610	598	603	603.7	650	640	635	641.7
4	3.82	631	593	606	610.0		626	629	634.3
Center	5.91	598	593	608	603.0	583	620	629	605.0
5	8.00	595	597 606	598	599.7	565	600	572	579.0
6	9.52	604	606	634	621.7	530	566	572	579.0
7	9.52	604	627	634	621.7	530	543	539	538.7
8	11.31	632	624	606	629.0	546	558	551	551.7
	>	614.0	610.6	610.2	611.6	595.0	604.6	601.7	600.4
Averages —		014.0	010.0	010.2	011.0	333.0	004.0	001.7	000.4
		All	ppb	Der	/. from mean	Center 2/3	Side	Bottom	Ali
		Mean	606.00	De		Mean	610.48	599.14	604.81
		Min Point	538.67		-11 1%	Std. Dev.	10.84	42.18	30.17
		Max Point	658.00			COV as %	1.8	7.0	5.0
Avg. Conc.	606.250		0.00.00		Instuments		1.0	7.0	5.0
g	0001200	PP-			B&K 1302 G		1788615		Cat2 M& TE
		Start	Finish			alc SN T95351203			12/17/2012
Tracer tank p	ressure	100	100	_					
-				DSIG	Fisher Scier	ntific SN 90936818			12/7/2012
niection flow	/meter	50		psig sccm	Fisher Scier	ntific SN 90936818			12/7/2012
Injection flow Stack Temp	/meter	50 55	50	sccm	Fisher Scier	ntific SN 90936818			12/7/2012
Stack Temp		55	50 58.3	sccm °F	Fisher Scier	ntific SN 90936818			12/7/2012
Stack Temp Mean stack v	elocity	55 4257	50 58.3 4290	sccm °F Ipm	Fisher Scier	ntific SN 90936818			12/7/2012
Stack Temp Mean stack v Sampling flo	velocity wm eter	55 4257 5	50 58.3 4290 5	sccm °F 1pm Ipm					12/7/2012
Stack Temp Mean stack v Sampling flo Ambient pres	elocity wm eter ssure	55 4257 5 997	50 58.3 4290 5 998	sccm °F fprm Iprm mbar	Fisher Scier				12/7/2012
Stack Temp Mean stack Sampling flo Ambient pres Ambient hum	velocity wmeter ssure nidity	55 4257 5 997 61%	50 58.3 4290 5 998 50%	sccm °F fom Ipm mbar RH	700				12/7/2012
Stack Temp Mean stack Sampling flo Ambient pres Ambient hum Ambient Tem	velocity wmeter ssure nidity np	55 4257 5 997 61% 63.5	50 58.3 4290 5 998	sccm °F fom Iom Iom RH °F					12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	velocity wmeter ssure hidity hp porrection	55 4257 5 997 61% 63.5 Y	50 58.3 4290 5 998 50% 64.4 Y	sccm °F Ipm Ipm Mbar RH °F Y/N	700				12/7/2012
Stack Temp Mean stack Sampling flo Ambient pres Ambient hum Ambient Tem	velocity wmeter ssure hidity hp porrection	55 4257 5 997 61% 63.5	50 58.3 4290 5 998 50% 64.4 Y	sccm °F Ipm Ipm Mbar RH °F Y/N	700				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas	velocity wmeter ssure hidity hp prrection	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8,	50 58.3 4290 5 998 50% 64.4 Y 6, -2, 0, 0.8,	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	velocity wmeter ssure hidity hp prrection	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3	sccm °F Ipm Ipm Mbar RH °F Y/N	700 600 50 p 40				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	velocity wm eter ssure hidity hp porrection s amples	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 500 p 40 P				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas	velocity wm eter ssure hidity hp porrection s amples	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 500 p 40 P				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient nem Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	velocity wm eter ssure hidity hp porrection amples r checked:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 500 p 40 P				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient nem Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	velocity wm eter ssure hidity hp porrection s amples	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 40 9 30 5 30				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient nem Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	velocity wm eter ssure hidity hp porrection amples r checked:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 40 9 30 5 30				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	velocity wm eter ssure hidity hp porrection amples r checked:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 40 9 30 5 30				
Stack Temp Mean stack v Sampling to Ambient pres Ambient nem Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	velocity wm eter ssure hidity hp porrection amples r checked:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 40 9 30 5 30				12/7/2012
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	velocity wm eter ssure hidity hp porrection amples r checked:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 40 9 30 5 30				
Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	velocity wm eter ssure hidity hp porrection amples r checked:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012	50 58.3 4290 5 998 50% 64.4 Y 6,-2,0,0.8, -3 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 40 9 30 5 30				
Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	elocity wm eter ssure hidity 1p orrection amples r checked: Mean Velocity	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012 y at Bottom 8	50 58.3 4290 5 998 50% 64.4 Y 6, -2, 0, 0.8, -3 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 9 40 9 30 20 10	a a a a a a a a a a a a a a a a a a a	m		
Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	elocity www.eter ssure hidity hp onrection amples r checked: Mean Velocity e by:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012 y at Bottom 8	50 58.3 4290 5 998 50% 64.4 Y 6, -2, 0, 0.8, -3 5 3	sccm °F fpm Ipm mbar RH °F Y/N ppb n	700 600 9 40 9 30 20 10 Technical D	ata Review perform	ed by:	11/27/2012	
Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	elocity www.eter ssure hidity hp onrection amples r checked: Mean Velocity e by:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012 y at Bottom 8 Carmen Arin Signature or	50 58.3 4290 5 998 50% 64.4 Y 6, -2, 0, 0.8, -3 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	700 600 9 40 9 30 20 10	ata Review perform	m	11/27/2012	
Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	elocity www.eter ssure hidity hp onrection amples r checked: Mean Velocity e by:	55 4257 5 997 61% 63.5 Y -11,-9,-9,-8, -6 5 10/31/2012 y at Bottom 8	50 58.3 4290 5 998 50% 64.4 Y 6, -2, 0, 0.8, -3 5 3	sccm °F fpm Ipm mbar RH °F Y/N ppb n	700 600 9 40 9 30 20 10 Technical D	ata Review perform	ed by:	11/27/2012	

Rev. 0			TRACER GAS	S TRAVERSE						
31-Jul-06	Site	LB-S1 Mode			Run No.					
	Date	11/1/2012	-	Fan C	onfiguration					
	Testers	JEF, CA			Fan Setting		1	Hz		
	Stack Dia.	11.89	in.		Stack Temp		57.9 (-	
	Stack X-Area	111.0		St	art/End Time			- J ·	Ī	
	Test Port	1			nter 2/3 from		1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	in Center 2/3		2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Top				
Order>			1st					2nd		
Traverse>			Si	de				Botte	om	
Trial —->		1	2	3	Mean	r	1	2	3	Mean
Point	Depth, in.		рр	b				pp	b	
1	0.50	740	722	750	737.3		685	683	686	684.7
2	1.24	762	724	739	741.7		704	690	673	689.0
3	2.29	744	749	744	745.7		680	685	690	685.0
4	3.82	742	704	743	729.7		691	694	682	689.0
Center	5.91	696	697	702	698.3		695	694	697	695.3
5	8.00	676	696	688	686.7		687	715	712	704.7
6	9.52	636	645	637	639.3		684	693	715	697.3
7	10.57	633	620	654	635.7		696	692	718	702.0
8	11.31	620	586	629	611.7		702	709	697	702.7
Averages —	>	694.3	682.6	698.4	691.8	691.6		695.0	696.7	694.4
						•				
		All	ppb	Dev	/. from mean	Center 2/3		<u>Side</u>	Bottom	ᆁ
		Mean	693.09			Mean		696.71	694.62	695.67
		Min Point	611.67		-11.7%	Std. Dev.		45.87	7.29	31.57
		Max Point	745.67		7.6%	COV as %		6.6	1.0	4.5
Avg. Conc.	692.625	ppb			Instuments	Used:				
					B&K 1302 G		SN	1788615		Cat2 M&TE
		Start	Finish	,		alc SN T953		001		12/17/2012
Tracer tank p	pressure	100	100	psig	Fisher Scier	ntific SN 9093	36818			12/7/2012
Injection flow	/meter	50	50	sccm						
Stack Temp		57.8	58	°F						
Mean stack v	elocity	3747	3798	fpm –						
Sampling flo	wmeter	5	5	lpm						
Am bient pres	ssure	998	999	mbar	800	-	_			
Am bient hurr	nidity	56%	48%	RH						
Ambient Terr	ıp	62.6	65.3	°F	700			1		
B&K vapor co	orrection	Y	Y	Y/N						
Back-Gd gas	5			ppb	60					
		6,-2,0,0.8,-3	7,0,2,-3,0		50	0	И			
No. Bk-Gd sa	amples	5	5	n	Р		И			
					р ⁴⁰					
Gas analyze	r checked:	10/31/2012			b		1			
					30		И			
Notes:	Mean Velocity	/ at Bottom 8	3		20	x / .				
							╏┠			
					10)0 -	~	╶╴		
CA 11/1/12						0	~~~		5 5 5 1	Side
									- /	
							Bottor	n		
Entries mad	e by:	Carmen Arin			Technical D	ata Review p	erforme	ed by:		
Signature/da	ite	Signature on	file with orig	inal	Signature/da	ate	9	gbj	11/27/2012	
		11/1/2012								

Rev. 0			TRACER GAS	S TRAVERSE		I			
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date		-	Fan C	onfiguration				
	Testers	JEF, CA			Fan Setting		Hz	-	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0		St	art/End Time		3.	Ī	
	Test Port			-	nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	-	inches		in Center 2/3		-	7	
	urem ent units					Port 2 Center			
Order ->		pp	2nd		1		1st		
Traverse>			Si	de			Bott	om	
Trial —->		1	2	3	Mean	r 1	2	3	Mean
Point	Depth, in.		pp	b			pp	b	
1	0.50	643	682	636	653.7	675		Y	662.3
2	1.24	668	647	658	657.7	638	667	649	651.3
3	2.29	689	654	665	669.3	678	692	699	689.7
4	3.82	665	644	677	662.0	668	653	661	660.7
Center	5.91	685	666	668	673.0	681	691	681	684.3
5	8.00	698	693	666	685.7	688	680		687.7
6	9.52	701	684	700	695.0	690			693.0
7	10.57	727	722	709	719.3				716.3
8	11.31	734	701	688	707.7	694	716	702	704.0
Averages —	>	690.0	677.0	674.1	680.4	682.4	682.2	685.1	683.3
		Min Point Max Point	651.33 719.33		5.5%	Std. Dev. COV as %	21.56 3.2	21.53 3.2	20.76 3.0
Avg. Conc.	682.208	ppb			Instuments	Used:			
					B&K 1302 G	as Analyzer SN	1788615		Cat2 M& TE
		Start	Finish		TSI VelociCa	alc SN T95351203	3001		12/17/2012
Tracer tank p	pressure	100	100	psig	Fisher Scier	ntific SN 90936818			12/7/2012
Injection flow	/meter	50	50	sccm					
Stack Temp		58	56.5	۴F					
Mean stack v	-	3798	3722	tpm –		~			
Sampling flo		5	5	lpm		and a state of the			
Am bient pres		999	999	mbar	800				
Am bient hurr	-	43%	42%	RH				1	
Ambient Terr	•	67.1	71.6	۴F	700		i i în		
B&K vapor co		Y	Y	Y/N	60				
Back-Gd gas	6	-1,1, -1,		ppb					
	_	0.6,0.8	6,2,4,2,-8		50				
No. Bk-Gd sa	amples	5	5	n	P				
		10/04/0010			р ⁴⁰				
Gas analyze	r checked:	10/31/2012			b 30	0			
Notes:	Moon Valaait	(at Pattern)	0						
NUES.	Mean Velocity		5		. 20				
					- 10	xo - 🖊 🖊 📕			
CA 11/1/12					•		5° .		
SA 11/1/12					•	0 - 2	~		Side
				<u> </u>	-	Botto	IM		
Entries made	e by:	Carm en Arin	nescu		Technical D	ata Review perform	ed by:		
Signature/da		Signature or		inal	Signature/da		gbj	11/27/2012	
		11/1/2012	-				3~)		

Rev. 0			TRACER GAS	S TRAVERSE		l			
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date	11/1/2012	-	Fan C	onfiguration				
	Testers	MSP, CA			Fan Setting	39	Hz	•	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0	in . ²	St	art/End Time	1240/1350			
	Test Port	1		Ce	nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	in Center 2/3	2	to:	7	
Meas	urement units	ppb SF6		In	jection Point	Port 2 Far			
Order>			1st				2nd		
Traverse>			Sie			L	Both		
Trial>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		PP				рр	YT	
1	0.50	646	628	639	637.7	727	702	660	696.3
2	1.24	620	676	663	653.0	711	699	712	707.3
3	2.29	676	662	658	665.3	695	730	728	717.7
4 Contor	3.82	661	663	661	661.7	684	704	697 706	695.0
Center 5	5.91 8.00	685 725	677 726	671 696	677.7 715.7	661 681	693 660	706 676	686.7 672.3
6 7	9.52 10.57	749 728	708 720	712 767	723.0 738.3	674 679	671 672	654 701	666.3 684.0
8	11.31	728	720	751	730.3	668	716	701	698.0
Averages —	>	692.1	688.6	690.9	690.5	686.7	694.1	693.8	691.5
vuerageo	-	002.1	000.0	000.0	000.0	000.7	004.1	000.0	001.0
		All Mean	<u>ppb</u> 691.02	Dev	/. from mean	<u>Center 2/3</u> Mean	<u>Side</u> 690.67	Bottom 689.90	<u>All</u> 690.29
		Min Point	637.67		-7.7%	Std. Dev.	34.19	18.30	26.35
		Max Point	742.33		7.4%	COV as %	5.0	2.7	3.8
Avg. Conc.	692.125	ppb			Instuments	Used:		1	
-					B&K 1302 G	as Analyzer SN	1788615		Cat2 M& TE
		Start	Finish		TSI VelociCa	alc SN T95351203	3001		12/17/2012
Tracer tank p	pressure	100	100	psig	Fisher Scier	ntific SN 90936818			12/7/2012
Injection flow	vm eter	50	50	sccm					
Stack Temp		56.5	58.5	°F					
Mean stack	velocity	3722	3741	fpm –					
Sampling fo		5	5	lpm		and a start of the			
Ambientpre		999	999	mbar	800		-		
Ambienthun	-	41%	36%	RH				-	
Ambient Ten	•	71.6	75.2	۴F	700				
B&K vapor c		Y	Y	Y/N	60				
Back-Gd gas	5	2 2 2 4 4	107550	ppb					
No. Bk-Gd sa	amples	-2,-2,0,-4,-4 5	5	n	50				
NU. DK-GU S	ampies	J	J	88	Р р 40				
Gas analyze	r checked:	10/31/2012			b 30				
Notes:	Mean Velocity	/ at Bottom 8	3		20				
					10	10 -			
CA 11/1/12					- 10 -			<u>רקי</u> יי	Side
CA 11/1/12					10	20			Side
CA 11/1/12					10	20			Side
CA 11/1/12 Entries mad	e by:	Carmen Arim	nescu			0			Side
		Carmen Arim Signature on 11/1/2012		inal		0 Botto		11/27/2012	Side

Rev. 0			TRACER GAS	S TRAVERSE		1			
31-JuH06	Site	LB-S1 Mode			Run No.				
	Date			Fan C	onfiguration				
		MSP, CA			Fan Setting		Hz		
	Stack Dia.	11.89	in.	_	Stack Temp		deg F	-	
	Stack X-Area	111.0		St	art/End Time			Ī	
	Test Port			-	nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	-	inches		n Center 2/3		-	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Near			
Order>			1st		•		2nd		
Traverse>			Sid	de			Both	om	
Trial —->		1	2	3	Mean	7 1	2	3	Mean
Point	Depth, in.		рр	b			рр	b	
1	0.50	762	703	718	727.7	718	723	722	721.0
2	1.24	711	735	693	713.0	689	735	750	724.7
3	2.29	746	705	730	727.0	704	713	694	703.7
4	3.82	712	747	725	728.0	734	722	716	724.0
Center	5.91	730	704	687	707.0	686	676	698	686.7
5	8.00	673	657	636	655.3	642	628	674	648.0
6	9.52	646	639	654	646.3	657	634	656	649.0
7	10.57	626	656	651	644.3	637	628	675	646.7
8	11.31	623	613	586	607.3	609	587	644	613.3
Averages —	>	692.1	684.3	675.6	684.0	675.1	671.8	692.1	679.7
						1			
		All	ppb	Der	/. from mean		Side		젤
		Mean	681.83			Mean	688.71	683.24	685.98
		Min Point	607.33			Std. Dev.	38.33	r	35.60
		Max Point	728.00			COV as %	5.6	5.2	5.2
Avg. Conc.	679.958	ррь			Instuments		4700045		
		Ohant	Carinh			as Analyzer SN	1788615		Cat2 M& TE
Tresserterk		Start	Finish	hola	TSI VelociCa	alc SN T95351203	3001		12/17/2012
Tracer tank p		100	100	psig	TSI VelociCa		3001		
Injection flow		100 50	100 50	sccm	TSI VelociCa	alc SN T95351203	3001		12/17/2012
I njection flow Stack Temp	vm eter	100 50 58.5	100 50 59.8	sccm °F	TSI VelociCa	alc SN T95351203	3001		12/17/2012
Injection flow Stack Temp Mean stack v	vm eter velocity	100 50 58.5 3741	100 50 59.8 3774	sccm °F Ipm	TSI VelociCa	alc SN T95351203	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo	vm eter velocity wm eter	100 50 58.5 3741 5	100 50 59.8 3774 5	sccm °F fpm Ipm	TSI VelociCa Fisher Scier	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	vmeter velocity owmeter ssure	100 50 58.5 3741 5 999	100 50 59.8 3774 5 1000	sccm °F fpm Ipm mbar	TSI VelociCa	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum	vmeter velocity swmeter ssure nidity	100 50 58.5 3741 5 999 36%	100 50 59.8 3774 5 1000 55%	sccm °F 1pm Ipm mbar RH	TSI VelociCa Fisher Scier 800	alc SN T95351203 httific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wwm eter ssure nidity np	100 50 58.5 3741 5 999 36% 75.2	100 50 59.8 3774 5 1000 55% 64.4	sccm °F 1pm Ipm Mbar RH °F	TSI VelociCa Fisher Scier	alc SN T95351203 httffc SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wwm eter ssure nidity np orrection	100 50 58.5 3741 5 999 36%	100 50 59.8 3774 5 1000 55%	sccm °F Ipm Ipm Mbar RH °F Y/N	TSI VelociCa Fisher Scier 800	alc SN T95351203 httific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wwm eter ssure nidity np orrection	100 50 58.5 3741 5 999 36% 75.2 Y	100 50 59.8 3774 5 1000 55% 64.4 Y	sccm °F 1pm Ipm Mbar RH °F	TSI VelociCa Fisher Scier 800 700 600	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wwm.eter ssure hidity hp omection	100 50 58.5 3741 5 999 36% 75.2 Y -1.2,12,-2	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 50	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wwm.eter ssure hidity hp omection	100 50 58.5 3741 5 999 36% 75.2 Y	100 50 59.8 3774 5 1000 55% 64.4 Y	sccm °F Ipm Ipm Mbar RH °F Y/N	TSI VelociCi Fisher Scier 800 700 600 50 P	alc SN T95351203 httffic SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	vm eter velocity wwm eter ssure nidity np orrection s am ples	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCi Fisher Scier 800 700 600 50 P p 40	alc SN T95351203 httffic SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wwm eter ssure nidity np orrection s am ples	100 50 58.5 3741 5 999 36% 75.2 Y -1.2,12,-2	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCi Fisher Scier 800 700 600 50 P	alc SN T95351203 httific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 9 9 40 9 40 0 300	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	vm eter velocity wwm eter ssure nidity np orrection s am ples	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 50 P p 40 b	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 50 P 40 b 30 20	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 50 P 40 b 30 20	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 50 P 40 b 30 20	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 50 P 40 b 30 20	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 50 P 40 b 30 20	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked: Mean Velocity	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012 y at Bottom 8	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5 3	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 800 700 600 9 9 40 9 300 20 10	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzed Notes:	vm eter velocity wwm eter ssure nidity np orrection amples r checked: Mean Velocity e by:	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012 y at Bottom 8 Carmen Arin	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5 3 3 1000 1	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 800 700 50 P 40 b 30 20 10 Technical D	alc SN T95351203 httific SN 90936818	3001		
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter velocity wwm eter ssure nidity np orrection amples r checked: Mean Velocity e by:	100 50 58.5 3741 5 999 36% 75.2 Y -1.2.122 5 10/31/2012 y at Bottom 8 Carmen Arin Signature on	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5 3	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 800 700 600 9 9 40 9 300 20 10	alc SN T95351203 httific SN 90936818		11/27/2012	
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter velocity wwm eter ssure nidity np orrection amples r checked: Mean Velocity e by:	100 50 58.5 3741 5 999 36% 75.2 Y -1,2,1,-2,-2 5 10/31/2012 y at Bottom 8 Carmen Arin	100 50 59.8 3774 5 1000 55% 64.4 Y 9,3,3,14,8 5 3	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 800 700 50 P 40 b 30 20 10 Technical D	alc SN T95351203 httific SN 90936818	3001		

Rev. 0			TRACER GAS	S I KAVEKSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date	11/1/2012		Fan C	onfiguration	AB			
	Testers	MSP, CA			- Fan Setting	39	Hz	•	
	Stack Dia.	11.89	in.	•	Stack Temp	60.85	deg F	-	
	Stack X-Area	111.0	in . ²	St	art/End Time	1505/1610			
	Test Port	1		Ce	nter 2/3 from	1.09	to:	10.80	
Distance	lo disturbance	123.5	inches	Points i	n Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		in	jection Point	Port 2 Bottom			
Order>			1st			:	2nd		
Traverse>			Sie	de			Both	om	
Trial>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		pp				рр	Y	
1	0.50	648	617	660	641.7	726	685	692	701.0
2	1.24	649	627	628	634.7	678	673	726	692.3
3	2.29	661	642	615	639.3	696	695	701	697.3
4	3.82	669	655	640	654.7	694	648	689	677.0
Center	5.91	697	703	713	704.3	677	678	682	679.0
5	8.00	757	705	671	711.0	698	691	703	697.3
6	9.52	753	731	747	743.7	737	735		732.3
7	10.57	771	774	738	761.0	661	736	670	689.0
8	11.31	866	754	643	754.3	726	665	760	717.0
Averages —	>	719.0	689.8	672.8	693.9	699.2	689.6	705.3	698.0
		All Mean	<u>ppb</u> 695.94	Dev	/. from mean	<u>Center 2/3</u> Mean	<u>Side</u> 692.67		<u>All</u> 693.79
		Min Point	634.67		_8.8%	Std. Dev.	50.65	18.38	36.63
		Max Point	761.00			COV as %	7.3	г	5.3
Avg. Conc.	696.479		701.00		Instuments		7.0	2.0	510
		PP-			B&K 1302 G		1788615		Cat2 M& TE
		Start	Finish			alc SN T953512030			12/17/2012
Tracer tank p	ressure	100	100	psiq	Fisher Scier	HE. CN 00020010			
Injection flow	/meter	50				1000 200 200 200 10			12/7/2012
Stack Temp		50	50	sccm		1000 50 90936818			12/7/2012
Older remp		50	50 61.9						12/7/2012
Mean stack v	elocity			sccm					12/7/2012
•	-	59.8	61.9	sccm °F					12/7/2012
Mean stack v	wmeter	59.8 3774	61.9 3737	sccm °F 1pm	800				12/7/2012
Mean stack v Sampling flo	wm eter ssure	59.8 3774 5	61.9 3737 5	sccm °F fpm Ipm	800				12/7/2012
Mean stack v Sampling flo Ambient pres	wmeter ssure nidity	59.8 3774 5 1000	61.9 3737 5 1000	sccm °F fpm Ipm mbar	800		Lan	1	12/7/2012
Mean stack v Sampling flo Ambient pres Ambient hum	wm eter ssure hidity hp	59.8 3774 5 1000 50%	61.9 3737 5 1000 41%	sccm °F fom Ipm mbar RH	70				
Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem	wmeter ssure hidity hp prrection	59.8 3774 5 1000 50% 67.1	61.9 3737 5 1000 41% 71.6	sccm °F forn Iom mbar RH °F					
Mean stack w Sampling flo Ambient pres Ambient hum Ambient Terr B&K vapor co	wmeter ssure hidity hp prrection	59.8 3774 5 1000 50% 67.1	61.9 3737 5 1000 41% 71.6	sccm °F Ipm Ipm RH °F Y/N	700				
Mean stack w Sampling flo Ambient pres Ambient hum Ambient Terr B&K vapor co	wm eter ssure hidity p prrection	59.8 3774 5 1000 50% 67.1 Y	61.9 3737 5 1000 41% 71.6 Y 9,-3,5,0,2	sccm °F Ipm Ipm RH °F Y/N	700 600 50				
Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	wm eter ssure hidity p prrection	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1	61.9 3737 5 1000 41% 71.6 Y 9,-3,5,0,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700				
Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	wm eter ssure hidity pprection amples	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1	61.9 3737 5 1000 41% 71.6 Y 9,-3,5,0,2	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 50 P 9 40 b				
Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	wm eter ssure hidity p porrection amples r checked:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012	61.9 3737 5 1000 41% 71.6 Y 9,-3,5.0,2 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 50 P p 40				
Mean stack v Sampling to Ambient pres Ambient num Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	wm eter ssure hidity pprection amples	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012	61.9 3737 5 1000 41% 71.6 Y 9,-3,5.0,2 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 50 P 9 40 b				
Mean stack v Sampling to Ambient pres Ambient num Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	wm eter ssure hidity p porrection amples r checked:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012	61.9 3737 5 1000 41% 71.6 Y 9,-3,5.0,2 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 p 40 b 300				
Mean stack v Sampling to Ambient pres Ambient num Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	wm eter ssure hidity p porrection amples r checked:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012	61.9 3737 5 1000 41% 71.6 Y 9,-3,5.0,2 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 p 40 b 300				
Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	wm eter ssure hidity p porrection amples r checked:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012	61.9 3737 5 1000 41% 71.6 Y 9,-3,5.0,2 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 p 40 b 300				12/7/2012
Mean stack v Sampling to Ambient pres Ambient num Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	wm eter ssure hidity p porrection amples r checked:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012	61.9 3737 5 1000 41% 71.6 Y 9,-3,5.0,2 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 p 40 b 300				
Mean stack v Sampling to Ambient pres Ambient num Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	wm eter ssure hidity p porrection amples r checked:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012	61.9 3737 5 1000 41% 71.6 Y 9,-3,5.0,2 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 p 40 b 300				
Mean stack v Sampling fo Ambient pres Ambient hum Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	wmeter ssure hidity tp porrection amples r checked: Mean Velocity	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012 y at Bottom 8	61.9 3737 5 1000 41% 71.6 Y 9,-3,5,0,2 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	700 600 P 40 b 30 20 10	De			
Mean stack v Sampling fo Ambient pres Ambient num Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes: CA 11/1/12 Entries made	wmeter ssure hidity tp porrection amples r checked: Mean Velocity e by:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012 y at Bottom 8 Carmen Arim	61.9 3737 5 1000 41% 71.6 Y 9,-3,5,0,2 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	700 9 40 9 40 9 30 20 10 10	Bottor ata Review performe	n ed by:		
Mean stack v Sampling fo Ambient pres Ambient hum Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes: CA 11/1/12	wmeter ssure hidity tp porrection amples r checked: Mean Velocity e by:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012 y at Bottom 8 Carmen Arim Signature on	61.9 3737 5 1000 41% 71.6 Y 9,-3,5,0,2 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	700 600 P 40 b 30 20 10	Bottor ata Review performe		11/27/2012	
Mean stack v Sampling fo Ambient pres Ambient hum Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes: CA 11/1/12 Entries made	wmeter ssure hidity tp porrection amples r checked: Mean Velocity e by:	59.8 3774 5 1000 50% 67.1 Y 7,2,3,-3,-1 5 10/31/2012 y at Bottom 8 Carmen Arim	61.9 3737 5 1000 41% 71.6 Y 9,-3,5,0,2 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	700 9 40 9 40 9 30 20 10 10	Bottor ata Review performe	n ed by:	11/27/2012	

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date			Fan C	configuration				
		MSP, CA			Fan Setting		Hz		
	Stack Dia.		in.		Stack Temp				
	Stack X-Area			St	art/End Time				
	Test Port			-	nter 2/3 from	1.09	to:	10.80	
Distance t	b disturbance		inches		in Center 2/3		to:	7	
	urem ent units			-		Port 2 Bottom			
Order ->		<u></u>	1st				2nd		
Traverse>			Sic	de		-	Both	กา	
Trial —->		1	2		Mean	r 1	2	3	Mean
Point	Depth, in.		pp			· · ·	pp		
1	0.50	764	765	777	768.7	928	921	878	909.0
2	1.24		801	816	795.0		1030	911	942.0
3	2.29	853	835	867	851.7	863	864	877	868.0
4	3.82		868	812	848.3	-	849	887	878.0
Center	5.91	899	978	814	897.0	-	893	877	885.0
5	8.00		984	931	948.7	942	915	843	900.0
6	9.52		1030	1080	1028.7	932	872	865	889.7
7	10.57	1003	1030	1080	1028.7		857	972	934.3
8	11.31	1000	992	1060	1018.7	879	826	880	861.7
Averages —	>	895.9	921.4	913.0	910.1	909.6	891.9	887.8	896.4
Aleiages		000.0	521.4	310.0	510.1	303.0	031.5	007.0	030.4
		All	ppb	Dev	. from mean	Center 2/3	Side	Bottom	All
		Mean	903.26			Mean	914.81	899.57	907.19
		Min Point	768.67		-14 9%	Std. Dev.	92.62	28.23	66.26
		Max Point	1034.33			COV as %	10.1	3.1	7.3
Avg. Conc.	904.792		1001.00		Instuments		10.1	0.1	1.0
g		FF-			B&K 1302 G		1788615		Cat2 M& TE
		Start	Finish			alc SN T953512030	001		12/17/2012
Tracer tank p	ressure	100	100	psiq		ntific SN 90936818			12/7/2012
Injection flow		50	50	sccm					
Stack Temp		50.7	55.4	°F					
Mean stack v	elocity	2921	2985	iom.					
Sampling to	-			•					
• •		5	5	e orn					
Ambient pres		5 1006	5 1006	lpm mbar	4000				
Ambient pres Ambient hum	ssure	1006	1006	mbar	1200	'I			
Ambient hum	ssure nidity	1006 57%	1006 45%	mbar RH	1200		1	1	
Ambient hur Ambient Terr	ssure nidity np	1006 57% 61.7	1006 45% 68.9	, mbar RH °F	1200			1	
Ambienthum AmbientTem B&K vapor co	ssure nidity np prection	1006 57% 61.7 Y	1006 45% 68.9 Y	nbar RH ⁰F Ƴ∕N				11.	
Ambient hurr Ambient Terr	ssure nidity np prection	1006 57% 61.7 Y -3, -5, -7, -6,	1006 45% 68.9 Y	, mbar RH °F					
Ambient hum Ambient Tem B&K vapor co Back-Gd gas	ssure nidity np prrection	1006 57% 61.7 Y -3, -5, -7, -6, -6	1006 45% 68.9 Y 1,1,4,-3,1	mbar RH °F Y/N ppb	1000				
Ambienthum AmbientTem B&K vapor co	ssure nidity np prrection	1006 57% 61.7 Y -3, -5, -7, -6,	1006 45% 68.9 Y 1,1,4,-3,1	nbar RH ⁰F Ƴ∕N	1000 800 P				
Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	ssure nidity 1p orrection 3 amples	1006 57% 61.7 Y -3, -5, -7, -6, -6 5	1006 45% 68.9 Y 1,1,4,-3,1	mbar RH °F Y/N ppb	1000 800 P p 60				
Ambient hum Ambient Tem B&K vapor co Back-Gd gas	ssure nidity 1p orrection 3 amples	1006 57% 61.7 Y -3, -5, -7, -6, -6	1006 45% 68.9 Y 1,1,4,-3,1	mbar RH °F Y/N ppb	1000 800 p 60 b				
Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	ssure nidity 1p porrection 3 amples r checked:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P p 60				
Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	ssure nidity 1p orrection 3 amples	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P 60 b 40				
Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	ssure nidity 1p porrection 3 amples r checked:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P 60 b 40				
Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	ssure nidity 1p porrection 3 amples r checked:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P 60 b 40				
Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	ssure nidity 1p porrection 3 amples r checked:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P 60 b 40				Side
Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	ssure nidity 1p porrection 3 amples r checked:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P 60 b 40				Side
Ambient hum Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	ssure nidity 1p porrection 3 amples r checked:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P 60 b 40				Side
Ambient hum Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	ssure nidity tp porrection amples r checked: Mean Velocity	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012 y at Bottom 8	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P 60 b 400 200	De			Side
Ambient hum Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes: CA 11/2/12 Entries made	ssure hidity porrection amples r checked: Mean Velocity e by:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012 y at Bottom 8 Carmen Arin	1006 45% 68.9 Y 1,1,4,-3,1 5 8	mbar RH °F Y/N ppb	1000 800 P 60 b 400 200 Technical D	Bottom ata Review performed	ed by:		Side
Ambient hum Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	ssure hidity porrection amples r checked: Mean Velocity e by:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012 y at Bottom 8 Carmen Arin Signature on	1006 45% 68.9 Y 1,1,4,-3,1 5	mbar RH °F Y/N ppb	1000 800 P 60 b 400 200	Bottom ata Review performed		11/27/2012	Side
Ambient hum Ambient Terr B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes: CA 11/2/12 Entries made	ssure hidity porrection amples r checked: Mean Velocity e by:	1006 57% 61.7 Y -3, -5, -7, -6, -6 5 10/31/2012 y at Bottom 8 Carmen Arin	1006 45% 68.9 Y 1,1,4,-3,1 5 8	mbar RH °F Y/N ppb	1000 800 P 60 b 400 200 Technical D	Bottom ata Review performed	ed by:	11/27/2012	Side

Rev. 0			TRACER GAS			1			
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date			Fan C	onfiguration				
	Testers	MSP, CA			Fan Setting		Hz	•	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0		St	art/End Time		5	-	
	Test Port	1			nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	n Center 2/3		to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Center			
Order>			1st		-		2nd		
Traverse>			Sic	de			Botte	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		рр	b			ppl	b	
1	0.50	885	899	864	882.7	856	868	898	874.0
2	1.24	893	904	891	896.0	884	847	851	860.7
3	2.29	881	935	915	910.3	895	861	856	870.7
4	3.82	883	902	915	900.0	891	882	896	889.7
Center	5.91	869	913	900	894.0	880	917	907	901.3
5	8.00	903	887	919	903.0	927	933	911	923.7
6	9.52	858	906	857	873.7	913	917	920	916.7
7	10.57	939	892	911	914.0	913	948	968	943.0
8	11.31	865	863	864	864.0		931	965	947.0
Averages —	>	886.2	900.1	892.9	893.1	900.4	900.4	908.0	903.0
		All	ppb	Dev	/. from mean		Side		ᆁ
		Mean	898.02			Mean	898.71	900.81	899.76
		Min Point Max Point	860.67 947.00			Std. Dev. COV as %	13.20 1.5	29.43 3.3	21.94
Avg. Conc.	898.063		347.00		instuments		1.0	3.3	2.4
Alg. Cont.	000.000	PP0							
					B&K 1302 G	as Analyzer SN	1788615		Cat2 M& TE
		Start	Finish			as Analyzer SN alc SN T95351203	1788615 001		Cat2 M&TE 12/17/2012
Tracer tank p	pressure	Start 100	Finish 100	psiq	TSI VelociCa	as Analyzer SN alc SN T95351203 htific SN 90936818			Cat2 M&TE 12/17/2012 12/7/2012
Tracer tank p Injection flow		·		psig sccm	TSI VelociCa	alc SN T95351203			12/17/2012
•		100	100		TSI VelociCa	alc SN T95351203			12/17/2012
I njection flow	vm eter	100 50	100 50	sccm	TSI VelociCa	alc SN T95351203			12/17/2012
I njection flow Stack Temp	vm eter velocity	100 50 55.4	100 50 60.5	sccm °F	TSI VelociCa	alc SN T95351203			12/17/2012
I njection flow Stack Temp Mean stack v	vm eter velocity wm eter	100 50 55.4 2985	100 50 60.5 2998	sccm °F fpm	TSI VelociCa Fisher Scier	alc SN T95351203 htific SN 90936818		_1	12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo	vmeter velocity owmeter ssure	100 50 55.4 2985 5	100 50 60.5 2998 5	sccm °F 1pm Ipm	TSI VelociCa Fisher Scier	alc SN T95351203 httffic SN 90936818		1	12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	vmeter velocity swmeter ssure nidity	100 50 55.4 2985 5 1006	100 50 60.5 2998 5 1007	sccm °F fpm Ipm mbar	TSI VelociCa Fisher Scier	alc SN T95351203 httffic SN 90936818		1	12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum	vm eter velocity wwm eter ssure nidity np	100 50 55.4 2985 5 1006 44%	100 50 60.5 2998 5 1007 39%	sccm °F fom Ipm mbar RH	TSI VelociCa Fisher Scier	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wwm eter ssure nidity np orrection	100 50 55.4 2985 5 1006 44% 67.1	100 50 60.5 2998 5 1007 39% 71.6	sccm °F fom Iom mbar RH °F	TSI VelociCa Fisher Scier 1000 900 800	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wwm eter ssure nidity np orrection	100 50 55.4 2985 5 1006 44% 67.1 Y	100 50 60.5 2998 5 1007 39% 71.6	sccm °F Ipm Ipm RH °F Y/N	TSI VelociCa Fisher Scier 1000 900 800 70	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wwm.eter ssure hidity hp omection	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6,	100 50 60.5 2998 5 1007 39% 71.6 Y 6,5,4,3,1	sccm °F Ipm Ipm RH °F Y/N	TSI VelociCa Fisher Scier 1000 900 800	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wwm.eter ssure hidity hp omection	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5	100 50 60.5 2998 5 1007 39% 71.6 Y 6,5,4,3,1	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 60	alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wwm eter ssure nidity np orrection s am ples	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5	100 50 60.5 2998 5 1007 39% 71.6 Y 6,5,4,3,1	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 70 90 800 70 800 70	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012	100 50 60.5 2998 5 1007 39% 71.6 Y 6.5,4,3,1 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 0 9 50 0 9 50 0 9 40	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure nidity np orrection s am ples	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012	100 50 60.5 2998 5 1007 39% 71.6 Y 6.5,4,3,1 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 900 900 800 700 900 800 700 900 800 700 900 800 700 900 800 700 800 700 800 700 800 700 800 8	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012	100 50 60.5 2998 5 1007 39% 71.6 Y 6.5,4,3,1 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 900 900 800 700 900 800 700 900 800 700 900 800 700 800 800 700 800 800 700 800 8	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012	100 50 60.5 2998 5 1007 39% 71.6 Y 6.5,4,3,1 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 900 900 800 700 900 800 700 900 800 700 900 800 700 800 800 700 800 800 700 800 8	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012	100 50 60.5 2998 5 1007 39% 71.6 Y 6.5,4,3,1 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 900 900 800 700 900 800 700 900 800 700 900 800 700 800 800 700 800 800 700 800 8	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012	100 50 60.5 2998 5 1007 39% 71.6 Y 6.5,4,3,1 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 900 900 800 700 900 800 700 900 800 700 900 800 700 800 800 700 800 800 700 800 8	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling to Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012	100 50 60.5 2998 5 1007 39% 71.6 Y 6.5,4,3,1 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 900 900 800 700 900 800 700 900 800 700 900 800 700 800 800 700 800 800 700 800 8	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor cc Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked:	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012 y at Bottom 8	100 50 60.5 2998 5 1007 39% 71.6 Y 6,5,4,3,1 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1000 900 800 700 p 50 b 400 300 20 10	alc SN T95351203 httffic SN 90936818			
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked: Mean Velocity	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012 y at Bottom 8 Carmen Arim	100 50 60.5 2998 5 1007 39% 71.6 Y 6,5,4,3,1 5 3 3 1005 1007 1007 39% 71.6 1007 100	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 1000 900 800 700 p 50 b 400 300 20 10 10 10 10 10 10 10 10 10 10 10 10 10	alc SN T95351203 http://www.secondary.com/se	001		
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor cc Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked: Mean Velocity	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012 y at Bottom 8 Carmen Arin Signature on	100 50 60.5 2998 5 1007 39% 71.6 Y 6,5,4,3,1 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 1000 900 800 700 p 50 b 400 300 20 10	alc SN T95351203 http://www.secondary.com/se		11/28/2012	
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked: Mean Velocity	100 50 55.4 2985 5 1006 44% 67.1 Y -7, -6, -8, -6, -5 5 10/31/2012 y at Bottom 8 Carmen Arim	100 50 60.5 2998 5 1007 39% 71.6 Y 6,5,4,3,1 5 3 3 1005 1007 1007 39% 71.6 1007 100	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 1000 900 800 700 p 50 b 400 300 20 10 10 10 10 10 10 10 10 10 10 10 10 10	alc SN T95351203 http://www.secondary.com/se	001		

Rev. 0			TRACER GAS	S TRAVERSE					
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date		-	Fan C	configuration				
	Testers	MSP, CA			Fan Setting		Hz	-	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0	in. ²	St	art/End Time		<u> </u>		
	Test Port	1		Ce	nter 2/3 from	1.09	to:	10.80	
Distance	lo disturbance	123.5	inches	Points i	in Center 2/3	2	to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Center	_		
Order>			1st				2nd		
Traverse>			Sie	de			Boti	om	
Trial>		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		pp	¥			PP	·Y	
1	0.50	910	999	934	947.7	892		851	866.7
2	1.24	925	953	951	943.0			843	861.3
3	2.29	909	948	954	937.0				872.0
4	3.82	965	953	917	945.0		4	4	892.7
Center	5.91	919	922	947	929.3	913		915	913.0
5	8.00	905	914	882	900.3				893.0
6	9.52	866	857	874	865.7	896			927.7
7	10.57 11.31	851 813	839 911	856 889	848.7 871.0				920.7 936.0
	>	895.9	911 921.8	911.6	909.7	894.2	887 903.0	952 897.1	936.U 898.1
Averages —	/	090.9	921.0	911.0	909.7	0942	903.0	097.1	030.1
		All	ppb	Dev	v. from mean	Center 2/3	Side	Bottom	Ali
		Mean	903.93	<u></u>	. Iom moun	Mean	909.86		903.52
		Min Point	848.67		-6.1%	Std. Dev.	39.24		32.21
		Max Point	947.67			COV as %	4.3		3.6
Avg. Conc.	901.771	ppb			Instuments	Used:			
					B&K 1302 G	as Analyzer SN	1788615		Cat2 M& TE
		Start	Finish	_	TSI VelociCa	alc SN T95351203	3001		12/17/2012
Tracer tank p	ressure	100	100	psig	Fisher Scier	ntific SN 90936818	}		12/7/2012
Injection flow	/meter	50	50	sccm					
Stack Temp		60.5	63.5	۴F					
Mean stack v	elocity	2998	2997	1pm					
Sampling flo		5	5	lpm –		and the second se		-	
Ambient pres		1007	1007	mbar	1000				
Ambienthum	-	38%	35%	RH	90				
Ambient Terr	•	71.6	75.2	۴F					
B&K vapor co		Y	Y	Y/N	80				
Back-Gd gas	i			ppb	70				
		0,-2,2,-2,-1 5	9,6,7,5,0.1 5	_	_ 60	0			
No. Bk-Gd sa	ampies	5	5	n	P				
Gas analyze	r abaakad:	10/31/2012							
Gas analyze	GREGNEU.	10/31/2012			. b ₄₀				
Notes:	Mean Velocity	v at Bottom 8	2		- 30	ю - 🖊 - н			
NOL 3.	Wear velocity		,		- 20				
					- 1	00			
CA 11/2/12					· "		5		Sida
					-	0	- -		Side
					-	Botto	ım		
					-	DOIL			
Entries mad	e by:	Carm en Arin	nescu		Technical D	ata Review perform	ned by:		
Signature/da			file with orig	inal	Signature/da		gbj	11/28/2012	
-		11/2/2012	J		-				

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM	1			
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date			Fan C	onfiguration				
	Testers				Fan Setting		Hz		
	Stack Dia.	11.89	in.	_	Stack Temp		deg F	-	
	Stack X-Area	111.0		St	art/End Time		3.	Ī	
	Test Port			-	nter 2/3 from		to:	10.80	
Distance	to disturbance	123.5	inches		n Center 2/3		-	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Far			
Order>			1st	1	•		2nd		
Traverse>			Sid	de			Bott	om	
Trial —->		1	2	3	Mean	1 1	2	3	Mean
Point	Depth, in.		рр	b			рр	b	
1	0.50	837	867	859	854.3	945	945	964	951.3
2	1.24	851	831	837	839.7	960	885	966	937.0
3	2.29	866	875	861	867.3	895	987	974	952.0
4	3.82	882	854	899	878.3	888	883	900	890.3
Center	5.91	852	856	858	855.3	912	875	906	897.7
5	8.00	923	918	888	909.7	854	847	859	853.3
6	9.52	929	934	920	927.7	892	892	839	874.3
7	10.57	984	970	984	979.3	837	888	892	872.3
8	11.31	963	944	1001	969.3	904	915	842	887.0
Averages —	>	898.6	894.3	900.8	897.9	898.6	901.9	904.7	901.7
		All	ppb	-	/. from mean		Side		
		Mean Min Point	899.80		C 70/	Mean	893.90		895.31
		Max Point	839.67 979.33			Std. Dev. COV as %	48.42 5.4		40.94 4.6
Avg. Conc.	902.708		319.33		0.0%		J.4	4.0	4.0
rug. conc.	002.100	PP-5					1700015		
					B&K 1302 G	ias Analyzer – SN	1788615		Cat2 M& IE
		Start	Finish			as Analyzer SN alc SN T95351203	1788615 3001		Cat2 M&TE 12/17/2012
Tracer tank p	pressure	Start 100	Finish 100	psiq	TSI VelociC	as Analyzer SN alc SN T95351203 htific SN 90936818	3001		12/17/2012 12/7/2012
Tracer tank p Injection flow				psig sccm	TSI VelociC	alc SN T95351203	3001		12/17/2012
-		100	100		TSI VelociC	alc SN T95351203	3001		12/17/2012
I njection flow	vm eter	100 50	100 50	sccm	TSI VelociC	alc SN T95351203	3001		12/17/2012
I njection flow Stack Temp	vm eter velocity	100 50 66	100 50 69	sccm °F	TSI VelociC	alc SN T95351203	3001		12/17/2012
injection flow Stack Temp Mean stack v	vm eter velocity wm eter	100 50 66 3005	100 50 69 2952	sccm °F Ipm	TSI VelociC	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo	vmeter velocity owmeter ssure	100 50 66 3005 5	100 50 69 2952 5	sccm °F 1pm Ipm	TSI VelociC	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres	vmeter velocity swmeter ssure nidity	100 50 66 3005 5 1011	100 50 69 2952 5 1012	sccm °F fpm Ipm mbar	TSI VelociC: Fisher Scier 1200	alc SN T95351203 httific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hurr	vm eter velocity wwm eter ssure nidity np	100 50 66 3005 5 1011 50%	100 50 69 2952 5 1012 17%	sccm °F 1pm Ipm mbar RH	TSI VelociC	alc SN T95351203 httific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack w Sampling to Ambient pres Ambient hum Ambient Tem	vm eter velocity wwm eter ssure nidity np orrection	100 50 66 3005 5 1011 50% 68.0	100 50 69 2952 5 1012 17% 74	sccm °F Ipm Ipm Mbar RH °F Y/N	TSI VelociC: Fisher Scier 1200	alc SN T95351203 httific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wwm eter ssure nidity np orrection	100 50 66 3005 5 1011 50% 68.0 Y	100 50 69 2952 5 1012 17% 74 Y	sccm °F Ipm Ipm Mbar RH °F Y/N	TSI VelociC: Fisher Scier 1200	alc SN T95351203 httific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wwm.eter ssure hidity hp omection	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,-	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7	sccm °F Ipm Ipm Mbar RH °F Y/N	TSI VelociC. Fisher Scier 1200 1000 800	alc SN T95351203 httific SN 90936818	3001	1	12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wwm.eter ssure hidity hp omection	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC: Fisher Scier 1200	alc SN T95351203 ntific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wwm eter ssure nidity np orrection s am ples	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 80 P	alc SN T95351203 ntific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 80 P p 60	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 80 P p 60 b	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 80 P 60 b 40	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 80 P 60 b 40	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 80 P 60 b 40	alc SN T95351203 htific SN 90936818	3001		12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 80 P 60 b 40	alc SN T95351203 httific SN 90936818	3001		
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer	vm eter velocity wwm eter ssure nidity np orrection s am ples r checked:	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 80 P 60 b 40	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked: Mean Velocity	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012 y at Bottom 8	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5 3	sccm °F Ipm Ipm Mbar RH °F Y/N ppb	TSI VelociC. Fisher Scier 1200 1000 800 P 60 b 40 21	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked: Mean Velocity	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012 y at Bottom 8 Carmen Arim	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociC. Fisher Scier 1200 1000 P 60 b 40 20 21	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzee Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked: Mean Velocity	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012 y at Bottom &	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociC. Fisher Scier 1200 1000 800 P 60 b 40 21	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyzer Notes:	vm eter velocity wwm eter ssure nidity np orrection s amples r checked: Mean Velocity	100 50 66 3005 5 1011 50% 68.0 Y -3,-5,-8,-8,- 10 5 10/31/2012 y at Bottom 8 Carmen Arim	100 50 69 2952 5 1012 17% 74 Y 10,10,0.3,2, 0.7 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociC. Fisher Scier 1200 1000 P 60 b 40 20 21	alc SN T95351203 httific SN 90936818			

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date		-	Fan C	onfiguration				
	Testers	EA. CA			Fan Setting		Hz	-	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0	in. ²	St	art/End Time			-	
	Test Port			Ce	nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	123.5	inches	Points i	n Center 2/3		to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Near			
Order>			2nd		-		1st		
Traverse>			Sic	le			Both	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		рр	b			рр	b	
1	0.50	975	937	985	965.7	863	890	903	885.3
2	1.24	942	973	953	956.0	856	900	924	893.3
3	2.29	976	915	968	953.0	919	925	922	922.0
4	3.82	959	964	965	962.7	906	907	938	917.0
Center	5.91	928	955	956	946.3	963	962	968	964.3
5	8.00	900	911	926	912.3	973	957	975	968.3
6	9.52	909	853	902	888.0	950	950	929	943.0
7	10.57	815	867	904	862.0	939	958	951	949.3
8	11.31	805	824		814.5	902	932	986	940.0
Averages —	>	912.1	911.0	944.9	917.8	919.0	931.2	944.0	931.4
		All	ppb	Dev	. from mean	Center 2/3	Side	Bottom	셴
		Mean	924.62			Mean	925.76	936.76	931.26
		Min Point	814.50		-11.9%	Std. Dev.	38.97	27.23	32.80
		Max Point	968.33		4.7%	COV as %	4.2	2.9	3.5
Avg. Conc.	920.781	ppb			Instuments				
					B&K 1302 G		1788615		Cat2 M&TE
		Start	Finish			alc SN T95351203	001		12/17/2012
Tracer tank p		100	100	psig	Fisher Scier	ntific SN 90936818			12/7/2012
Injection flow	vmeter	50	50	sccm					
Stack Temp		69	69.5	۴F					
Mean stack v	-	2952	2902	fpm -		~			
Sampling fo		5	5	lpm		and a state of the			
Am bient pres		1012	1012	mbar	1000		-		
Ambienthum	-	24%	40%	RH	900				
Ambient Ten	•	73.4	70.7	۴F					
B&K vapor co		Y	Y	Y/N	80				
Back-Gd gas	5	-8 ,-6, -2, -7,		ppb	70				
		-5	9, 6, 6, 3, 2		60				
No. Bk-Gd sa	amples	-5 5	9, 6, 6, 3, 2 5	n	р ⁶⁰				
	•	5		Π	р р 50				
No. Bk-Gd sa Gas analyze	•	<u></u>		n	P	0			
Gas analyze	r checked:	5 10/31/2012	5	n	р р 50 р 40				
Gas analyze	•	5 10/31/2012	5	n	р р 50 р 40 30				
Gas analyze	r checked:	5 10/31/2012	5	n 	р р 50 b 40 30				
Gas analyze Notes:	r checked:	5 10/31/2012	5	n 	р р 50 b 40 30				
Gas analyze	r checked:	5 10/31/2012	5	n	р р 50 b 40 30				Side
Gas analyze Notes:	r checked:	5 10/31/2012	5	n	р р 50 b 40 30				Side
Gas analyze Notes:	r checked:	5 10/31/2012	5	n	р р 50 b 40 30				Side
Gas analyze	r checked: Mean Velocit	5 10/31/2012 y at Bottom 8	5	n	P p 50 b 40 30 20	D D D D D D D D D D D D D D D D D D D			Side
Gas analyze Notes: CA 11/5/12 Entries m ad	r checked: Mean Velocity e by:	5 10/31/2012 y at Bottom 8 Carmen Arim	5 3 nescu		P p 50 b 40 30 20				Side
Gas analyze	r checked: Mean Velocity e by:	5 10/31/2012 y at Bottom 8 Carmen Arim	5		P p 50 b 40 30 20	e o o o o o o o o o o o o o o o o o o o		11/28/2012	Side
Gas analyze Notes: CA 11/5/12 Entries m ad	r checked: Mean Velocity e by:	5 10/31/2012 y at Bottom 8 Carmen Arim	5 3 nescu		P p 50 b 40 30 20 10	e o o o o o o o o o o o o o o o o o o o	ed by:	11/28/2012	Side
Gas analyze Notes: CA 11/5/12 Entries mad	r checked: Mean Velocity e by:	5 10/31/2012 y at Bottom 8 Carmen Arim Signature on	5 3 nescu		P p 50 b 40 30 20 10	e o o o o o o o o o o o o o o o o o o o	ed by:	11/28/2012	Side

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM	1			
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date	11/5/2012	-	Fan C	onfiguration				
		MSP,CA			Fan Setting		Hz		
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0		St	art/End Time			Ī	
	Test Port	1			nter 2/3 from	1.09	to:	10.80	
Distance	lo disturbance		inches		n Center 2/3			7	
	urement units		meneo	-	jection Point		ω.	1	
Order ->			1st				2nd		
Traverse>			Sie	l de			Both		
Trial>		1	2		Mean	r 1	2		Mean
Point	Depth, in.	•	pp			•	pp		modif
1	0.50	938	996	998	977.3	864	883	Y	881.7
2	1.24	925	1010	955	963.3	942	899	915	918.7
- 3	2.29	998	970	982	983.3	925	906	930	920.3
4	3.82	948	989	949	962.0		909	921	911.7
Center	5.91	951	931	953	945.0		906	951	925.3
5	8.00	884	910	927	907.0	938	924	916	926.0
6	9.52	875	860	874	869.7	938	959	924	940.3
7	10.57	850	858	888	865.3	966	916	939	940.3
8	11.31	821	817	827	821.7	923	915	959	932.3
Averages —	>	910.0	926.8	928.1	921.6	924.4	913.0	928.1	921.9
ruelageo	-	010.0	320.0	520.1	521.0	321.1	010.0	520.1	921.9
		All	ppb	Dev	from mean	Center 2/3	Side	Bottom	All
		Mean	921.74			Mean	927.95	926.10	927.02
		Min Point	821.67		-10.9%	Std. Dev.	47.48	10.82	33.10
		Max Point	983.33			COV as %	5.1	1.2	3.6
Avg. Conc.	920.063				Instuments				
3		FF-			B&K 1302 G		1788615		Cat2 M& TE
		Start	Finish		TSI VelociCa	alc SN T95351203	001		12/17/2012
Tracer tank p	ressure	100	100	psig	Fisher Scier	ntific SN 90936818			12/7/2012
Injection flow	rmeter	50	50	sccm					
Stack Temp		69.8	70.3	°F					
Mean stack v	elocity	2931	2899	1pm					
Sampling to	wmeter	5	5	lpm		and the second se			
Ambientpres	ssure	1012	1012	mbar	1000				
Ambienthum	nidity	45%	43%	RH					
Ambient Terr	י קו	69.8	69.8	°F	900	, t _ 1			
B&K vapor co	orrection	Y	Y	Y/N	80				
Back-Gd gas	5	-4,-5,-2,-3,-		ppb	70				
-		6	10,6,5,0,-3						
No. Bk-Gd sa	amples	5	5	n	р 60 р				
	-			8	p 50	0			
Gas analyze	r checked:	10/31/2012			b 40				
-									
Notes:	Mean Velocity	/ at Bottom 8	}		30				
					20	ю / / /			
					•				
					10)0 + / ~			
					10				Side
CA 11/5/12					10				Side
					10	0			Side
					10				Side
CA 11/5/12	e by:	Carmen Arim	escu			0 Botto	m		Side
CA 11/5/12 Entries made		Carm en Arim Signature on		inal	Technical D	0 Botto	ed by:	11/28/2012	Side
CA 11/5/12		Signature on		inal		0 Botto	m	11/28/2012	Side
CA 11/5/12 Entries made				inal	Technical D	0 Botto	ed by:	11/28/2012	Side

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date		•	Fan C	onfiguration				
		MSP,CA			Fan Setting		Hz		
	Stack Dia.	11.89	in.		Stack Temp			-	
	Stack X-Area	111.0		St	art/End Time		- J ·	Ī	
	Test Port				nter 2/3 from	1.09	to:	10.80	
Distance	to disturbance	-	inches		n Center 2/3		to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Bottom			
Order>			1st				2nd		
Traverse>			Sid	le			Both	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		рр	b			рр	b	
1	0.50	846	851	831	842.7	944	919	909	924.0
2	1.24	812	814	756	794.0	982	982	908	957.3
3	2.29	908	861	876	881.7	967	903	898	922.7
4	3.82	863	961	859	894.3	1000	893	900	931.0
Center	5.91	952	946	827	908.3	912	945	940	932.3
5	8.00	906	983	968	952.3	849	950	925	908.0
6	9.52	927	989	966	960.7	924	935	910	923.0
7	10.57	1020	1040	1080	1046.7	958	929	920	935.7
8	11.31	1020	1090	1020	1043.3	849	959	864	890.7
Averages —	>	917.1	948.3	909.2	924.9	931.7	935.0	908.2	925.0
		All	ppb	Dev	/. from mean		Side		셴
		Mean	924.93			Mean	919.71	930.00	924.86
		Min Point	794.00			Std. Dev.	78.40	15.12	54.51
		Max Point	1046.67			COV as %	8.5	1.6	5.9
Avg. Conc.	925.500	ррь			Instuments				
		Chard.	Caista		B&K 1302 G		1788615		Cat2 M&TE 12/17/2012
Tracer tank p		Start 100	Finish 100	psiq		alc SN T953512030 ntific SN 90936818	501		12/7/2012
•		50	50		Fisher Scier	10110 514 90936616			12/1/2012
Injection flow Stack Temp	nnelei	70	69.5	°F					
Mean stack \	nlocity	2950	2956	form					
Sampling fo	-	5	5	iom					
Ambientpres		1012	1011	mbar		and the second se			
Ambienthum		43%	41%	RH	1200				
Ambient Terr	-	68.9	68.9	°F			-		
B&K vapor co	•	Y	Y	' Y/N	1000				
Back-Gd gas				ppb					
buck ou gue	•	3,2,0,-2,-1	4.6.8.5.3	662	80				
IND DK-LID Si	ampies	5	5	n					
No. Bk-Gd sa	ampies	5	5	n	р л 60				
			5	Π	р ⁶⁰	0			
Gas analyze		5 10/31/2012	5	n	р 60 . b				
Gas analyze	r checked:	10/31/2012		n	р ⁶⁰				
Gas analyze		10/31/2012		n 	р 60 b 40	0			
Gas analyze	r checked:	10/31/2012		n 	р 60 b 40				7
Gas analyze Notes:	r checked:	10/31/2012		n 	р 60 b 40				540
Gas analyze	r checked:	10/31/2012		n 	р 60 b 40				Side
Gas analyze Notes:	r checked:	10/31/2012			р 60 b 40				Side
Gas analyze Notes:	r checked:	10/31/2012			р 60 b 40				Side
Gas analyze Notes: CA 11/5/12	r checked: Mean Velocit	10/31/2012	3		p 60 b 40				Side
Gas analyze Notes: CA 11/5/12 Entries made	r checked: Mean Velocity e by:	10/31/2012 y at Bottom &	3		p 60 b 40	bo bo bo bo bottor ata Review performed		11/28/2012	Side
Gas analyze	r checked: Mean Velocity e by:	10/31/2012 y at Bottom & Carmen Arim Signature on	3 nescu		p 60 b 40 20	bo bo bo bo bottor ata Review performed	n ed by:	11/28/2012	Side
Gas analyze Notes: CA 11/5/12 Entries made	r checked: Mean Velocity e by:	10/31/2012 y at Bottom &	3 nescu		p 60 b 40 20	bo bo bo bo bottor ata Review performed	n ed by:	11/28/2012	Side

Rev. 0			TRACER GAS	S TRAVERSE	DATA FORM				
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date			Fan C	onfiguration				
		MSP,CA			Fan Setting		Hz	-	
	Stack Dia.	11.89	in	1	Stack Temp			-	
	Stack X-Area	111.0		St	art/End Time		3.		
	Test Port			-	nter 2/3 from	1.09	to:	10.80	
Distance	lo disturbance	-	inches		in Center 2/3		to:	7	
	urement units		meneo	-		Port 2 Bottom		1	
Order ->		<u>pps 010</u>	1st	1			2nd		
Traverse>				de			Both	000	
Trial>		1	2		Mean	1	2		Mean
Point	Depth, in.	•	pp		ITRAGI	•	pp		inc an
1	0.50	818	818	864	833.3	938	988	Y	929.0
2	1.24	840	915	830	861.7	889	902	881	890.7
3	2.29	876	815	888	859.7	845	850	901	865.3
4	3.82	921	877	859	885.7	858	891	897	882.0
Center	5.91	868	893	839	877.3	848	955	911	904.7
5	8.00	895	944	962	933.7	888	898	822	904.7 869.3
6	9.52	979	944	962	938.3	837	855	822	854.3
7	9.52	979 987	1020	920	938.3	837	855		853.7
8	10.57	1010	964	1030	1000.0	937	844	922	803.7 909.0
	>	910.4	906.9	913.0	910.1	879.8	894.6	878.3	884.2
Averages —		510.4	300.3	313.0	310.1	0/ 3.0	034.0	070.3	004.2
		All	ppb	Der	/. from mean	Center 2/3	Side	Bottom	All
		Mean	897.17	De		Mean	908.05		891.17
		Min Point	833.33		-7 1%	Std. Dev.	51.58		41.26
		Max Point	1001.33			COV as %	5.7	r	4.6
Avg. Conc.	897.938		1001.00		Instuments		0.7	2.2	7.0
		FF-							
					B&K 1302 G	as Analyzer SN	1788615		Cat2 M& TE
		Start	Finish		B&K 1302 G TSI VelociCa		1788615		Cat2 M& TE
Tracer tank o	ressure	Start 100	Finish 100	osia	TSI VelociCa	alc SN T95351203			12/17/2012
Tracer tank p Injection flow		100	100	psig	TSI VelociCa				
I njection flow		100 50	100 50	sccm	TSI VelociCa	alc SN T95351203			12/17/2012
I njection flow Stack Temp	vm eter	100 50 69.5	100 50 67.4	sccm °F	TSI VelociCa	alc SN T95351203			12/17/2012
injection flow Stack Temp Mean stack v	vm eter velocity	100 50	100 50 67.4 2928	sccm °F Ipm	TSI VelociCa	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo	vm eter velocity wm eter	100 50 69.5 2956 5	100 50 67.4 2928 5	sccm °F fpm Ipm	TSI VelociCa Fisher Scier	alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack Sampling flo Ambient pres	vmeter velocity wmeter ssure	100 50 69.5 2956 5 1011	100 50 67.4 2928 5 1011	sccm °F fpm Ipm mbar	TSI VelociCa	alc SN T95351203 htific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum	vmeter velocity wmeter ssure nidity	100 50 69.5 2956 5 1011 41%	100 50 67.4 2928 5 1011 41%	sccm °F fpm Ipm	TSI VelociCa Fisher Scier	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wm eter ssure nidity 1p	100 50 69.5 2956 5 1011 41% 68.0	100 50 67.4 2928 5 1011 41% 67	sccm °F 1pm Ipm Mbar RH °F	TSI VelociCa Fisher Scier	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity hp porrection	100 50 69.5 2956 5 1011 41%	100 50 67.4 2928 5 1011 41%	sccm °F Ipm Ipm Mbar RH °F Y/N	TSI VelociCa Fisher Scier	alc SN T95351203			12/17/2012
Injection flow Stack Temp Mean stack w Sampling flo Ambient pres Ambient hum Ambient Tem	vm eter velocity wm eter ssure hidity hp porrection	100 50 69.5 2956 5 1011 41% 68.0 Y	100 50 67.4 2928 5 1011 41% 67 Y	sccm °F 1pm Ipm Mbar RH °F	TSI VelociCa Fisher Scier	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter ssure hidity hp prrection	100 50 69.5 2956 5 1011 41% 68.0	100 50 67.4 2928 5 1011 41% 67	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800	alc SN T95351203 httffic SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co	vm eter velocity wm eter ssure hidity hp prrection	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3	sccm °F Ipm Ipm Mbar RH °F Y/N	TSI VelociCi Fisher Scier 1200 1000 800 P	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling to Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa	vm eter velocity wm eter ssure hidity hp porrection s am ples	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P p 60	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor co Back-Gd gas	vm eter velocity wm eter ssure hidity hp porrection s am ples	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P p 60 b	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient nem Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p porrection s am ples r checked:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P p 60	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient nem Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity hp porrection s am ples	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P 60 b 400	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p porrection s am ples r checked:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P 60 b 400	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p porrection s am ples r checked:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P 60 b 400	alc SN T95351203 httffic SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p porrection s am ples r checked:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P 60 b 400	alc SN T95351203 httific SN 90936818			12/17/2012
Injection flow Stack Temp Mean stack v Sampling flo Ambient press Ambient hum Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p porrection s am ples r checked:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P 60 b 400	alc SN T95351203 httffic SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient hum Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze	vm eter velocity wm eter ssure hidity p porrection s am ples r checked:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012	100 50 67.4 2928 5 1011 41% 67 Y 9,6,7,5,3 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P 60 b 400	alc SN T95351203 httffic SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure hidity porrection amples r checked: Mean Velocity	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012 y at Bottom 8	100 50 67.4 2928 5 1011 41% 67 Y 9.6.7.5.3 5	sccm °F Ipm Ipm RH °F Y/N ppb	TSI VelociCa Fisher Scier 1200 1000 800 P 60 b 400 20	alc SN T95351203 httific SN 90936818			
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity e by:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012 y at Bottom 8 Carmen Arin	100 50 67.4 2928 5 1011 41% 67 Y 9.6,7,5,3 5 3 3	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 1200 1000 9 60 9 60 9 40 20 21	alc SN T95351203 httific SN 90936818	001		
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor cd Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity e by:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012 y at Bottom 8 Carmen Arin Signature on	100 50 67.4 2928 5 1011 41% 67 Y 9.6.7.5.3 5	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 1200 1000 800 P 60 b 400 20	alc SN T95351203 httific SN 90936818		11/28/2012	
Injection flow Stack Temp Mean stack v Sampling flo Ambient pres Ambient num Ambient Tem B&K vapor co Back-Gd gas No. Bk-Gd sa Gas analyze Notes:	vm eter velocity wwm eter ssure nidity 10 porrection amples r checked: Mean Velocity e by:	100 50 69.5 2956 5 1011 41% 68.0 Y 2,5,2,2,-2 5 10/31/2012 y at Bottom 8 Carmen Arin	100 50 67.4 2928 5 1011 41% 67 Y 9.6,7,5,3 5 3 3	sccm °F fpm Ipm mbar RH °F Y/N ppb n	TSI VelociCa Fisher Scier 1200 1000 9 60 9 60 9 40 20 21	alc SN T95351203 httific SN 90936818	001		

Rev. 0			TRACER GAS			I			
31-Jul-06	Site	LB-S1 Model			Run No.				
	Date	11/6/2012	·	Fan C	onfiguration				
	Testers	MSP,CA			Fan Setting		Hz	-	
	Stack Dia.	11.89	in.		Stack Temp		deg F	-	
	Stack X-Area	111.0	in. ²	St	art/End Time			-	
	Test Port				nter 2/3 from	1.09	to:	10.80	
Distance	b disturbance	123.5	inches	Points i	in Center 2/3		to:	7	
Meas	urem ent units	ppb SF6		In	jection Point	Port 2 Bottom			
Order>			1st		-		2nd		
Traverse>			Sic	de			Both	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		рр	b			рр	b	
1	0.50	761	788	716	755.0	913	683	791	795.7
2	1.24	768	827	727	774.0	757	769	792	772.7
3	2.29	745	745	752	747.3	848	779	841	822.7
4	3.82	778	823	681	760.7	873	797	690	786.7
Center	5.91	811	709	771	763.7	747	777	799	774.3
5	8.00	854	786	838	826.0	770	870	780	806.7
6	9.52	875	806	778	819.7	749	812	811	790.7
7	10.57	791	873	908	857.3	751	729	786	755.3
8	11.31	845	875	935	885.0	683	850	798	777.0
Averages —	>	803.1	803.6	789.6	798.7	787.9	785.1	787.6	786.9
		All	ppb	Der	/. from mean		Side		ᆁ
		Mean	792.80			Mean	792.67		789.83
		Min Point	747.33			Std. Dev.	41.41 5.2	22.51	32.16
Avg. Conc.	795.771	Max Point	885.00		Instuments	COV as %	J .2	2.9	4.1
Alg. Only.	155.111	PPD			B&K 1302 G		1765299	(Cat2 M& TE
		Start	Finish			alc SN T95351203			12/17/2012
Tracer tank p	ressure	100	100	psiq		ntific SN 90936818			12/7/2012
Injection flow		50	50	sccm					
Stack Temp		57.1	61	۴					
Mean stack v	elocity	2997	2934	form					
Sampling to	-	5	5	Ipm					
Ambientpres	ssure	1006	1005	mbar	900				
Ambient hum	nidity	37%	39%	RH	300				
Ambient Terr	י וף	67.1	67.1	۴F	800				
B&K vapor co	orrection	Y	Y	Y/N	70				
Back-Gd gas	i		10,6,	ppb	1				
		6,7,6,6,5	10,11,8		60				
No. Bk-Gd sa	amples	5	5	n	P 50	0			
				•	D				
Gas analyze	r checked:	11/6/2012			b 40				
					30	0			
	45 degree turi				20				
	Mean velocity	= bottom 8							7
					. 10		-		
CA 11/6//12						o - 🖉 🖉			Side
					.			- /	
						Botto	m		
					-				
Entries made		Carm en Arim				ata Review perform	ed by:		
Entries made Signature/da		Signature on		inal	Technical D Signature/da	ata Review perform		11/28/2012	
				inal		ata Review perform	ed by:	11/28/2012	

Rev. 0			TRACER CA	S TRAVERSE		1			
31-Jul-06	Site	LB-S1 Mode			Run No.				
	Date			Fan C	onfiguration				
		MSP,CA, JEF	:		Fan Setting		Hz		
	Stack Dia.	11.89			Stack Temp			-	
	Stack X-Area	111.0		St	art/End Time		3-	Ī	
	Test Port				nter 2/3 from	1.09	to:	10.80	
Distance t	o disturbance	-	inches		n Center 2/3		to:	7	
	urem ent units			-		Port 2 Bottom		-	
Order>			2nd		•		1st		
Traverse>			Sid	de			Both	om	
Trial —->		1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		рр	b			рр	b	
1	0.50	740	792	741	757.7	848	871	866	861.7
2	1.24	738	777	750	755.0	896	906	837	879.7
3	2.29	812	814	764	796.7	900	805	878	861.0
4	3.82	801	789	784	791.3	859	842	799	833.3
Center	5.91	828	808	806	814.0	789	773	823	795.0
5	8.00	841	840	849	843.3	775	798	838	803.7
6	9.52	872	888	914	891.3	783	776	712	757.0
7	10.57	883	831	859	857.7	825	754	756	778.3
8	11.31	783	923	863	856.3	825	781	719	775.0
Averages —	>	810.9	829.1	814.4	818.1	833.3	811.8	803.1	816.1
		All	ppb	Dev	/. from mean		Side		셴
		Mean	817.11			Mean	821.33		818.38
		Min Point	755.00			Std. Dev.	45.95	44.48	43.55
		Max Point	891.33			COV as %	5.6	5.5	5.3
Avg. Conc.	818.688	ppb			Instuments				
					B&K 1302 G		1765299		Cat2 M&TE
		Start	Finish			alc SN T95351203	001		12/17/2012
Tracer tank p		100	100	psig	Fisher Scier	ntific SN 90936818			12/7/2012
Injection flow	meter	50	50	sccm					
Stack Temp		61	65.3	°F					
Mean stack v	-	2934	2948	form -					
Sampling for		5	5	lpm		and a second			
Ambientpres		1004	1002	mbar	1000				
Ambienthum	-	42%	32%	RH	900				
Ambient Tem	•	65.3	74.3	۴F					
B&K vapor co		Y	Y	Y/N	80				
Back-Gd gas				ppb	70				
		2, 5, 9, 6, 5	9,8,7,3,7	_	_ 60				
No. Bk-Gd sa	mples	5	5	n	P				
					р ⁵⁰				
Gas analyzer	r checked:	11/6/2012			b 40	0			
Nata	15	_			30				
	45 degree turi				2			▋₽₽₽₽₽₽₽	
	Mean velocity								7
0.1.4.10.11.0					. 10)0 / <i></i>	~]		
CA 11/6/12						0 - 🗸 🖉	~ 1 2	227	Side
								_ /	
						Botto	m		
Entrine contract	- h. <i>u</i>	Comerca			Technical D	ata Daview resta	od by:		
Entries made		Carmen Arim		inal		ata Review perform	-	14/00/0040	
Entries made Signature/da		Signature on		inal	Technical D Signature/da		ed by: gbj	11/28/2012	
				inal			-	11/28/2012	

Appendix A.5: LB-S1 Tracer Particle Uniformity Data Sheets

3 Aug. 2006 Site LB-S1 Model Run No. PT-1 Date 10/17/2012 Fan configuration BC Tester CA,JEF, EA Fan Setting 43 Hz Stack Dia. 11.8906 in. Stack Temp 65.4 deg F 1 Stack X-Area 111.0 in.2 Start/End Time 1220/1400 1 Test Port 1 Center 2/3 from 1.09 to: 7 Measurement units particles/ft3 Injection Point Port 2 Center 7 Measurement units particles/ft3 Injection Point Port 2 Center 7 Order 2 2 1 2 3 Mean 1 2 3 Point Depth, in. particles/ft3 Port 2 Center 977 3 1 2 3 1 0.50 1046 687 980 904.3 915 1022 977 2 1.24 1108 763 1107 92.7 1313 1226<	Mean	10.80		BC		Fan co				3 Aug. 2006
Tester CAJEF, EA Fan Setting 43 Hz Stack Dia 11.8906 in. Stack Temp 65.4 deg F 10.80 Stack Dia 111.0 in.2 Start/End Time 1220/1400 10.80 Test Port 1 Cent=7.3 from 1.09 to: 10.80 Distance to Ustrbance 123.5 inches Points in Center 2/3 2 to: 7 Measurement units particles/ft3 Injection Point Port 2 Center 7 Verder 2nd 1 1 2 3 Trial 2nd 1 2 3 Point Depth, in. Particles/ft3 Mean 1 2 3 Point Depth, in. Particles/ft3 </th <th></th> <th>10.80</th> <th></th> <th></th> <th>nfiguration</th> <th>Fan co</th> <th></th> <th>10/17/2012</th> <th>Data</th> <th>-</th>		10.80			nfiguration	Fan co		10/17/2012	Data	-
Tester CAJEF, EA Fan Setting 43 Hz Stack Dia 11.8906 in. Stack Temp 65.4 deg F 1 Stack X-Area 111.0 in.2 Start/End Time 1220/1400 1 10.80 Test Port 1 Cent= 2/3 from 1.09 to: 10.80 Distance to distribution 123.5 inches Points in Center 2/3 2 to: 7 Measurement units 123.5 inches Points in Center 2/3 2 to: 7 Measurement units 123.5 inches Points in Center 2/3 2 to: 7 Measurement units 123.5 inches Points in Center 2/3 2 to: 7 Measurement units 123.5 inches Points in Center 2/3 2 to: 7 Measurement units 123.5 inches Points in Center 2/3 2 to: 7 Measurement units 2nd 1110 12 3 111 2 3 Traverse> 2nd 111 2 3 <		10.80			•					
Stack Dia.11.8906 in.Stack Temp65.4 deg F10Stack X-Area111.0 in.2Start/End Time1220/140010.80Distance to disturbance123.5 inchesPoints in Center 2/3 from1.09to:10.80Distance to disturbance123.5 inchesPoints in Center 2/32to:7Measurement unitsparticles/ft3Injection PointPort 2 Center7Traverse->2ndSide123PointDepth, in.particles/ft3Mean123PointDepth, in.particles/ft3900.3915102297710.501046687980992.713131256129132.291336113813091261.014711365142943.821595145814111488.0153915101515Center5.911705103515621434.015791627158458.001804177715141698.316591711175969.52181216361651169716221754169169.52181216361651169716221754169169.52181216361651169716221754169169.52181216361651169716221754169169.521812<			dea F		Fan Setting			CAJEF, EA	Tester	
Test Port10.8010.9to:10.80Distance to is surbance123.5 inchesPoints in Center 2/32to:7Measurement uitsparticles/ft3Indector Points in Center 2/32to:7Order>2ndIntervation PointPort 2 CenterIntervation PointPort 2 CenterTraverse->Intervation PointIntervation PointIntervation PointIntervation PointIntervation PointIntervation PointTrial>Intervation PointIntervation Point <th></th> <th></th> <th></th> <th></th> <th>-</th> <th></th> <th>in.</th> <th></th> <th></th> <th></th>					-		in.			
Distance to is urbance123.5 inchesPoints in Center 2/32formation of the state s			<u> </u>				in.2	111.0	ack X-Area	S
Distance to is urbance123.5 inchesPoints in Center 2/32ftmeasure with the set of the set			to:							
Measure particles/ft3 Image: Conder and the conder an							inches			Distance to o
Order> 2nd 1st Traverse-> Side Bottom Trial> 1 2 3 Mean 1 2 3 Point Depth, in. particles/ft3 matrix particles/ft3 matrix particles/ft3 1 0.50 1046 687 980 904.3 915 1022 977 2 1.24 1108 763 1107 992.7 1313 1256 1291 3 2.29 1336 1138 1309 1261.0 1471 1365 1429 4 3.82 1595 1458 1411 1488.0 1539 1510 1515 Center 5.91 1705 1035 1562 1434.0 1579 1627 1584 5 8.00 1804 1777 1514 1698.3 1659 1711 1759 6 9.52 1812 1636 1651 1699.7 1622 <th< th=""><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th><th></th></th<>										
Traverse-> Side Bottom Trial> 1 2 3 Mean 1 2 3 Point Depth, in. particles/ft3 904.3 915 1022 977 1 0.50 1046 687 980 904.3 915 1022 977 2 1.24 1108 763 1107 992.7 1313 1256 1291 3 2.29 1336 1138 1309 1261.0 1471 1365 1429 4 3.82 1595 1458 1411 1488.0 1539 1510 1515 Center 5.91 1705 1035 1562 1434.0 1579 1627 1584 5 8.00 1804 1777 1514 1698.3 1659 1711 1759 6 9.52 1812 1636 1651 1699.7 1622 1743 1691 7 10.57 1494 <th></th> <th></th> <th></th> <th></th> <th></th> <th></th> <th>2nd</th> <th>purpuesino</th> <th></th> <th></th>							2nd	purpuesino		
Trial> 1 2 3 Mean 1 2 3 Point Depth, in. particles/ft3 980 904.3 915 1022 977 1 0.50 1046 687 980 904.3 915 1022 977 2 1.24 1108 763 1107 992.7 1313 1256 1291 3 2.29 1336 1138 1309 1261.0 1471 1365 1429 4 3.82 1595 1458 1411 1488.0 1539 1510 1515 Center 5.91 1705 1035 1562 1434.0 1579 1627 1584 6 9.52 1812 1636 1651 1698.3 1659 1711 1759 6 9.52 1812 1636 1651 1699.7 1622 1743 1691 7 10.57 1494 1569 1420 1494.3		ttom				de				
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2 1.24 1108 763 1107 992.7 1313 1256 1291 3 2.29 1336 1138 1309 1261.0 1471 1365 1429 4 3.82 1595 1458 1411 1488.0 1539 1510 1515 Center 5.91 1705 1035 1562 1434.0 1579 1627 1584 5 8.00 1804 1777 1514 1698.3 1659 1711 1759 6 9.52 1812 1636 1651 1699.7 1622 1754 1691 7 10.57 1494 1569 1420 1494.3 1367 1437 1431 8 11.31 1129 1054 959 1047.3 765 770 818	971.3		•	915	90/13		•	10/6		
3 2.29 1336 1138 1309 1261.0 1471 1365 1429 4 3.82 1595 1458 1411 1488.0 1539 1510 1515 Center 5.91 1705 1035 1562 1434.0 1579 1627 1584 5 8.00 1804 1777 1514 1698.3 1659 1711 1759 6 9.52 1812 1636 1651 1699.7 1622 1754 1691 7 10.57 1494 1569 1420 1494.3 1367 1437 1431 8 11.31 1129 1054 959 1047.3 765 770 818	1286.7						1			
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	1411.7							= -		-
	784.3									
Averages> 1447.7 1235.2 1323.7 1335.5 1358.9 1383.6 1388.3	1376.9	1300.3	1303.6	1358.9	1335.5	1323.7	1235.2	1447.7	>	Averages
All pt/ft3 Dev. from mean Center 2/3 Side Bottom All	Normiza	A B	Dattors	Sido	Contor 2/2	for moon	Des	nt/ft3	All	
Mean 1356.2 Mean 1438.3 1519.5 1478.9	1560.48					. Iom mean				
						40.00				
	220.21 14.11									
	al. Due		10.3			20.1%				A
Avg Conc 1336 pt/ft3 Instuments Used: Ca Start Finish TSI VelociCalc T95351203001	12/17/2012		T05351203001				Cinin h		1220	Avg Conc
Generator Inlet Press 2.6 2.6 psig Fisher Scientific 90936818	12/7/2012					noia			let Drees	Con o restor la
Stack Temp 64 66.8 F Met One OPC 1011529010	2/1/2012								iel riess	
Centerline vel. 4404 4323 fpm Met One OPC 1011529019	1/9/2013									•
Ambient pressure 29.94 29.91 inHg	1/9/2013		1011323003	0	Met One OF	•				
Ambient humidity 32% 31% RH						-				•
					-				-	
									•	
					-	рињ				
No. Bk-Gd samples 4 4 1800				ю —	18	-			•	
Compressor output 18 23 psig p 1600				00	P 16	psig	23	18	rounpun	Compressor
a 1400				00	a 14					N = 4 = = -
Notes:				m	Г ₁₂					Notes:
					l t					<u> </u>
									\searrow	
f 800										
CA 10/17/12 t 600				200						CA 10/17/12
3 400				400	3		<u> </u>			
200			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	200						
				o 🗸						
Oil Used: Edwards 19	Side									
Ref. Probe Location: Ref port downstream of Port 1 Bottom		_ /	iom	Bott						
Probe Type / Configuration: L-Shaped Probe		\sim				Probe	L-Shaped	ration:	e / Configu	Probe Type
Entries made by: Carmen Arimescu 10/17/2012 Technical Data Review performed by:			performed by:	ata Review	Technical D	10/17/2012	nescu	Carmen Arir	e by:	Entries made
Signature/date On File w/ Original Signature/date gbj 11/19/2012		11/19/2012	-						-	
							-			-

Rev. 0		PA	RTICLE TRA	CER TRAVER	SE DATA R	ORM			
3 Aug. 2006	Site	LB-S1 Mode	el		Run No.	PT-2			
_	Date	10/17/2012		Fan co	onfiguration	AC			
	Tester	CĄĘĄ			Fan Setting	43		Hz	
	Stack Dia.	11.8906	in.		Stack Temp	64	deg F		
ę	Mack X-Area	111.0	in.2		rt/End Time		3		
	Test Port	1		_	ter 2/3 from		to:	10.80	
Distance to			inches		Center 2/3			7	
		particles/ft3				Port 2 cent			
Incusur	Order>	paracismo	1st				2nd		
	Traverse->			de				ottom	
	Trial>	1			Mean	1	2		Mean
Point		•		les/fl3	Mean	•		des/ft3	Mean
1		1528	1583		1529.0	1335	1368	1274	1325.7
2		1520	1852	1			1692	1274	
			Į		1827.3	1608			1657.7
3		1880	2040		2010.0	1838	1680	1783	1767.0
4		1909	2164		2092.3	1821	1783	1895	1833.0
Center		1833	2045	2096	1991.3	1845	1842	1921	1869.3
5		1579	1861	1899	1779.7	1797	1726	1839	1787.3
6		1946	1853	<u>.</u>	1838.7	1608	1633	1697	1646.0
7		1809	1545	1437	1597.0	1276	1253	1309	1279.3
8	11.31	1327	1057	1498	1294.0	592	554	616	587.3
Averages	>	1731.0	1777.8	1811.0	1773.3	1524.4	1503.4	1556.3	1528.1
	All	pt/ft3	Dev	/. from mean	Center 2/3	Side	Bottom	A	Normizd
	Mean	1650.7			Mean	1876.6	1691.4		1839.19
	Min Point	587.3		-61 1%	Std. Dev.	167.8	199.8	201.7	188.20
	Max Point	2092.3			COV as %	8.9	11.8		100.20
Avg Conc		pt/ft3		20.0 %	Instuments		11.0		Cal. Due
Avg Conc	1010	Start	Finish		TSI VelociC		T95351203001		12/17/2012
Generator in	lot Droce	2.6		psig	Fisher Scie		90936818		12/1/2012
Stack Temp	iel Fiess	68			Met One Of		1011529010		2/1/2012
Centerline w		4284	4499	-	Met One Of		1011529009		1/9/2013
		29.91	29.91		Wet One Or	-0	1011323003		1/3/2013
Ambient pre		33%	34%	-	-				
Ambienthur	-		59.9		-				
Ambienttem	•	61.7		-	-				
Back-Gd aei		4,5,8,3	1,1,4,4	pt/ft3	25	00			
No. Bk-Gd s	•	4	4						
Compresso	r output	22	18	psig	P 20	000			
					a				
Notes:						500			
					. t "	500 T			1
					1				
					f 1	000			
CA 10/17/12					t				
					3	500			
			$\overline{}$						
						0			
	Edwards 1	.9							Side
Oil Used:			wnstream	n of Port 1		Bot	tom	- /	,
Oil Used: Ref. Probe	Location:	Ref port do	own builden		- 1				
			L-Shaped	Probe	-			\sim	
Ref. Probe Probe Type	e / Configu	ration:	L-Shaped		Tochricol	Data Povácu	porformed by	~	
Ref. Probe Probe Type Entries mad	e / Configu e by:	ration: Carmen Arir	L-Shaped				performed by:	11/10/2012	
Ref. Probe Probe Type	e / Configu e by:	ration:	L-Shaped		Technical I Signature/c		performed by: gbj	11/19/2012	
Ref. Probe Probe Type Entries mad	e / Configu e by:	ration: Carmen Arir	L-Shaped					11/19/2012	

		PA	RTICLE TRA	CER TRAVER	SE DATA FO	RM			
3 Aug. 2006	Site	LB-S1 Mode	el 🛛		Run No.	PT-3			
	Date	10/11812		Fan ce	onfiguration 7	AB			
	Tester	CA, EA			Fan Setting	43		Hz	
	Stack Dia.	11.8906	in.		Stack Temp	54.75	deg F		
S	Mack X-Area	111.0	in.2	Sta	rt/End Time				
	Test Port	1		Cen	ter 2/3 from	1.09	to:	10.80	
Distance to	disturbance	123.5	inches	Points in	Center 2/3	2	to:	7	
Measur	ement units	particles/ft3		Ini	ection Point	Port 2 cent	er	-	
	Order>	•		2nd			1st		
	Traverse>		Si	de			Bo	ottom	
	Trial>	1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		partic	les/fl3			parti	des/ft3	
1		866	1127	812	935.0	1086	1191	1075	1117.3
2	1.24	1244	1420	1197	1287.0	1390	1407	1343	1380.0
3	2.29	1675	1478	1316	1489.7	1518	1676	1521	1571.7
4			1481	1505	1554.7	1710	1830	1739	1759.7
Center		1608	1455		1495.7	1775	1815	1684	1758.0
5			1371	1453	1412.0	1724	1670	1722	1705.3
6	9.52		1337	1303	1334.0	1579	1520	1523	1540.7
7	10.57	1175	1282	1245	1234.0	1256	1157	1182	1198.3
8	11.31	543	1249	911	901.0	509	568	559	545.3
Averages	>	1284.8	1355.6	1240.7	1293.7	1394.1	1426.0	1372.0	1397.4
U									
	All	pt/ft3	Dev	. from mean	Center 2/3	Side	Bottom	A	Normizd
	Mean	1345.5			Mean	1401.0	1559.1	1480.0	1602.91
	Min Point	545.3		-59.5%	Std. Dev.	119.7	209.7	183.4	177.48
	Max Point	1759.7		30.8%	COV as %	8.5	13.5	12.4	11.07
Avg Conc	1310	pt/ft3			Instuments	Usect			Cal. Due
		Start	Finish		TSI VelociCa	alc	T95351203001		12/17/2012
Generator In	let Press	2.6	2.6	psig	Fisher Scier	ntific	90936818		12/7/2012
Stack Temp		51.1	58.4	F	Met On e OP	С	1011529010		2/1/2013
Centerline ve	ə l.	4502	4296	fpm	Met On e OP	С	1011529009		1/9/2013
Ambient pres	ssure	29.85	29.85	inHg					
Ambient hun	nidity	45%	42%	RH					
Ambient tem	n		l						
	1 P	53.6	56.3						
Back-Gd aer	•	53.6 2,2,6,0	56.3 3,2,4,3		200	0 0			
Back-Gd aer No. Bk-Gd sa	osol			F					
	osol amples	2,2,6,0	3,2,4,3 4	F pt/ft3	180	0			
No. Bk-Gd sa	osol amples	2,2,6,0	3,2,4,3 4	F pt/ft3	180 P 160	ю ю			
No. Bk-Gd sa	osol amples	2,2,6,0	3,2,4,3 4	F pt/ft3	180 P 160 a 144	00 00 00			
No. Bk-Gd sa Compresso	osol amples	2,2,6,0	3,2,4,3 4	F pt/ft3	180 P 160 a 144 F 12 t				
No. Bk-Gd sa Compresso	osol amples	2,2,6,0	3,2,4,3 4	F pt/ft3	180 P 160 a 144 F 12 t	00 00 00			
No. Bk-Gd sa Compresso	osol amples routput	2,2,6,0	3,2,4,3 4	F pt/ft3	180 P 160 a 144 - r 12 - t 10 - /		H		
No. Bk-Gd si Compressor Notes:	osol amples routput	2,2,6,0	3,2,4,3 4	F pt/ft3	P 160 P 160 a 144 - r 12 - t 10 - <i>i</i> 8		H		
No. Bk-Gd si Compressor Notes:	osol amples routput	2,2,6,0	3,2,4,3 4	F pt/ft3	180 P 160 a 144 F 12 - t 10 - / 10 - / 8 - f 8 - t 6		H		
No. Bk-Gd si Compressor Notes:	osol amples routput	2,2,6,0	3,2,4,3 4	F pt/ft3	P 160 a 144 r 12 t 10 f 8 t 6 3 2		H		
No. Bk-Gd si Compressor Notes:	osol amples routput	2,2,6,0	3,2,4,3 4	F pt/ft3	P 160 a 144 r 12 t 10 f 8 t 6 3 2				
No. Bk-Gd sa Compressor Notes: CA 10/18/1 Oil Used:	osol amples routput 2 Edwards 1	2,2,6,0 4 19	3,2,4,3 4 22	F pt/ft3 psig	P 160 a 144 r 12 t 10 f 8 t 6 3 2				Side
No. Bk-Gd sa Compressor Notes: CA 10/18/1	osol amples routput 2 Edwards 1	2,2,6,0 4 19	3,2,4,3 4 22	F pt/ft3 psig	P 160 a 144 r 12 t 10 f 8 t 6 3 2				Side
No. Bk-Gd sa Compressor Notes: CA 10/18/1 Oil Used: Ref. Probe	eosol amples routput 2 Edwards 1 Location:	2,2,6,0 4 19 19 19 19 Ref port do	3,2,4,3 4 22	F pt/fl3 psig	P 160 a 144 r 12 t 10 f 8 t 6 3 2				Side
No. Bk-Gd sa Compressor Notes: CA 10/18/1 Oil Used: Ref. Probe Probe Type	Edwards 1 Location: 2 Location:	2,2,6,0 4 19 19 19 19 Ref port do	3,2,4,3 4 22 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F pt/fl3 psig	180 P 160 a 144 r 122 t 100 f 8 t 6 3 2 2	00 00 00 00 00 00 00 00 00 00 00 00 00			side
No. Bk-Gd sa Compressor Notes: CA 10/18/1 Oil Used: Ref. Probe	Edwards 1 Location: e by:	2,2,6,0 4 19 	3,2,4,3 4 22 pwnstream L-Shaped	F pt/fl3 psig	180 P 160 a 144 r 122 t 100 f 8 t 6 3 2 2	00 00 00 00 00 00 00 00 00 00 00 00 00	performed by: gbj	11/19/2012	Side
No. Bk-Gd si Compressor Notes: CA 10/18/1 Oil Used: Ref. Probe Probe Type Entries mad	Edwards 1 Location: e by:	2,2,6,0 4 19 29 Ref port do ration: Carmen Arin	3,2,4,3 4 22 pwnstream L-Shaped	F pt/fl3 psig	Technical D	00 00 00 00 00 00 00 00 00 00 00 00 00	performed by:	11/19/2012	Side

Rev. 0		PAR	TICLE TRA	CER TRAVER	ISE DATA R	жн			
3 Aug. 2006	Site	LB-S1 Mode	I		Run No.	PT-4			
	Date	10/18/2012		Fan ce	onfiguration	AB			
	Tester	CA, XY			Fan Setting	42		Hz	
	Stack Dia.	11.8906	in.		Stack Temp	62.65	deg F		
S	ack X-Area	111.0	in.2	Sta	rt/End Time		_		
	Test Port	1		Cen	ter 2/3 from	1.09	to:	10.80	
Distance to c	disturbance	123.5	inches	Points in	Center 2/3	2	to:	7	
Measure	ement units	particles/ft3		Inj	ection Point	Port 2 cent	er		
	Order>			1st			2nd		
-	Traverse->		Si	de			Be	ottom	
	Trial>	1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		partic	les/ft3			parti	ides/ft3	
1	0.50	913	886	813	870.7	702	950	653	768.3
2	1.24	1366	1168	1225	1253.0	1152	1307	1154	1204.3
3	2.29	1453	1325	1363	1380.3	1205	1435	1334	1324.7
4	3.82	1410	1432	1437	1426.3	1331	1531	1407	1423.0
Center	5.91	1337	1406	1386	1376.3	1372	1633	1540	1515.0
5	8.00	1480	1451	1339	1423.3	1235	1610	1519	1454.7
6	9.52	1385	1515	1401	1433.7	1094	1479	1467	1346.7
7	10.57	1008	1375	1135	1172.7	975	1320	1334	1209.7
8	11.31	839	990	897	908.7	957	929	980	955.3
Averages	>	1243.4	1283.1	1221.8	1249.4	1113.7	1354.9	1265.3	1244.6
	All	<u>pt/ft3</u>	Der	<u>/. from mean</u>		<u>Side</u>	Bottom		Normizd
	Mean	1247.0			Mean	1352.2	1354.0	1353.1	1421.24
	Min Point	768.3			Std. Dev.	100.5	119.0	105.8	130.60
	Max Point	1515.0		21.5%	COV as %	7.4	8.8		9.19
Avg Conc	1222	pt/ft3			Instuments				Cal. Due
		Start	Finish	_	TSI VelociC		T95351203001		12/17/2012
Generator Ini	let Press	2.6		psig	Fisher Scie		90936818		12/7/2012
Stack Temp	-	59.8	65.5		Met One OF		1011529010		2/1/2013
Centerline ve		4523	4431	-	Met One OF	С	1011529009		1/9/2013
Ambient pres		29.83		inHg	-				
		0.001							
Ambienthum	-	38%	27%		-				
Ambient tem	P	59	73.4	F					
Ambient tem Back-Gd aero	p osol	59 0,0,3,1	73.4 1,4,3,2	F	16	00			
Ambient tem Back-Gd aero No. Bk-Gd sa	p osol amples	59 0,0,3,1 4	73.4 1,4,3,2 4	F pt/ft3	-				
Ambient tem Back-Gd aero	p osol amples	59 0,0,3,1	73.4 1,4,3,2 4	F	14 P	00			
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor	p osol amples output	59 0,0,3,1 4 22	73.4 1,4,3,2 4 23	F pt/ft3 psig	14 P		J		
Ambient tem Back-Gd aen No. Bk-Gd sa Compressor Notes:	p osol amples routput Fan freque	59 0,0,3,1 4 22 ncy was redu	73.4 1,4,3,2 4 23 ced from 43	F pt/ft3 psig	14 P 12 a ¹²	00			
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloc	p osol amples output Fan freque city would	59 0,0,3,1 4 22 ncy was redu be around 4	73.4 1,4,3,2 4 23 ced from 43 4500fpm.	F pt/ft3 psig	14 P a 12 r 10 t	00	Î		
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloc	p osol amples output Fan freque city would	59 0,0,3,1 4 22 ncy was redu	73.4 1,4,3,2 4 23 ced from 43 4500fpm.	F pt/ft3 psig	14 P a 12 r 10 t	00	Î		
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the	p osol amples output Fan freque city would velocity w	59 0,0,3,1 4 22 ncy was redu be around 4	73.4 1,4,3,2 4 23 ced from 43 4500fpm.	F pt/ft3 psig	14 P 12 a 12 - r 10 - r 10 - t - t - f	00			
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloc	p osol amples output Fan freque city would velocity w	59 0,0,3,1 4 22 ncy was redu be around 4	73.4 1,4,3,2 4 23 ced from 43 4500fpm.	F pt/ft3 psig	14 P 12 - r 10 - t 4 - f 4 - t	00 200 200 300 500			
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the	p osol amples output Fan freque city would velocity w	59 0,0,3,1 4 22 ncy was redu be around 4	73.4 1,4,3,2 4 23 ced from 43 4500fpm.	F pt/ft3 psig	14 P 12 - r 10 - t 4 - f - t	00 00 000 500 500 400			
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the	p osol amples output Fan freque city would velocity w	59 0,0,3,1 4 22 ncy was redu be around 4	73.4 1,4,3,2 4 23 ced from 43 4500fpm.	F pt/ft3 psig	14 P 12 - r 10 - t 4 - f 4 - t	00 200 200 300 500			
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the Ca 10/18/12	p osol amples routput Fan frequei city would velocity w	59 0,0,3,1 4 22 ncy was redu be around 4 vas around 5	73.4 1,4,3,2 4 23 ced from 43 4500fpm.	F pt/ft3 psig	14 P 12 - r 10 - t 4 - f 4 - t	00 00 000 500 500 400			
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the Ca 10/18/12 Oil Used:	P osol amples routput Fan frequei city would velocity w Edwards 1	59 0,0,3,1 4 22 ncy was redu be around 4 vas around 5	73.4 1,4,3,2 4 23 ced from 43 4500fpm. 5000fpm.	F pt/fl3 psig 3Hz to 42Hz	14 P 12 - r 10 - t 4 - f 4 - t	00 00 00 00 00 00 00 00 00 00			Side
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the Ca 10/18/12 Oil Used: Ref. Probe	p osol amples routput Fan frequer city would velocity w Edwards 1 Location:	59 0,0,3,1 4 22 hey was reduced be around 4 vas around 5 2 9 Ref port do	73.4 1,4,3,2 4 23 ced from 43 4500fpm. 5000fpm.	F pt/fl3 psig 3Hz to 42Hz	14 P 12 - r 10 - t 4 - f 4 - t	00 00 000 000 000 600 400 200			Side
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the Ca 10/18/12 Oil Used:	p osol amples routput Fan frequer city would velocity w Edwards 1 Location:	59 0,0,3,1 4 22 hey was reduced be around 4 vas around 5 2 9 Ref port do	73.4 1,4,3,2 4 23 ced from 43 4500fpm. 5000fpm.	F pt/fl3 psig 3Hz to 42Hz	14 P 12 - r 10 - t 4 - f 4 - t	00 00 00 00 00 00 00 00 00 00			Side
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the Ca 10/18/12 Oil Used: Ref. Probe Probe Type	P osol amples routput Fan frequer city would velocity w Edwards 1 Location: c/Configur	59 0,0,3,1 4 22 hey was reduced be around 4 vas around 5 2 2 9 Ref port do ration:	73.4 1,4,3,2 4 23 ced from 43 4500fpm. 5000fpm.	F pt/fl3 psig 3Hz to 42Hz of Port 1 Probe	14 P 12 I 10 I 10 I 10 I 10 I 10 I 10 I 10 I 10	00 000 000 000 000 000 000 000 000 000			Side
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the Ca 10/18/12 Oil Used: Ref. Probe Probe Type Entries made	P osol amples routput Fan frequer city would velocity w Edwards 1 Location: c/ Configur e by:	9 Ref port do Carmen Arin	73.4 1,4,3,2 4 23 ced from 43 4500fpm. 5000fpm. 5000fpm. 	F pt/fl3 psig 3Hz to 42Hz of Port 1 Probe	14 P 12 r 10 t 1 f 1 3 Technical E	00 00 000 000 000 000 000 000 000 000	performed by:	11/19/2012	Side
Ambient tem Back-Gd aero No. Bk-Gd sa Compressor Notes: so the veloo At 43Hz the Ca 10/18/12 Oil Used: Ref. Probe Probe Type	P osol amples routput Fan frequer city would velocity w Edwards 1 Location: c/ Configur e by:	59 0,0,3,1 4 22 hey was reduced be around 4 vas around 5 2 2 9 Ref port do ration:	73.4 1,4,3,2 4 23 ced from 43 4500fpm. 5000fpm. 5000fpm. 	F pt/fl3 psig 3Hz to 42Hz of Port 1 Probe	14 P 12 I 10 I 10 I 10 I 10 I 10 I 10 I 10 I 10	00 00 000 000 000 000 000 000 000 000		11/19/2012	Side

Rev. 0		PAJ	RTICLE TRA	CER TRAVER	SE DATA FO	RM			
3 Aug. 2006	Site	LB-S1 Mode	el 🛛		Run No.	PT-5			
	Date	10/18/2012		Fan ce	onfiguration /	AB			
	Tester	CA, XY			Fan Setting	42		Hz	
	Stack Dia.	11.8906	in.		Stack Temp	66.75	deg F		
S	ack X-Area	111.0	in.2	Sta	rt/End Time	1325/1530			
	Test Port	1		Cen	ter 2/3 from	1.09	to:	10.80	
Distance to o			inches		Center 2/3	2	to:	7	
Measure	ement units	particles/ft3		Inje	ection Point	Port 2 cent	er		
	Order>		2nd				1st		
	Traverse->			de				ottom	
	Trial>	1			Mean	1	2	3	Mean
	Depth, in.		•	les/ft3			•	des/ft3	
1					956.3	964	1020	1240	1074.7
2		1216		1417	1350.0	1419	1505	1623	1515.7
3		1592	1527	1589	1569.3	1652	1714	1757	1707.7
4		1591	1553		1608.7	1619	1876	1905	1800.0
Center 5	5.91	1693	1523		1618.7	1680	1927	2021 2039	1876.0
5		1408 1067	1136 1337	1430 1348	1324.7 1250.7	1665 1683	1898 1837	2039	1867.3
7	9.52	1187	1329	1346	1250.7	1354	1671	1619	1792.3
8		827	1077	1230	987.0	1354	1251	1205	1189.7
Averages	>	1273.4	1321.6	1377.0	1324.0	1461.0	1633.2	1696.2	1596.8
/weiages		121 3.4	1521.0	1377.0	1024.0	1401.0	1000.2	1090.2	1000.0
	All	pt/ft3	Des	/. from mean	Center 2/3	Side	Bottom	A	Normlzd
	Mean	1460.4			Mean	1424.7	1729.6	1577.1	1690.36
	Min Point	956.3		-34.5%	Std. Dev.	167.6	146.4	218.8	10.0.17
	Max Point	1876.0			COV as %	11.8	8.5	13.9	10.07
Avg Conc	1425	pt/ft3			Instuments	Usect			Cal. Due
		Start	Finish		TSI VelociCa	alc	T95351203001		12/17/2012
Generator In	let Press	2.6	2.6	psig	Fisher Scier	ntific	90936818		12/7/2012
Stack Temp		65.5	68	F	Met One OP	С	1011529010		2/1/2013
Centerline ve	Я .	4387	4550	fpm	Met On e OP	С	1011529009		1/9/2013
Ambient pres	ssure	29.8		-					
Ambient hun	nidity	25%	33%	RH			and the second s		
Ambient tem					1				
	P	77	65.3	F					
Back-Gd aer	osol			F pt/ft3	200	0			
Back-Gd aer No. Bk-Gd sa	osol amples	77 1,1,2,3 4	65.3 2,3,5,4 4	pt/ft3	200				
Back-Gd aer	osol amples	77 1,1,2,3	65.3 2,3,5,4 4	pt/ft3	180	0			
Back-Gdaen No. Bk-Gdsa Compressor	osol amples routput	77 1,1,2,3 4 23	65.3 2,3,5,4 4 22	pt/ft3 psig	180 P 160	ю хо - ох			
Back-Gd aen No. Bk-Gd sa Compresson Notes:	osol amples routput	77 1,1,2,3 4 23 Particle num	65.3 2,3,5,4 4 22 nber concen	pt/ft3 psig tration went	180 P 160 a 144	xo xo xo xo	H		
Back-Gdaen No. Bk-Gdsa Compressor	osol amples routput	77 1,1,2,3 4 23 Particle num	65.3 2,3,5,4 4 22 nber concen	pt/ft3 psig tration went	180 P 160 a 144 F 12 t		H		
Back-Gd aen No. Bk-Gd sa Compresson Notes:	osol amples routput	77 1,1,2,3 4 23 Particle num	65.3 2,3,5,4 4 22 nber concen	pt/ft3 psig tration went	180 P 160 a 144 - F 12 - t 10 - /				
Back-Gd aen No. Bk-Gd sa Compressor Notes: up in the m	osol amples routput iiddle of te	77 1,1,2,3 4 23 Particle num	65.3 2,3,5,4 4 22 nber concen	pt/ft3 psig tration went	180 P 160 a 144 - F 12 - t 10 - / 10 - f 8		H		
Back-Gd aen No. Bk-Gd sa Compresson Notes:	osol amples routput iiddle of te	77 1,1,2,3 4 23 Particle num	65.3 2,3,5,4 4 22 nber concen	pt/ft3 psig tration went	180 P 160 a 144 F 12 t 10 J 10 f 8 t 6		H		
Back-Gd aen No. Bk-Gd sa Compressor Notes: up in the m	osol amples routput iiddle of te	77 1,1,2,3 4 23 Particle num	65.3 2,3,5,4 4 22 nber concen	pt/ft3 psig tration went	180 P 160 a 144 F 12 t 10 J 10 f 8 t 6		H		
Back-Gd aen No. Bk-Gd sa Compressor Notes: up in the m	osol amples routput iiddle of te	77 1,1,2,3 4 23 Particle num	65.3 2,3,5,4 4 22 nber concen	pt/ft3 psig tration went	P 160 a 144 r 12 t 10 f 8 t 6 3 4				
Back-Gd aer No. Bk-Gd sa Compressor Notes: up in the m CA 10/18/12	iddle of te	77 1,1,2,3 4 23 Particle num esting, repea	65.3 2,3,5,4 4 22 nber concen	pt/ft3 psig tration went	P 160 a 144 r 12 t 10 f 8 t 6 3 4				
Back-Gd aer No. Bk-Gd sa Compressor Notes: up in the m CA 10/18/12 Oil Used:	iddle of te	77 1,1,2,3 4 23 Particle num sting,repea	65.3 2,3,5,4 4 22 nber concen ated one tr	pt/ft3 psig tration went raverse.	P 160 a 144 r 12 t 10 f 8 t 6 3 4				Side
Back-Gd aer No. Bk-Gd sa Compressor Notes: up in the m CA 10/18/12 Oil Used: Ref. Probe	iddle of te Edwards 1 Location:	77 1,1,2,3 4 23 Particle num sting, repea	65.3 2,3,5,4 4 22 nber concen ated one tr	pt/ft3 psig tration went raverse.	P 160 a 144 r 12 t 10 f 8 t 6 3 4				Side
Back-Gd aer No. Bk-Gd sa Compressor Notes: up in the m CA 10/18/12 Oil Used:	iddle of te Edwards 1 Location:	77 1,1,2,3 4 23 Particle num sting, repea	65.3 2,3,5,4 4 22 nber concen ated one tr	pt/ft3 psig tration went raverse.	P 160 a 144 r 12 t 10 f 8 t 6 3 4				Side
Back-Gd aer No. Bk-Gd sa Compressor Notes: up in the m CA 10/18/12 Oil Used: Ref. Probe Probe Type	iddle of te Edwards 1 Location: e / Configure	77 1,1,2,3 4 23 Particle num esting, repea	65.3 2,3,5,4 4 22 nber concen ated one tr ated one tr bwnstream L-Shaped	pt/ft3 psig tration went raverse.	180 P 160 a 144 r 12 t 10 f 8 t 6 3 4 2	00 00 00 00 00 00 00 00 00 00 00 00 00			Side
Back-Gd aer No. Bk-Gd sa Compressor Notes: up in the m CA 10/18/12 Oil Used: Ref. Probe Probe Type Entries made	iddle of te Edwards 1 Location: e by:	77 1,1,2,3 4 23 Particle num sting,repea 9 Ref port do ration: Carmen Arin	65.3 2,3,5,4 4 22 nber concen ated one tr ber concen ted one tr	pt/ft3 psig tration went raverse.	Technical D	00 00 00 00 00 00 00 00 00 00 00 00 00	performed by:	11/19/2012	Side
Back-Gd aer No. Bk-Gd sa Compressor Notes: up in the m CA 10/18/12 Oil Used: Ref. Probe Probe Type	iddle of te Edwards 1 Location: e by:	77 1,1,2,3 4 23 Particle num esting, repea	65.3 2,3,5,4 4 22 nber concen ated one tr ber concen ted one tr	pt/ft3 psig tration went raverse.	180 P 160 a 144 r 12 t 10 f 8 t 6 3 4 2	00 00 00 00 00 00 00 00 00 00 00 00 00		11/19/2012	Side

		PAF	RTICLE TRA	CER TRAVER	ISE DATA R)RM			
3 Aug. 2006	Site	LB-S1 Mode	el		Run No.	PT-6			
	Date	10/22/2012		Fan c	onfiguration	AB			
	Tester	EA, CA			Fan Setting		36	Hz	
	Stack Dia.	11.8906	in.		Stack Temp	48.55	deg F		
S	ack X-Area	111.0	in.2	Sta	rt/End Time	941/1150			
	Test Port	1		Cen	ter 2/3 from	1.09	to:	10.80	
Distance to (disturbance	123.5	inches	Points in	Center 2/3	2	to:	7	
Measure	ement units	particles/ft3		Inje	ection Point	Port 2 cent	er		
	Order>		1st				2nd		
	Traverse>		Si	de			Be	ottom	
	Trial ——>	1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		•	les/fl3	-		•	ides/ft3	
1		732	775	<u></u>	752.7	895	912		892.3
2		875	971	914	920.0	1150	1152	1149	1150.3
3	2.29	999	958	962	973.0	1171	1312	1362	1281.7
4		997	1043	1001	1013.7	1263	1401	1369	1344.3
Center	5.91	987	987	1007	993.7	1367	1417	1379	1387.7
5		928	967	1011	968.7	1324	1462	1375	1387.0
6	9.52	934	862	946	914.0	1213	1326	Į	1308.7
7	10.57	802	811	849	820.7	1081	1143	1191	1138.3
8		644	562	655	620.3	736	731	848	771.7
Averages	>	877.6	881.8	899.6	886.3	1133.3	1206.2	1214.4	1184.7
	All	pt/ft3	Des	/. from mean	Contor 2/2	Side	Bottom	A	Normizd
	Mean	1035.5		<u>. Tom mean</u>	<u>Center 23</u> Mean	943.4	1285.4		1301.44
	Mean Min Point	620.3		40.1%	Std. Dev.	545.4 65.1	1203.4		95.24
	Max Point	1387.7			COV as %	6.9	8.1		<u> </u>
Avg Conc		pt/ft3		04.070	Instuments		0.1		Cal. Due
Ang conc	1010	Start	Finish		TSI VelociC		T95351203001		12/17/2012
Generator In	let Press	2.6	26	-	Fisher Scie				
				DSIC		ntific	90936818		17/7/2012
		48.9	48.2	psig F	Met One OF		90936818		
Stack Temp Centerline w	əl.		48.2	F		PC			2/1/2013
Stack Temp Centerline ve		48.9 3719	48.2 3546	F fpm	Met On e OF	PC	1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres	ssure	48.9	48.2	F fpm inHg	Met On e OF	PC	1011529010		2/1/2013
Stack Temp Centerline ve	ssure nidity	48.9 3719 29.29	48.2 3546 29.26	F fpm inHg RH	Met On e OF	PC	1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hun	ssure nidity P	48.9 3719 29.29 50%	48.2 3546 29.26 36% 62.6	F fpm inHg RH	Met One OF Met One OF	20	1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hun Ambient tem Back-Gd aer	ssure nidity P osol	48.9 3719 29.29 50% 47.3	48.2 3546 29.26 36%	F fpm inHg RH F	Met One OF Met One OF		1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hun Ambient tem	ssure nidity p osol amples	48.9 3719 29.29 50% 47.3 2,1,1,1	48.2 3546 29.26 36% 62.6 5,3,4,1 4	F fpm inHg RH F pt/ff3	Met One OF Met One OF 16	20	1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hun Ambient tem Back-Gd aer No. Bk-Gd sa	ssure nidity p osol amples	48.9 3719 29.29 50% 47.3 2,1,1,1 4	48.2 3546 29.26 36% 62.6 5,3,4,1 4	F fpm inHg RH F	Met One OF Met One OF 16 14 P 12		1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hun Ambient tem Back-Gd aer No. Bk-Gd sa Compressor	ssure nidity p cosol amples r output	48.9 3719 29.29 50% 47.3 2,1,1,1 4	48.2 3546 29.26 36% 62.6 5,3,4,1 4 22	F fpm inHg RH F pt/ft3 psig	Met One OF Met One OF 16 14 P 12 a		1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hun Ambient tem Back-Gd aer No. Bk-Gd sa Compressor	ssure nidity p osol amples r output Finish tem	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu	48.2 3546 29.26 62.6 5,3,4,1 4 22 re were me	F fpm inHg RH F pt/ft3 psig	Met One OF Met One OF 16 14 P 12 a		1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient pres Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes:	ssure nidity p osol amples r output Finish tem	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu	48.2 3546 29.26 62.6 5,3,4,1 4 22 re were me	F fpm inHg RH F pt/ft3 psig	Met One OF Met One OF 16 14 P 12 a 12 r 10 t		1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th	ssure nidity p cosol amples r output Finish tem he tend bec	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu	48.2 3546 29.26 62.6 5,3,4,1 4 22 re were me	F fpm inHg RH F pt/ft3 psig	Met One OF Met One OF 16 14 P 12 a r 10 t 4		1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient pres Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes:	ssure nidity p cosol amples r output Finish tem he tend bec	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu	48.2 3546 29.26 62.6 5,3,4,1 4 22 re were me	F fpm inHg RH F pt/ft3 psig	Met One OF Met One OF 16 14 P 12 a 12 c 1 t 10 f t		1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hum Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th	ssure nidity P osol amples r output Finish tem he tend bec	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu	48.2 3546 29.26 62.6 5,3,4,1 4 22 re were me	F fpm inHg RH F pt/ft3 psig	Met One OF Met One OF 16 14 P 12 a 12 c 1 t 10 f t		1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hum Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th	ssure nidity P osol amples r output Finish tem he tend bec	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu	48.2 3546 29.26 62.6 5,3,4,1 4 22 re were me	F fpm inHg RH F pt/ft3 psig	Met One OF Met One OF 16 14 P 12 a r 10 t 1 f t 3		1011529010		
Stack Temp Centerline ve Ambient pres Ambient hum Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th	ssure nidity P osol amples routput Finish tem he tend bed	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu cause was ra	48.2 3546 29.26 62.6 5,3,4,1 4 22 re were me	F fpm inHg RH F pt/ft3 psig	Met One OF Met One OF 16 14 P 12 a r 10 t 1 f t 3	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 000 00 000 00 000 00 000 00 000 00 000 00 000 00 000 00	1011529010		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient pres Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th CA 10/22/12	ssure nidity P osol amples routput Finish tem he tend bed	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu cause was ra	48.2 3546 29.26 36% 62.6 5,3,4,1 4 22 re were me aining .	F fpm inHg RH F pt/ft3 psig asured	Met One OF Met One OF 16 14 P 12 a r 10 t 1 f t 3	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0 00 0	1011529010 1011529009		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient pres Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th CA 10/22/12 Oil Used: Ref. Probe	ssure nidity P osol amples routput Finish tem le tend bed Edwards 1 Location:	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu cause was ra	48.2 3546 29.26 36% 62.6 5,3,4,1 4 22 re were me aining .	F fpm inHg RH F pt/ft3 asured	Met One OF Met One OF 16 14 P 12 a r 10 t 1 f t 3	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 000 00	1011529010 1011529009		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient pres Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th CA 10/22/12 Oil Used: Ref. Probe	ssure nidity P osol amples routput Finish tem le tend bed Edwards 1 Location:	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu cause was ra	48.2 3546 29.26 36% 62.6 5,3,4,1 4 22 re were me aining .	F fpm inHg RH F pt/ft3 asured	Met One OF Met One OF 16 14 P 12 a r 10 t 1 f t 3	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 0 00 0	1011529010 1011529009		
Stack Temp Centerline ve Ambient pres Ambient pres Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th CA 10/22/12 Oil Used: Ref. Probe Probe Type	ssure nidity P osol amples routput Finish tem te tend bed Edwards 1 Location: c / Configure	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu cause was ra cause was ra 9 Ref port do ration:	48.2 3546 29.26 36% 62.6 5,3,4,1 4 22 re were me aining .	F fpm inHg RH F pt/ft3 asured	Met One OF Met One OF 16 14 P 12 a r 10 t t 3	00 00 00 00 00 00 00 00 00 00 00 00 00	1011529010 1011529009		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient pres Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th CA 10/22/12 Oil Used: Ref. Probe Probe Type Entries made	ssure nidity p osol amples r output Finish tem he tend bed te tend bed Edwards 1 Location: c / Configure	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu cause was ra cause was ra 9 Ref port do ration: Carmen Arir	48.2 3546 29.26 36% 62.6 5,3,4,1 4 22 re were me aining .	F fpm inHg RH F pt/ft3 asured	Met One OF Met One OF 16 14 P 12 a 12 f 10 t 3 Technical E	2C 2C 00 00 00 00 00 00 00 00 00 0	1011529010 1011529009		2/1/2013
Stack Temp Centerline ve Ambient pres Ambient hun Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes: inside of th CA 10/22/12 Oil Used: Ref. Probe Probe Type	ssure nidity p osol amples r output Finish tem he tend bed te tend bed Edwards 1 Location: c / Configure	48.9 3719 29.29 50% 47.3 2,1,1,1 4 19 o and pressu cause was ra cause was ra 9 Ref port do ration:	48.2 3546 29.26 3.6% 62.6 5,3,4,1 4 22 re were me aining .	F fpm inHg RH F pt/ft3 asured	Met One OF Met One OF 16 14 P 12 a r 10 t t 3	2C 2C 00 00 00 00 00 00 00 00 00 0	1011529010 1011529009		2/1/2013

		PA	REALE TRA	CER TRAVER	RSE DATA FO				
3 Aug. 2006	Site	LB-S1 Mode	el		Run No.	PT-7			
•	Date	10/22/2012		Fan co	onfiguration	AB			
	Tester	CAXY			Fan Setting		31	Hz	
	Stack Dia.	11.8906	in.		Stack Temp	48.15	deg F		
5	ack X-Area	111.0	in.2		rt/End Time				
	Test Port			_	ter 2/3 from	1.09	to:	10.80	
Distance to			inches		Center 2/3	2	to:	7	
		particles/ft3	meneo		ection Point				
incusur.	Order>	panacomo	2nd				1st		
	Traverse>			de				ottom	
	Trial>	1			Mean	1	2		Mean
Point		•		les/fl3	Medin	•		des/ft3	MCan
1		1131	1392		1286.7	1438	1412	1409	1419.7
2			1669		1634.7	1430	1713	1409	1746.3
3			1820		1862.3	1880	1713	1946	1748.3
э 4			1883		1928.0	2051	2072	2027	2050.0
4 Center	5.02 5.91	1990	1825		1920.0	1957	2072	2027	
									2077.7 2051.0
5	8.00 9.52		1435 1457		1506.7	2048 1912	2118	1987	
-			ļ	1415			1923	2046	1960.3
7	10.57	1365	1239	1169		1744	1754	1815	1771.0
8		1159	1131	1109		1386	1462	1437	1428.3
Averages	>	1564.6	1539.0	1533.1	1545.6	1799.3	1831.2	1840.4	1823.7
	All	pt/ft3	Der	/. from mean	Center 2/3	Side	Bottom	AI	Normizd
	Mean	1684.6			Mean	1641.5	1937.9	1789.7	1893.50
	Min Point	1133.0		-32.7%	Std. Dev.	248.9	135.9	246.5	216.63
	Max Point	2077.7			COV as %	15.2	7.0	13.8	11.44
Avg Conc		pt/ft3		20.010	Instuments		110		Cal. Due
Ang conc	1050	Start	Finish		TSI VelociC		T95351203001		12/17/2012
Generator In	let Press	2.6	2.6	psig	Fisher Scie		90936818		12/7/2012
Stack Temp		49	47.3		Met One OF	PC	1011529010		2/1/2013
Centerline w	ə.	3064	3113		Met One OF		1011529009		1/9/2013
Ambient pres		29.26	29.23	•		-			
					-				
Ambient hun	nidity		41%	RH					
Ambient hun Ambient tem	-	41%	41%						
Ambient tem	P	41% 59	66.2	F	25	00			
Ambienttem Back-Gdaer	p osol	41% 59 0,1,0,3	66.2 5,1,1,0		25	00			
Ambient tem Back-Gd aer No. Bk-Gd sa	p osol amples	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3	25	00			
Ambienttem Back-Gdaer	p osol amples	41% 59 0,1,0,3	66.2 5,1,1,0	F pt/ft3		00		111	
Ambient tem Back-Gd aer No. Bk-Gd sa Compresso	p osol amples	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3				11.	
Ambient tem Back-Gd aer No. Bk-Gd sa	p osol amples	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3	Р 20 а	00			
Ambient tem Back-Gd aer No. Bk-Gd sa Compresso	p osol amples	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3	Р 20 а				
Ambient tem Back-Gd aer No. Bk-Gd sa Compresso	p osol amples	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3	р 20 а - г ₁₈ - t	00			
Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes:	p osol amples routput	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3	р 20 а - г ₁₈ - t	00			
Ambienttem Back-Gdaer No. Bk-Gdsa Compresso	p osol amples routput	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3	P 20 a t t f 10 f 10	00	H		
Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes:	p osol amples routput	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3	P 20 a t t f 10 f 10	00	H		
Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes:	p osol amples routput	41% 59 0,1,0,3 4	66.2 5,1,1,0 4	F pt/ft3	P 20 a t t f 10 f 10	00			
Ambient tem Back-Gd aer No. Bk-Gd sa Compressor Notes: CA 10/22/12	p osol amples routput	41% 59 0,1,0,3 4 22	66.2 5,1,1,0 4	F pt/ft3	P 20 a t t f 10 f 10	00			
Ambient tem Back-Gd aer No. Bk-Gd sa Compressor Notes: CA 10/22/12 Oil Used:	p osol amples routput Edwards 1	41% 59 0,1,0,3 4 22	66.2 5,1,1,0 4 22	F pt/fl3 psig	P 20 a t t f 10 f 10				Side
Ambient tem Back-Gd aer No. Bk-Gd sa Compressor Notes: CA 10/22/12 Oil Used: Ref. Probe	p osol amples routput Edwards 1 Location:	41% 59 0,1,0,3 4 22	66.2 5,1,1,0 4 22 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F pt/fl3 psig	P 20 a t t f 10 f 10	00 500 500 500			Side
Ambient tem Back-Gd aer No. Bk-Gd sa Compressor Notes: CA 10/22/12 Oil Used:	p osol amples routput Edwards 1 Location:	41% 59 0,1,0,3 4 22	66.2 5,1,1,0 4 22	F pt/fl3 psig	P 20 a t t f 10 f 10				Side
Ambient tem Back-Gd aer No. Bk-Gd sa Compresson Notes: CA 10/22/12 Oil Used: Ref. Probe Probe Type	p osol amples routput Edwards 1 Location: e / Configure	41% 59 0,1,0,3 4 22 19 Ref port do ration:	66.2 5,1,1,0 4 22 0 wnstream L-Shaped	F pt/fl3 psig	P 20 a t 18 1 1 1 1 1 3	000 500 500 0 0 Bot			Side
Ambient tem Back-Gd aer No. Bk-Gd sa Compressor Notes: CA 10/22/12 Oil Used: Ref. Probe Probe Type Entries mad	p osol amples routput Edwards 1 Location: e / Configure	41% 59 0,1,0,3 4 22 22 22 22 22 22 22 22 22 22 22 22 2	66.2 5,1,1,0 4 22 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F pt/fl3 psig	P 20 a f 18 f 10 f 10 t 3 Technical E	000 500 500 0 500 0 Bot	performed by:	11/19/2012	Side
Ambient tem Back-Gd aer No. Bk-Gd sa Compressor Notes: CA 10/22/12 Oil Used: Ref. Probe Probe Type	p osol amples routput Edwards 1 Location: e / Configure	41% 59 0,1,0,3 4 22 19 Ref port do ration:	66.2 5,1,1,0 4 22 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	F pt/fl3 psig	P 20 a t 18 1 1 1 1 1 3	000 500 500 0 500 0 Bot		11/19/2012	Side

Rev. 0		PA	RTICLE TRA	CER TRAVER	SE DATA R	жM			
3 Aug. 2006	Site	LB-S1 Mode	el		Run No.	PT-8			
	Date	10/24/2012		Fan ce	onfiguration	Bottom			
	Tester	XY,CA			Fan Setting	45		Hz	
	Stack Dia.	11.8906	in.	:	Stack Temp	46.2	deg F		
S	tack X-Area	111.0	in.2	Sta	rt/End Time	930/1200			
	Test Port	1		Cen	ter 2/3 from	1.09	to:	10.80	
Distance to d	disturbance	123.5	inches	Points in	Center 2/3	2	to:	7	
Measure	ement units	particles/ft3		Inje	ection Point	Port 1 cent	er		
(Order>			1st			2nd		
-	Traverse>		Si	de			Bo	ottom	
	Trial>	1	2	3	Mean	1	2	3	Mean
Point	Depth, in.		partic	les/fl3			parti	des/ft3	
1	0.50	696	744	765	735.0	1190	1253	1174	1205.7
2	1.24	1045	1059	1122	1075.3	1613	1726	1652	1663.7
3	2.29	1028	1290	1183	1167.0	1829	1871	1788	1829.3
4	3.82	1207	1325	1319	1283.7	1901	1846	1940	1895.7
Center	5.91	1383	1398	1382	1387.7	1923	1956	1967	1 9 48.7
5	8.00	1358	1493	1446	1432.3	1871	2063	2014	1 9 82.7
6	9.52	1453	1589	1500	1514.0	1889	1986	2008	1961.0
7	10.57	1419	1476	1497	1464.0	1628	1679	1702	1669.7
8	11.31	1176	1414	1218		891	968	953	937.3
Averages	>	1196.1	1309.8	1270.2	1258.7	1637.2	1705.3	1688.7	1677.1
	All	pt/ft3	Dev	/. from mean	Center 2/3	Side	Bottom	A	Normizd
	Mean	1467.9			Mean	1332.0	1850.1	1591.0	1860.30
	Min Point	735.0		_19.9%	Std. Dev.	162.9	135.0	304.8	180.75
	Max Point	1982.7			COV as %	12.2	7.3	19.2	9.72
Avg Conc		pt/ft3			Instuments		1.0		Cal. Due
		Start	Finish		TSI VelociC	alc	T95351203001		12/17/2012
Generator Ini	et Press	4	4	psig	Fisher Scie	ntific	90936818		12/7/2012
Stack Temp		45.6	46.8		Met One OF	°C	1011529010		2/1/2013
Centerline ve	ਮ .	4564	4564	fpm	Met One OF	°C	1011529009		1/9/2013
Ambient pres	sure	29.56	29.65	inHg					
Ambient hum	nidity	42%	70%	RH					
Ambient tem	p	58.1	50.9	F					
Back-Gd aero	osol								
		0,1,2,0	0,1,0,3	pt/ft3	25	00 -			
No. Bk-Gd sa	mples	0,1,2,0	0,1,0,3	pt/ft3	25	00			
No. Bk-Gd sa Compressor	•		4						
	•	4	4	pt/ft3 psig	P 20	00		1	
	•	4	4				ıllı		
Compressor	•	4	4		р 20 а				
Compressor	•	4	4		р 20 а	100		ſ.	
Compressor	•	4	4		P 20 a - r ₁₀ - t	100			
Compressor	output	4	4		P 20 a - r ₁₀ - t	500	H		
Compressor Notes:	output	4	4		P 20 a . r 18 . t . f 10 . f		H		
Compressor Notes:	output	4	4		P 20 a . r 18 . t . f 10 . f	500			
Compressor Notes:	output	4	4		P 20 a . r 18 . t . f 10 . f				
Compressor Notes: CA 10/24/12	output	4 19	4		P 20 a . r 18 . t . f 10 . f				Side
Compressor Notes: CA 10/24/12	Edwards 1	.9	4 22	psig	P 20 a . r 18 . t . f 10 . f	000 500 500 500			Side
Compressor Notes: CA 10/24/12 Oil Used:	Edwards 1	4 19 .9 Ref port do	4 22	psig	P 20 a . r 18 . t . f 10 . f				Side
Compressor Notes: CA 10/24/12 Oil Used: Ref. Probe I Probe Type	Edwards 1 Location: / Configure	4 19 .9 Ref port do ration:	4 22 Dwnstream L-Shaped	psig of Port 1 Probe	P 20 a f 12 f 10 f 10 t 3	000 500 500 0 0 Bott			Side
Compressor Notes: CA 10/24/12 Oil Used: Ref. Probe I Probe Type Entries made	Edwards 1 Location: / Configur	4 19 9 Ref port do ration: Carmen Arin	4 22 Dwnstream L-Shaped	psig of Port 1 Probe	P 20 a f 12 f 12 f 12 t 3 Technical E	000 500 000 500 0 Bott	performed by:		Side
Compressor Notes: CA 10/24/12 Oil Used: Ref. Probe I Probe Type	Edwards 1 Location: / Configur	4 19 .9 Ref port do ration:	4 22 Dwnstream L-Shaped	psig of Port 1 Probe	P 20 a f 12 f 10 f 10 t 3	000 500 000 500 0 Bott		11/19/2012	Side

Appendix B

Document List

Appendix B: Document List

Project Plan	PP-WTPSP-045 Rev. 1	Air Sampling Probe Location Tests for Waste Treatment Plant HV-S1, HV-S2, IHLW-S1 (Group 3-4), and LAB C3V (LB-S1) Air Exhaust Systems					
Test Plan	TP-WTPSP-094	Air Sampling Probe Location Tests for Waste Treatment Plant LAB C3V (LB-S1) Air Exhaust System					
Test Instructions	TI-WTPSP-096	Measurements of LB-S1 Scale Model					
	TI-WTPSP-097	Calibration of Ventilation Flow Controller for LB-S1 Scale Model Stack					
	TI-WTPSP-098	Velocity Uniformity Measurements of LB-S1 Scale Model					
	TI-WTPSP-099	Determine Flow Angle in LB-S1 Scale Model Stack					
	TI-WTPSP-100	Tests of Gas Tracer Mixing in LB-S1 Scale Model Stack					
	TI-WTPSP-101	Tests of Particle Tracer Mixing in LB-S1 Scale Model Stack					
	CCP-WTPSP-1120 CCP-WTPSP-1294	LAB C3V (LB-S1) Scale Model Flowrate Calculations Scale Model Exhauster Dimensions LAB C3V (LB-S1)					
Calculation Package	es						
	CCP-WTPSP-1298	Calibration of Ventilation Flow Controller for LB-S1 Scale Model					
	CCP-WTPSP-1299	Determine Air Velocity Uniformity of LB-S1 Scale Model Stack					
	CCP-WTPSP-1300	Determine Flow Angle in LB-S1 Scale Model Stack					
	CCP-WTPSP-1175	Gas Tracer Mixing in LAB C3V (LB-S1) Scale Model Stack					
	CCP-WTPSP-1174	Determine Particle Tracer Uniformity of LAB C3V (LB-S1) Scale Model Exhausters					

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