

Community Air Monitoring and Sampling Summary

Grove Incident

On June 23, 2016, Center for Toxicology and Environmental Health, LLC (CTEH®) initiated air monitoring in support of response operations for the Grove Incident in Ventura, California. This summary presents real-time air monitoring and analytical air sampling results from June 23, 2016 at 17:12 PDT to July 8, 2016 at 15:00 PDT at community locations near the Prince Barranca that are accessible to the public. To date, the results of real-time air monitoring and analytical air sampling in the community indicate that crude oil-associated compounds are not present at levels that would pose a health concern.

General Summary of Community Air Monitoring and Sampling Operations and Preliminary Results

CTEH® conducted real-time air monitoring at publically-accessible locations near the Prince Barranca. Real-time air monitoring refers to the use of direct-reading instruments that report nearly instantaneous measurements of an airborne substance. These data can be used to quickly evaluate air quality and identify conditions that may have an impact on community health and safety. Real-time air monitoring was performed for volatile organic compounds (VOCs), benzene, toluene, hexane, atmospheric flammability as percent of the lower explosive limit (%LEL), and hydrogen sulfide (H₂S). Notably, H₂S was not a primary concern, as the oil released did not contain high amounts of H₂S. A map depicting the locations of handheld real-time air monitoring are included as **Attachment A**.

Preliminary results of real-time air monitoring in the community:

- More than 6,000 real-time air monitoring readings were recorded with handheld instruments during community air monitoring operations from June 23, 2016, to July 8, 2016.
- Intermittent, low-level detections of VOCs have been reported in community areas immediately adjacent to the Prince Barranca. VOCs have not been detected in the community since July 1, 2016.
- Real-time air monitoring in the community has not detected benzene, toluene, hexane, %LEL, or H₂S.

In addition to real-time air monitoring, CTEH® began collecting analytical air samples at 00:32 PDT on June 24, 2016. Laboratory analysis of analytical air samples provides chemical-specific results at lower chemical detection limits than real-time instrumentation. Analytical air sampling stations were established at 7 fixed locations in the community near the Prince Barranca. Analytical air samples have been collected over 24-hour periods at these fixed locations and were submitted to an accredited laboratory for analysis of VOCs and H₂S. Human health risk-based screening levels developed for the VOCs benzene, toluene, ethylbenzene, and xylene (collectively known as BTEX) were used to evaluate the analytical air sample results. The California Office of Environmental Health Hazard Assessment (OEHHA) has developed Acute Reference Exposure Levels (RELs) for individual BTEX compounds which represent an exposure concentration that is not likely to cause adverse health effects in a human population, including sensitive subgroups, exposed to that concentration for a one-hour duration on an intermittent basis. The Agency for Toxic Substances and Disease Registry (ATSDR) has developed Acute Minimum Risk Levels (MRLs) for individual BTEX compounds which are an estimate of the daily human exposure to these compounds that is likely to be without appreciable risk of adverse non-cancer health effects over a 1-14 day exposure duration. The MRLs are set below levels that might cause adverse health effects in the people most sensitive to substance-induced effects. A comparison of the analytical air sampling BTEX results to OEHHA Acute RELs and ATSDR Acute MRLs are provided in **Table 1**.

Preliminary results of analytical air sampling in the community:

- 55 analytical air samples were collected in the community from June 24, 2016, to July 1, 2016.
- Results of analytical air sampling in the community indicate no exceedances of OEHHA Acute RELs or ATSDR Acute MRLs for BTEX compounds. As such, these compounds do not pose an airborne risk to human health. These concentrations are within the range of values reported for indoor air of homes.
- H₂S was not detected in any analytical air samples collected in the community.

Table 1: Summary of Analytical Air Sampling Results¹**6/24/2016 – 7/1/2016**

Analyte	Number of Samples	Number of Detections	Max Result (ppbv)	ATSDR Acute MRL ² (ppbv)	OEHHA Acute REL ³ (ppbv)	Max Result Above Screening Level?
Benzene	55	0	Not Detected ⁴	9	8	No
Toluene	55	31	37	2,000	10,000	No
Ethylbenzene	55	1	4.7	5,000	-	No
Xylenes (Total)	55	3	15.8	2,000	5,000	No

¹ Analytical results presented here have not undergone full QA/QC (quality assurance/quality control) analysis and are presented in a preliminary format.

² The Agency for Toxic Substances and Disease Registry (ATSDR) develops Acute Minimum Risk Levels (MRLs) for individual compounds which are an estimate of the daily human exposure to these compounds that is likely to be without appreciable risk of adverse non-cancer health effects over a 1-14 day exposure duration. The MRLs are set below levels that might cause adverse health effects in the people most sensitive to substance-induced effects.

³ The California Office of Environmental Health Hazard Assessment (OEHHA) develops Acute Reference Exposure Levels (RELs) for individual compounds which represent an exposure concentration that is not likely to cause adverse health effects in a human population, including sensitive subgroups, exposed to that concentration for a one-hour duration on an intermittent basis.

⁴ The laboratory method detection limit (MDL) for benzene is 2 ppbv.

“-“ = An OEHHA Acute REL has not been established for ethylbenzene.

Attachment A:

Map of the Locations of Real-Time Air
Monitoring Readings in the Community

