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CDPHE Comments on Global Community Monitor Report:
"Gassed! Citizen Investigation of Toxic Air Pollution from Natural Gas Development July 2011"

A coalition of environmental advocates, including "Global Community Monitoring", "San Juan Citizens Alliance", and "Battlement Concerned Citizens" have released a study that claims to have measured hazardous air pollutant levels due to natural gas activities that are far in excess of EPA thresholds. There are some serious technical deficiencies in the study. The following presents a brief analysis of this study developed by the Department's Air Pollution Control Division:

- Only 9 "grab samples" (2-3 minutes in length) were taken, at 8 different locations, and analyzed for VOC's.
  - This is a very small sample set and is not representative of a large area or a dispersed population.
  - Grab samples are not representative of long-term exposures.
- "Bucket Brigade samplers were employed.
  - These use Tedlar sample bags, which have issues.
  - Manufacturers do not generally recommend Tedlar bags for sub-ppm (low concentration) monitoring.
  - Tedlar bags are susceptible to retaining/adsorbing some VOC's, which can contaminate subsequent samples taken with the same bag. (Note: unknown if Tedlar bags are being re-used.)
  - Tedlar bags may potentially have high background concentrations of some VOC's and hydrogen sulfide.
  - Stability of some compounds in Tedlar bags, including hydrogen sulfide and acrylonitrile, is not good beyond 24-48 hours.
  - It is unknown if sampled Tedlar bags were kept out of sunlight during transport to reduce photochemical reactions.
- Risk analysis was performed using grab samples and long-term chronic risk factors.
  - Grab samples are not representative of long-term (lifetime) exposures from a single source and thus should not be used as estimates for long-term cancer/non-cancer risk.
  - Long-term (lifetime) exposure estimates need long-term average concentrations (e.g. 24-hour samples over an extended period) as source impacts are very variable.
  - Acute risk was not analyzed, though even these are generally based on 1-hour exposures and not grab samples.

- Other sources of air toxics beyond oil and gas sources were not investigated.
    - There are many sources of benzene, including motor vehicle exhaust, refueling operations, cigarette smoke, etc.
    - There are many sources of hydrogen sulfide, including animal operations, sewage treatment, stagnant ponds, etc.
    - There are many sources of other air toxic compounds, including vehicles, industrial facilities, water treatment facilities, household chemicals, etc.
    - No characterization was made on other possible sources in the area that may have had a significant impact on the sample.
- Sample locations were not described.
    - Other than the site across the road from Sunnyside School by a dehydrator unit, it is unknown if samples were taken immediately adjacent to facilities.
    - It is unknown if samples were taken at vent pipes, fencelines, or some other location.
    - It is unknown if samples were taken in emissions plumes.
- Background sampling and duplicate sampling was not conducted.
    - It is unknown if other sources in the area are contributing to a general "background" level of air toxics.
    - It is unknown if the Tedlar bags have a background concentration of any compounds from manufacturing or contamination.
    - No duplicate samples were taken to confirm the validity of the sampling and analytical methods.
- Meteorological measurements were not taken.
    - Without meteorological information, it is unknown if sampling was conducted in a plume, or where a plume may impact.
    - Meteorology has a large impact on how a plume disperses.
    - Meteorology is very variable throughout a day and will affect how long a person is exposed to a plume from a specific source.
- No QA plan or Standard Operating Procedures were included in the report, but were mentioned.
    - It is unknown exactly how training of personnel was done.
    - It is unknown if standard methods were used.
    - It is unknown if contamination may have occurred due to personnel actions and equipment during the sample collection and transport procedures.
    - Chain-of-custody is unknown.
- Hydrogen sulfide (H_2S) result is a puzzle that was not investigated by Global Community Monitor.
    - H_2S was detected once, at a high concentration, at a location near Silt in Garfield County, Colorado.
    - H_2S was only detected in 1 of the 2 samples that were taken on consecutive days.
    - The Piceance Basin (Garfield Co.) is not known for having much H_2S while the San Juan Basin in SW Colorado and NW New Mexico is known for the presence of H_2S.
    - This would possibly lead to either a contamination issue or a source other than oil and gas. It should be noted that there are many other possible sources for H_2S.

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