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October 31, 2017

Colorado State Judicial Branch
101 West Colfax Avenue, Suite 500
Denver, Colorado 80202

Attention: John Gossett

Subject: Air Quality Assessment
Archuleta District Court
Pagosa Springs, Colorado
Project Number 174618

Dear Mr. Gossett:

A. G. Wasseenaar, Inc. (AGW) conducted an air quality assessment at the Archuleta District Court building located in Pagosa Springs, Colorado on September 18, 2017. AGW returned on October 24, 2017, to meet with Dr. Michael Kosnett, M.D., a medical toxicologist, while he visited the building and interviewed court staff. The following report outlines AGW's findings and summarizes results of the sampling completed during our site visit.

EXECUTIVE SUMMARY

On September 7, 2017, AGW received a telephone call from the Colorado State Courts Administration office informing us that Archuleta Sheriff's offices and jail had been evacuated based on concerns surrounding the safety of the staff and air quality in the building. Based on an absence of information regarding this issue AGW advised the Courts to vacate while additional information was obtained. Some of the county offices in the original building remained open and are still occupied today.

On September 18, 2017, AGW visited the District Court, probation offices and the Court Clerk's offices to perform air sampling for general indoor air quality parameters (Carbon Dioxide- CO₂, Carbon Monoxide- CO, temperature and relative humidity- RH), arsine and hydrogen sulfide (H₂S). At the time of our visit the courtroom, probation and clerk's offices had been unoccupied for approximately two weeks. Air sampling was also performed in the meeting room and the Sheriff's offices in the adjoining building.

The CO₂ concentration measured outdoors upon arriving at the building was 530 parts per million (ppm) and CO was not detected, below the limit of detection (LOD) outdoors. Upon entering the Clerk's office, the CO₂ measured 900 ppm. In the hearing room in the morning, the CO₂ was 600 ppm and a sulfur "like"

odor was observed. The CO₂ in probation and the Judge’s chambers was 700 ppm while CO was below the LOD. H₂S and arsine were not detected in either building on this date.

In the Sheriff’s office and conference room, the CO₂ was 550 ppm and CO ranged from 0.1 to 0.6 ppm. The CO₂ increased to 1280 ppm as we moved toward the jail and the CO was between 0.2 and 0.9 ppm. The CO₂ and CO frequently fluctuated up and down within different rooms in this building. A sulfur “like” odor was noticed in most of the areas, and a musty smell was observed in the jail. I personally experienced a mild headache and dizziness while in this building.

The air sampling performed by AGW in this building is considered short-term periodic sampling. Although this air sampling is representative of the period-of-time we have spent in the building the air sampling results may not reflect what an occupant or tenant would experience over a longer term. Based on AGW’s observations it appears that the air quality and overall acceptability of the building environment changes based on the season, and possibly the underlying geological activity.

METHODS

Monitoring for CO, CO₂, temperature, and humidity was performed using a TSI Q-Trak Plus™ monitor. The Q-Trak measures CO between 0-500 ppm with a resolution of 0.1 ppm, and CO₂ between 0- 5000 ppm with a resolution of 1.0 ppm. H₂S and CO were measured with a calibrated MSA Sirius 4-gas meter. The Sirius meter measures H₂S between 3 – 200 ppm and CO between 0 – 150 ppm. Arsine gas was measured with Gastec detector tubes with a detection limit of 0.04 ppm.

Additionally, considering the numerous medical concerns exhibited by the staff that works in the facility, AGW brought a medical toxicologist into this project to assist in the assessment of the facility. A separate report from Dr. Kosnett will be forthcoming.

RESULTS

**Table 1:
Air Sampling
Archuleta County Courthouse
September 18, 2017**

| Area Sampled | Temperature | Relative Humidity | Carbon Dioxide (CO ₂) | Carbon Monoxide (CO) |
|------------------|-------------|-------------------|-----------------------------------|----------------------|
| Clerk’s offices | 63°F | 50% | 900 ppm | BDL |
| Hearing room | 68°F | 41% | 603 ppm | BDL |
| Jury room | 68°F | 44% | 747 ppm | BDL |
| County Courtroom | 61°F | 46% | 700 ppm | BDL |
| Judge’s chambers | 67°F | 40% | 665 ppm | BDL |
| Probation | 69°F | 40% | 700 – 777 ppm | BDL |
| Outdoors | 62°F | 41% | 530 ppm | BDL |

Legend:

ppm = parts per million. BDL – below the detection limit.

**Table 2:
Air Sampling
Archuleta County Sheriff's Office
September 18, 2017**

| Area Sampled | Temperature | Relative Humidity | Carbon Dioxide (CO ₂) | Carbon Monoxide (CO) |
|------------------------------|-------------|-------------------|-----------------------------------|----------------------|
| Sheriff's office | 69°F | 38% | 550 ppm | 0.6 ppm |
| Tracy's office – sulfur odor | 67°F | 39% | 530 ppm | 0.5 ppm |
| Hallway at Sheriff's office | 67°F | 38% | 1280 ppm | 0.5 ppm |
| Court office | 67°F | 38% | 1060 ppm | 0.9 ppm |
| Alvin's office | 67°F | 40% | 1300 ppm | 0.9 ppm |
| Detective's offices | 69°F | 40% | 1050 ppm | 0.8 ppm |
| Holding cell 1 | 67°F | 41% | 900 ppm | 0.4 ppm |
| Holding cell 2 | 67°F | 41% | 800 ppm | 0.7 ppm |
| Old control room | 67°F | 41% | 1005 ppm | 0.4 ppm |
| Booking area | 67°F | 41% | 572 ppm | 0.7 ppm |

DISCUSSION

AGW first visited the courthouse and Court Clerk's office in May 2014, and we have reviewed air quality assessment reports from other consultants dating to 2006. During our work at the building, we have evaluated general air quality, heating and cooling issues, roof leaks, roof structure, and bats in the attic. It is our understanding that the roof over the Court Clerk's area has been replaced. Heating and cooling remain an issue as evidenced by the water stained and missing ceiling tiles below the fan coil units (FCUs) in the Clerk's office. It is believed that the bats have been removed or relocated.

Air Quality

Carbon dioxide is a colorless gas that is generated as a byproduct of respiration and combustion. Carbon dioxide levels in an occupied area can be used as an indicator to determine if the ventilation system is adequately exchanging the indoor air with fresh, outside air. The American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) recommends that carbon dioxide levels remain below 1,000 parts per million (ppm) and not more than 700 ppm greater than the outdoor concentration in occupied areas.

AGW measured CO₂ in the Clerk's and Sheriff's areas up to 2X the outdoor concentration even though these areas had not been recently occupied. These measurements continue to demonstrate that the ventilation systems in the Clerk's office, Probation, and the Courts circulate the air but do not provide adequate ventilation and outside, fresh air. ASHRAE Standard 62 recommends a ventilation air flow rate of 5 – 10 cubic feet per minute (CFM) of outside air per person based on the use of the space, and under normal conditions. Based on the presence of sulfur odors and elevated CO₂ in the building it is AGW's opinion that the Clerk's office and courtroom are not normally anticipated conditions. It is probable that the fluctuating levels of CO₂ and CO measured in the jail and Sheriff's offices demonstrate an influence from the geothermal activity below the buildings.

Carbon monoxide is a colorless, odorless, tasteless, flammable, and toxic gas. Carbon monoxide is a major product of incomplete combustion of carbon and carbon-containing compounds and is normally present in the exhaust of vehicles, second-hand cigarette smoke, and as an emission from coal stoves, furnaces, and gas appliance which do not get enough air for complete combustion. Health effects from exposure to carbon monoxide can include a slight headache, nausea, diarrhea and “ringing in the ears.” The World Health Organization (WHO) Indoor Air Quality Guidelines, 2010, discusses carbon monoxide at length. The WHO has recommended a 24-hour limit of 6 ppm, (7 mg/m³), which might be suitable for work shifts exceeding 8-hours. During this study, AGW did not detect carbon monoxide, at the limit of detection, in the Court Clerk’s offices, probation or the County Courtroom. Carbon monoxide was measured between 0.4 and 0.9 ppm in the Sheriff’s office and jail. The measured CO concentration fluctuated up and down while in the jail building.

AGW did observe a sulfur odor in the Hearing Room, Sheriff’s offices and in the jail. A musty odor was observed in the jail control room. Hydrogen sulfide is a colorless gas with the characteristic foul odor of rotten eggs. Hydrogen sulfide (H₂S) was not detected in the buildings with the instrument used during this assessment. The odor threshold for H₂S, the concentration where individuals can detect the gas, is about 0.03 to 0.05 ppm, although some people can detect H₂S at lower concentrations. California has established an Ambient Air Quality Standard (limit) for H₂S at 0.03 ppm based on the odor.

In October 2016, the Pagosa Springs Fire Department, at various times, did detect H₂S in the jail facility. The Colorado Department of Public Health and Environment (CDPHE) did identify varying levels of H₂S in the facility in October 2017.

The question of whether long-term or continuous air monitoring would be possible in the space has been asked by Court staff and others. The short answer is yes although AGW has not seen this type of monitoring in office environments for parameters not related to temperature control and comfort. Personal air monitors, those worn by the person, are not generally applicable to an office environment. Typically, this type of personal monitoring equipment is used in petroleum production and refining, sewer and wastewater treatment, agricultural silos and pits, and in mining.

OBSERVATIONS

A new roof was observed over the Court Clerk’s offices. The Clerk’s office, probation, and the County Courtroom were unoccupied. The CO₂ concentration was higher indoors compared to the outdoor concentration which AGW believes is related to gases originating from beneath the building.

The Sheriff’s offices and the jail had a noticeable sulfur odor and carbon dioxide and carbon monoxide at levels higher than the outdoors. There were indications of roof leaks over the jail cells and the control room. AGW observed a musty odor in the jail area. Floor drains in the cells had been covered with plastic to stop odors from coming into the jail and offices. Some of the cast iron sewer lines have been abandoned and rerouted across the garage floor.

CLOSING

The air sampling performed by AGW on September 18, 2017, identified CO₂ in the Clerk's offices and County Courtroom at concentrations higher than the outdoors. This condition demonstrates the deficient ventilation system and inadequate dilution ventilation in the space. This air sampling is only applicable to the date and time we sampled. Conditions observed and experienced in the Clerk's office and the Sheriff's office/jail indicate a building that is not maintained, and in our opinion, is unhealthy.

A separate report from Dr. Kosnett will be forthcoming and will detail his findings regarding the building environment on the health and wellbeing of the people that work in the facility.

AGW recommends that the State Courts not reoccupy the building.

Please contact us for any clarification of the information presented in this report.

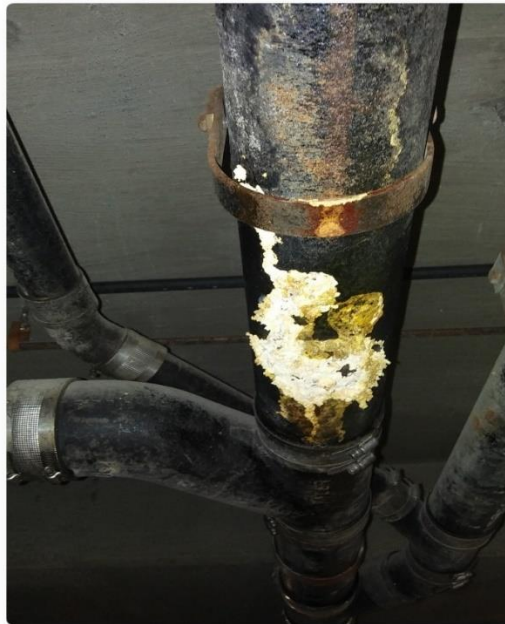
Sincerely,
A.G. Wassenaar, Inc.



Joseph D. Gifford, CIH
Principal Project Manager

JDG/mjg

ATTACHMENT



These photographs display the conditions of the plumbing in the jail area. Note that the cast iron has failed and has been replaced with PVC which is installed across the floor in the garage.