

TRONOX

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September 30, 2008

Shannon Harbour, P.E.
Staff Engineer III
Bureau of Corrective Actions
Special Projects Branch
NDEP-Las Vegas Office

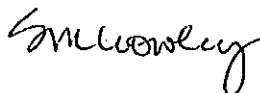
Subject: Response to NDEP September 18, 2008 Comments
Data Validation Summary Report (DVSR), Phase B Source Area Investigation
Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada
Dated August 25, 2008

Dear Ms. Harbour:

On September 18, 2008, the Nevada Division of Environmental Protection (NDEP) provided comments to the Tronox LLC (Tronox) Data Validation Summary Report dated August 25, 2008, which was prepared for the Phase B Soil Gas Survey conducted at the Tronox facility in Henderson, Nevada. This letter transmits the Tronox response to those comments.

If you have any comments or questions concerning this correspondence please contact me at (702) 651-2234.

Sincerely



Susan M. Crowley
Staff Environmental Specialist

Overnight Mail

Attachment: As stated

cc: See attached Distribution List

Tronox. Adding value beyond the product.

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Updated: 22-Sep-08

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Tronox Response to Comments

September 18, 2008 NDEP Letter Regarding Data Validation Summary Report (DVSR), Phase B Source Area Investigation Soil Gas Survey, Tronox LLC Facility, Henderson, Nevada (August 2008)

NDEP comment

- 1 **Helium Analysis:** Review of the laboratory reports from Columbia Analytical Services shows that helium analysis, using a modified method 3C, was performed on the Summa canister samples. It is unclear why helium analysis was required and why the soil gas samples would be exposed to helium. The DVSR should provide details on why helium analysis was performed along with a discussion of what impact helium detection in a sample has on the TO-15 results. For example, does helium indicate a soil gas sample was influenced from a purge gas? If helium detection in a sample does impact the VOC results the DVSR should also provide a validation of the helium analysis along with a discussion of the impact of helium results on the VOC data.

Tronox Response

Helium was used at each sample location as a tracer gas or leak-check compound during collection of soil gas samples. Ambient air has the potential to leak into the sampling system during sampling. This has the potential to dilute samples and produce results that underestimate actual site conditions or contaminate the sample with compounds present in the ambient air. Leakage can potentially occur at sample system connections, at surface bentonite seals (e.g., around rods and tubing), or at the top of the temporary soil gas probes.

The Interstate Technology Regulatory Council (ITRC) lists helium as an acceptable tracer compound for soil gas surveys. The laboratory (Columbia Analytical Services, Inc.), indicates that the presence of helium in a sample will not interfere with the TO-15 analysis and that the required reporting limits can still be achieved.

For the Phase B soil gas survey, the above-ground portion of the sample system (i.e., summa canisters, flow-controller, vacuum gauge, valves and tubing connections) was placed under a shroud (plastic box). Helium gas (provided by a compressed gas vendor) filled the shroud, creating an atmosphere surrounding the sampling system with between 5% to 55% helium. A hand-held helium meter was used to monitor the atmosphere within the shroud to ensure that the helium concentration was maintained as each sample was collected (see the attached **photos numbered 1 through 6**).

The laboratory was instructed to analyze each soil gas sample for helium as well as volatile organic compounds (VOCs). If helium was detected in a summa canister then the percent leak rate of helium was calculated for each sample (please see attached **Table E-8**). The ITRC, in their January 2007 document: "*Vapor Intrusion Pathway: A Practical Guideline*," indicate that: "A small amount of tracer in a sample does not necessarily indicate an unreliable sample. Some agencies, such as the New York Department of Environmental Conservation, allow tracer concentrations up to 10% of the starting concentration before considering the soil gas sample compromised. For gaseous tracer compounds, the starting concentration is the measured concentration under the shroud."

The percent leak for each soil gas sample where helium was detected is shown in the attached **Table E-8**. The percent leak was estimated as a ratio of the sample concentration to the average helium concentration measured in the shroud during sampling.

The helium concentration in the shroud was recorded at 5-minute intervals during sample collection. Of the fourteen soil gas samples with reported helium, the leak rate was estimated to be less than 1% in nine of the samples. The leak rate was estimated to be between 1% and 3% in three of the fourteen samples and greater than 3% in two of the fourteen samples. In four of the five samples where helium was reported above 1,000 parts per million by volume (ppmv) the soil gas probe was re-sampled (**Table E-8**). In the cases, where the soil gas probe was re-sampled, helium was not reported in the re-sample. Soil gas sample (SG17B-05) could not be re-sampled because the laboratory data was reported after the field team and sampling equipment had left the site.

For purposes of data validation protocols, where soil gas samples were found with He, at less than a 1% leakage rate, the VOC data were considered to be usable data and were not qualified. Those samples with a helium leakage rate between 1% and 10% were considered usable but were qualified as estimates (added "J" flag). Where the leakage rate exceeded 10% the associated VOC data are not considered usable and will be rejected in the revised dataset.

Tronox is currently updating the DVSR, results table and databases to reflect the changes following the protocols as described above. Finalization of this revision will require concurrence from NDEP on the approach toward data validation protocols using the helium leak rate. Helium data were provided on a results only basis by the laboratory because it was considered only a screening tool, therefore validation of the helium data will not be provided.

NDEP Comment

- 2 **Recommendation for Future Reports:** It would benefit the readability of the report if future reports included the following information in the Introduction section of the DVSR:
 - a. The number of SDGs included in this DVSR
 - b. The SDG IDs
 - c. The total number of samples taken
 - d. The number of samples taken within each SDG
 - e. An analyte list for each SDG.

Tronox Response

This information is provided in other sections of the DVSR and associated tables. A brief summary of this information and/or references to the appropriate tables containing the information will be included in the Introduction section of future DVSRs.

Table E-8
Calculated Helium Percent Leak for Phase B Soil Gas Samples
Phase B Source Area Soil Gas Investigation
Tronox Facility, Henderson, Nevada

Soil Gas Sample ID ¹	Soil Gas Probe Resampled Because of Elevated Helium (yes/no)	Re-sampled Soil Gas Sample ID	Helium Concentration Reported in the Soil Gas Sample (ppmV) ²	Starting helium concentration (%)	Helium concentration (%) inside the shroud measured every five minutes								Average helium concentration inside the shroud		% Average Leak ⁴	
					5 (min)	10 (min)	15 (min)	20 (min)	25 (min)	30 (min)	35 (min)	40 (min)	%	Converted ppmV ³		
SG42B-05	Yes. 5/29/08	SG42BR-05	14,000	8.6	7.1	5.0	12.2	10.9	10.2					9.1	90,800	15.4
SG53B-05	Yes. 5/29/08	SG53BR-05	5,000	11.5	8.1	5.2	15.6	9.4	8.9	8.4				9.3	92,667	5.4
SG64B-05	No	--	60	27.7	38.6	55.3	51.9	48.8	45.4					48.0	480,000	0.0
SG29B-05	No	--	120	7.9	9.4	8.7	7.3	6.7	6.3					7.7	76,800	0.2
SG60B-05	Yes. 5/29/08	SG60BR-05	1,100	7.2	9.0	6.9	5.0	7.2	5.9	12.9	6.3			7.6	76,000	1.4
SG76B-05	No	--	44	9.5	13.7	5.4	16.7	15.5	8.1	9.2	5.1	6.3		10.0	100,000	0.0
SG86B-05	No	--	83	14.6	10.5	7.2	5.2	7.6	5.2	6.9	5.5			6.9	68,714	0.1
SG32B-05	No	--	110	10.9	9.8	6.5	5.4	8.3	7.9	7.2	5.2	6.8		7.1	71,375	0.2
SG17B-05 ⁵	No	see note 5	2,100	11.3	10.1	8.9	8.3	7.6	6.5	5.4				7.8	78,000	2.7
SG18B-05	No	--	190	8.5	8.5	8.3	6.3	15.4	10.6	7.3	5.1	5.7		8.4	84,000	0.2
SG23B-05	No	--	45	15.5	13.8	10.7	8.6	6.0	5.5	8.1	6.1			8.4	84,000	0.1
SG73B-05	No	--	160	12.0	9.4	8.5	7.2	6.4	5.5	10.5	8.9			8.1	80,571	0.2
SG36B-20	No	--	110	16.6	6.7	6.1	5.3	27.5	17.1					12.5	125,400	0.1
SG94B-05	Yes. 5/29/08	SG94BR-05	1,700	6.6	5.4	6.8	5.1	9.6	5.6					6.5	65,000	2.6

Notes

- 1 The list of samples identifies the 14 soil gas samples (of the more than 100 samples collected) that contained detectable concentrations of helium.
- 2 All soil gas samples were tested for helium by the laboratory. Only those samples where helium was detected are shown
- 3 Conversion factor: 1% v/v = 10,000 ppm
- 4 % Average leak = $100 \times (\text{He concentration (ppmV) in soil gas sample}) / (\text{average He concentration (\%)} \times 10,000 \text{ ppmV})$
- 5 The soil gas probe (SG17B-05) could not be resampled because the laboratory data was reported after sampling equipment had been removed from the site.
- Not applicable.

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PHOTOGRAPHIC LOG

Client Name:
Tronox LLC

Site Location:
Henderson, Nevada

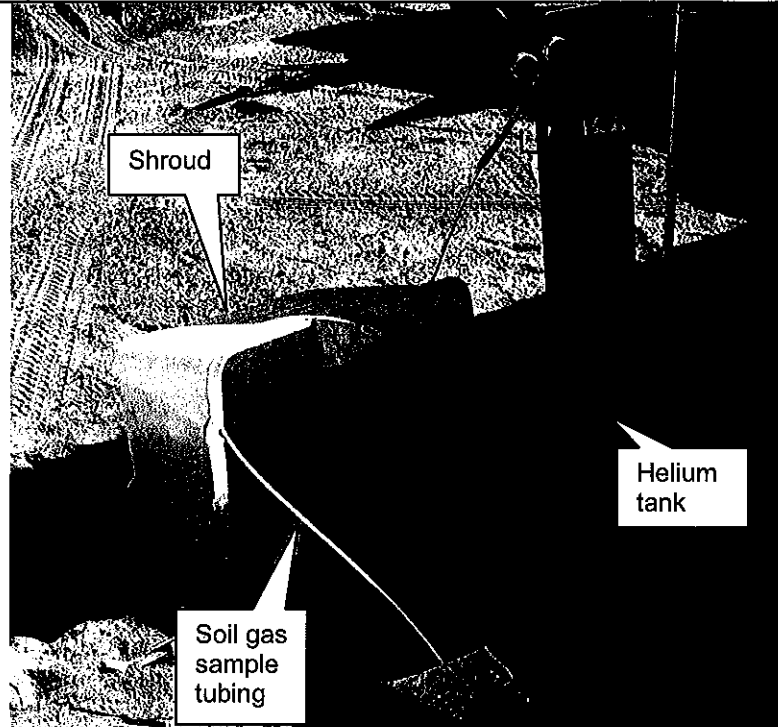
Project No.
04020-023-430

Photo No.
1

Date:
May-08

Activity:
Soil gas sampling

Description:
Preparation of sample point. The ground surface around the sample tubing is sealed with hydrated granular bentonite and covered with aluminum foil.



Shroud

Helium tank

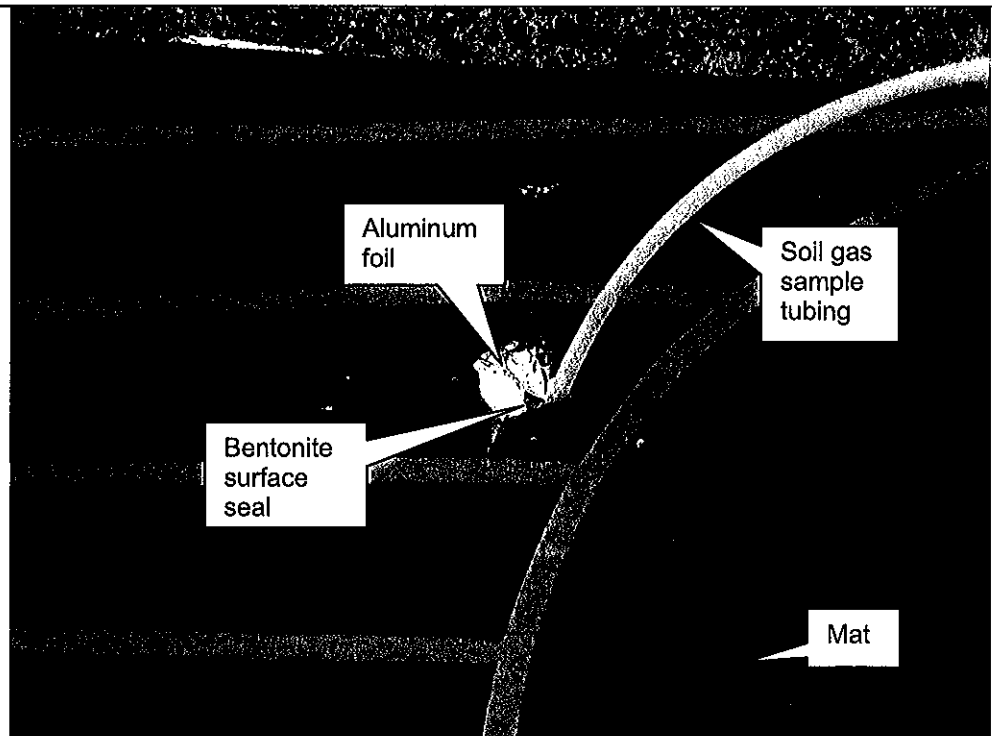
Soil gas sample tubing

Photo No.
2

Date:
May-08

Activity:
Soil gas sampling

Description:
Preparation of sample point. Mat acts as seal for the shroud.



Aluminum foil

Soil gas sample tubing

Bentonite surface seal

Mat

ENSR

PHOTOGRAPHIC LOG

Client Name:
Tronox LLC

Site Location:
Henderson, Nevada

Project No.
04020-023-430

Photo No.
3

Date:
May-08

Activity:
Soil gas sampling

Description:
Setup of purge and sample canisters. Soil gas-sampling tubing is connected to intake valve. A flow control device (i.e., critical orifice) maintains purge and sample rate at 200 cc per minute. Vacuum gauge allows field personnel to monitor the vacuum within the sampling system.

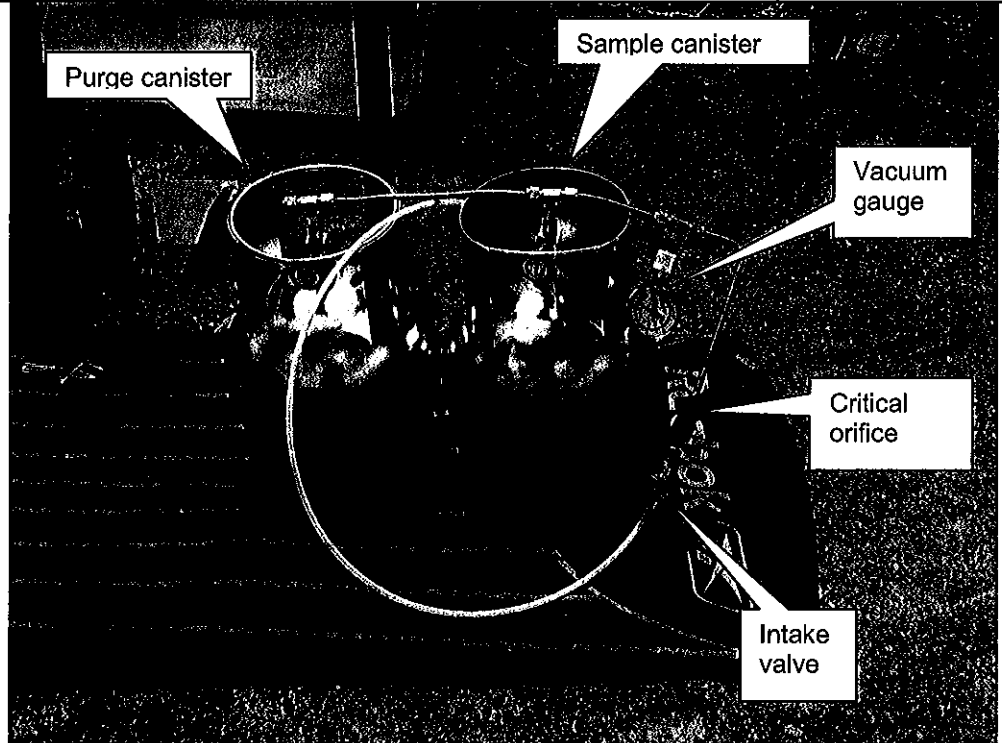


Photo No.
4

Date:
May-08

Activity:
Soil gas sampling

Description:
Setup of purge and sample canisters. Soil gas probe is set at 5 feet below ground surface. Soil gas flows from soil through tubing, to the intake valve, critical orifice, vacuum gauge, and into Summa canister.



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PHOTOGRAPHIC LOG

Client Name:
Tronox LLC

Site Location:
Henderson, Nevada

Project No.
04020-023-430

Photo No.
5

Date:
May-08

Activity:
Soil gas sampling

Description:
Sampling system in place and operational. Shroud is placed over the Summa canisters, gauge, valves, and tubing connections. Helium flows into the shroud creating a helium-enriched atmosphere.

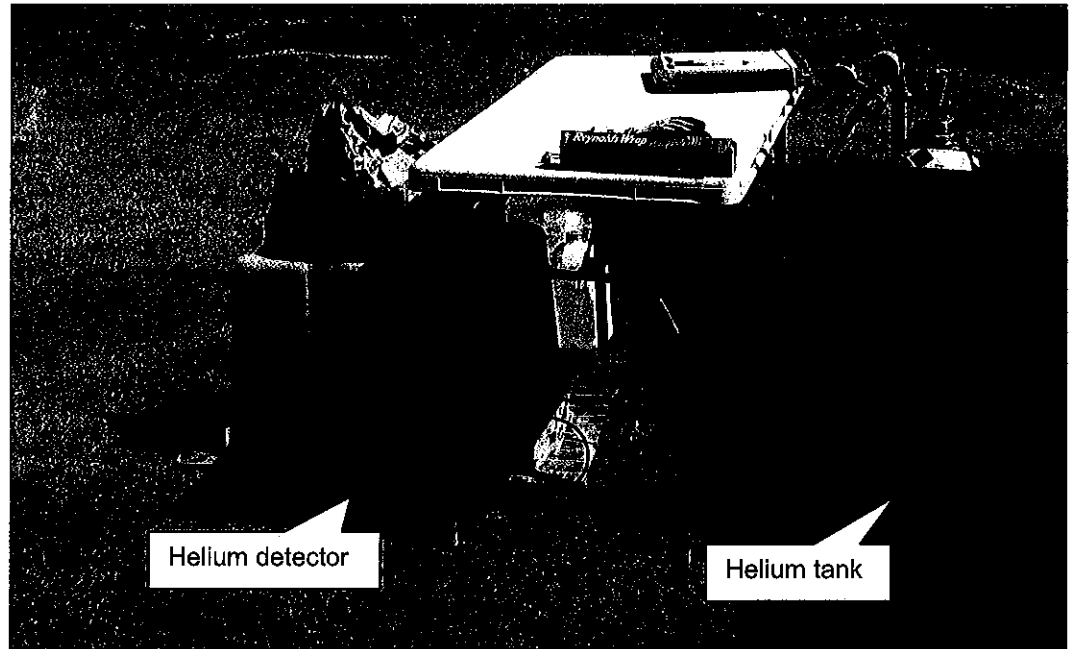
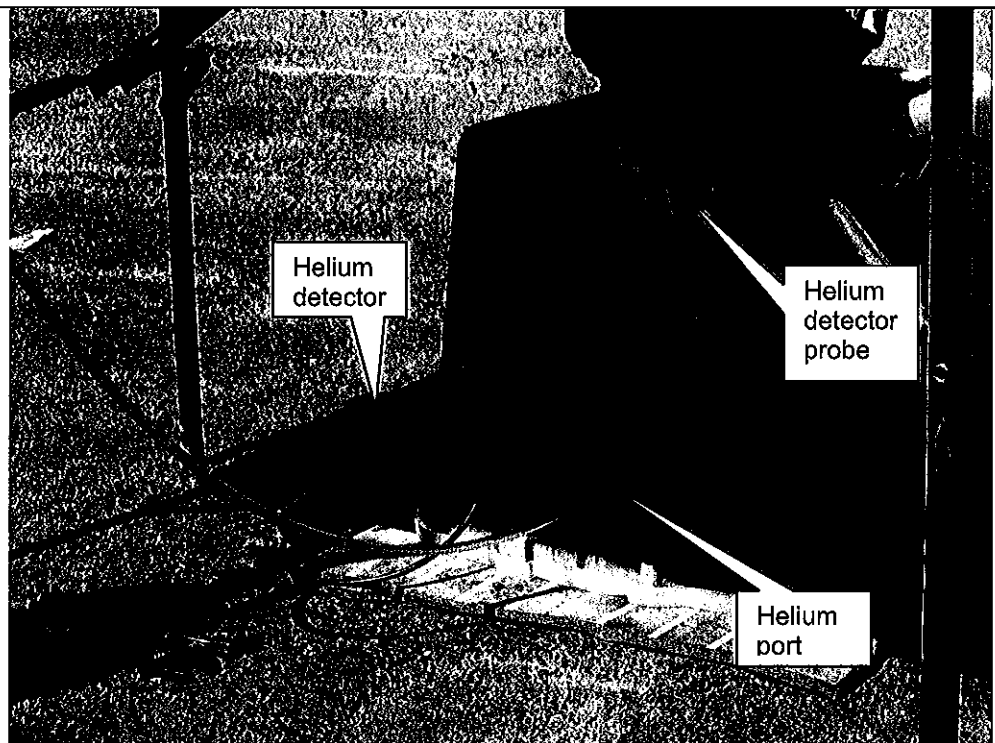


Photo No.
6

Date:
May-08

Activity:
Soil gas sampling

Description:
Sampling system in place and operational. Helium concentration inside the shroud is monitored with a handheld helium detector while the soil gas sample is being collected.



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October 2008
04020-023-4311

**Revised Data Validation Summary Report
Phase B-Source Area Investigation Soil Gas Survey
Tronox LLC Facility
Henderson, Nevada**

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October 2008
04020-023-4311

**Revised Data Validation Summary Report
Phase B-Source Area Investigation Soil Gas Survey
Tronox LLC Facility
Henderson, Nevada**