

# Office of the State Court Administrator

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11/17/14

**Gerald A. Marroney**  
*State Court Administrator*

**Mindy Masias**  
*Chief of Staff*

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*Judicial Legal Counsel*

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District 3 – Commissioner Michael Whiting  
County Administrator – Bentley Henderson  
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Dear Archuleta County Commissioners

As stated to you in our letter of March 2014, significant concerns regarding the health and safety of the Archuleta County Courthouse have been raised. Since receiving the complaints, we have completed a series of tests to determine if the safety of staff and the community are at risk. This letter serves to:

1. Summarize the results of spatial, environmental, mechanical and structural engineering reports. Full reports are also attached to this letter for your reference.
2. Articulate Judicial Department expectations under C.R.S. 13-3-108.

In July 2013, the Archuleta County Commissioners were presented with the first notice of problems existing throughout the building occupied by Courts and Probation. In the spring of 2014, complaints were received from employees ranging from respiratory issues to ongoing headaches. Workers compensation claims were filed for several employees in March 2014 as a result of these concerns.

AG Wassenaur was contracted with to conduct industrial hygiene testing in April 2014, including review of mechanical systems in August 2014. Structural Engineer, James Van Liere reviewed the roof structural in October 2014.

### **SPACE PLANNING (Full Report Attached, dated 9/23/2014)**

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In July 2013, the State Court Administrator's Office Facilities Division provided a space study report to the county on behalf of the 6<sup>th</sup> District Courts and Probation Department. In the report, a significant number of concerns were raised:

- **Lack of Adequate Courtrooms** – The current facility has only one adequate courtroom, however, two and sometimes three courtrooms are needed.
- **Lack of General Maintenance** - The building is in general disrepair due to aging, overcrowding and deferred maintenance and housekeeping. The cosmetics, paint, trim, ceiling tiles are in need of attention. Carpeting is discolored and worn and some stair treads have loose materials, which could present trip hazards. The roof has been leaking for quite a while however the county has initiated repairs and replacement of both the roofing materials and the roof sub-structure. There are reported vermin, birds and bats gaining access through unknown penetrations. There is a viable concern that air quality within the facility could be compromised by the combination water infiltration, dust and organic materials creating a condition conducive to mold and bacteria.
- **Security Problems** - There are a total of 4 entrances to the building, which hampers any ability to screen the public before entering. Currently security staff and x-ray equipment is posted near the second floor courtroom and probation department, however public entering the first level hearing room and clerk's office may enter the facility, unscreened by security personal.
- **Circulation Zones Non-Existent** - Circulation zones, which are required to separate staff, public and in-custody traffic, are not possible in the current room configuration. For example, judges and staff who use the main



courtroom for court hearings must either use the front entrance or rear fire escape to exit and must re-enter the building using a different door to access the BOCC hearing room.

- **Mechanical and Temperature Control** - The mechanical / temperature control systems are outdated and inadequate and have diminished ability to balance heat and cool in a climate with extreme temperature swings. It is common for one sector the building to be far too hot while the other is too cold. The cooling system has locked up on occasion and has been inoperable for days at a time.
- **Electrical Systems are Inadequate** - The electrical systems in the building are undersized and outdated to meet the increasing demand of the courts technology systems. There are numerous extension cords and surface conduits to distribute power. Additional telephone and data cabling is problematic to install and upgrade because of a non-centralized floor plan.
- **Lacking ADA Compliance** - The court areas are not ADA compliant for judges, staff, or public, specifically jurors, witnesses, and litigants. The elevator has a history of breakdowns and entrapments. Frequently, wheelchair bound litigants must remain on the first level and court or probation staff come down to assist them.
- **Lack of Holding Cells and Prisoner Traffic Routes** - No holding cells or secure prisoner traffic routes for in-custody defendants are provided. This is a significant issue, which has been a primary driver of other Colorado courthouses to remodel and sometimes rebuild. In Archuleta, prisoners appearing in court are walked to the courthouse where they are brought up the back fire escape or the interior public staircase to the courtroom level. There is no separate route for escorted prisoners to be delivered the courtroom. In all cases they are brought in through the public waiting area where they may contact family, friends, and victims. A disturbance or confrontation is always a possibility. Because there are no holding cells, all in-custody defendants are delivered directly to the courtrooms regardless of the readiness of the court.

- **Inadequate Restrooms** - There are inadequate available restrooms. Increasing caseloads and increased staff have increased the demand for restroom facilities.
- **Inadequate Meeting Space** - The lack of adequate meeting and conferencing facilities creates compound conflicts for spaces designated for other uses such as jury rooms.
- **Inadequate Queuing Space** - There is inadequate queuing, lobby and waiting areas for public, attorneys and probationers to await their appointments.
- **Inadequate and Unsafe Probation Offices** - Probation services have far outgrown their allocated space and are lacking the essential accommodations to safely carry out their workload. There is no secured waiting area for probationers arriving for appointments; there are no classrooms, or conference/training areas. All probation offices are too small and overbooked. There is no provision or available space to separate waiting victims, witnesses, and defendants and families.
- **Insufficient Jury Space** - Jury call is always a challenge due to insufficient assembly area. Because of limited courtroom availability, the Clerk of Court is constantly juggling the docket to meet the 180 day Speedy Trial requirement on criminal cases which ultimately pushes civil docket hearings further out on the calendar.
- **Insufficient Office Space** – Integral personnel are without permanent offices to prepare for the docket and conduct their business. There are insufficient meeting and interview rooms.
- **Lack of Confidential Meeting Space** – Confidentiality is essential for Judicial Department business, however, compromised under present conditions. There is no space available for judicially provided programs and services such as Mediation Services, First Appearance and Disposition, Litigant Self Help Center and Public Access Terminals.
- **Insufficient Square Footage** – The current space provided by the County is approximately 6000 square feet. However, **to adequately house the courts and probation, ensure proper space for security are in place and ensure**

**the public is adequately served, approximately 18,658 square feet are required.**

It is the opinion of the State Court Administrators office that, because of the combination of facility shortcomings, overcrowded conditions and rapidly growing caseloads, the Archuleta County court is the most over-stressed and challenging, and potentially unsafe courthouse in Colorado for both staff and customers.

### **INDOOR AIR QUALITY REPORT (Full Report Attached – See AG Wassenaar Report Dated 10/1/2014)**

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AGW identified slightly elevated fungal spore levels in the Probation offices. Although no obvious mold growth was observed the occupants did report that water leaks had previously occurred in the area. Additional observations and testing may be needed in this area to address these conditions. It is likely that the absence of outdoor make-up air, the lack of heating in the winter, and higher fungal/particulate levels in the Probation area will aggravate allergies and result in more complaints of poor air quality.

Indoor air quality screening identified elevated carbon dioxide (CO<sub>2</sub>) concentrations in all areas of the Archuleta County Courthouse Building. This condition indicates that outside air is not being adequately introduced into the work areas by the current ventilation system. Carbon monoxide (CO) was not detected. The temperature was generally measured within the ASHRAE comfort guidelines while relative humidity levels were very low, but consistent with outdoor ambient conditions.

Temperature control issues and temperature swings during the heating season were a common complaint by the building occupants.

The presence of carbon dioxide concentrations in excess of 1,000 ppm and the elevated “dust” levels in this workplace should be addressed to assist in increasing the comfort level and helping to alleviate respiratory irritation and odors for the occupants. AGW provides the following recommendations for your consideration (BOLD items should be considered a priority):

1. Evaluate the feasibility of a building-wide ventilation control and monitoring system.

- 2. Repair all AC condensing units and heating coils.**
- 3. Provide outside make-up air to all FCUs.**
- 4. Increase the frequency of housekeeping in all occupied areas.**
- 5. Direct all bathroom exhaust systems to the outside.**
6. Have the roof framing system evaluated by a structural engineer during the roof replacement project (COMPLETED BY JAMES VAN LIERE IN OCTOBER 2014).

### **MECHANICAL ENGINEER RECOMMENDATIONS (Full Report Attached – See Report from Bob Barrett dated 8/26/14)**

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At minimum, a complete cleaning, and adjustment is required (including refrigerant charge management) for the FCU/CU units that serve this area. The BOCC Meeting area should be provided with a control damper (and its own thermostat), and balanced to provide adequate cooling when occupied. Like all of the other areas, DOAC or ERV ventilation is required for the unit and the BOCC Meeting room.

### **STRUCTURAL REPORT RECOMMENDATIONS (Full Report Attached – See Report from James Van Liere dated 11/12/2014)**

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Inasmuch as the roofing for this building is scheduled to be replaced next year, it is recommended that not only the roofing material be removed, but also the decking in Area A. This would expose the framing members supporting the roof and make it possible to remove the existing 1 x 4 bracing in Span A and the 1 x 6 bracing in Span D and install a new bracing configuration as shown in Figure Nos. 9 and 10. This bracing configuration, known as a Pratt truss, has been used for many years prior to 1929 and has many advantages. Specifically, the shorter vertical members are in compression and the longer diagonal members are in tension. This also places the top chord in compression and the bottom chord in tension. With the deck removed, it would be fairly easy and economical to modify the existing roof framing.

As requested by the Colorado Judicial Courts and Probation Department of the State of Colorado, this report is prepared for the purpose of estimating the snow load capacity of the roofs, especially the original, high roof, of the Archuleta County Courthouse in Pagosa Springs, Colorado.

To arrive at an accurate and precise answer has proved to be a difficult task because of the lack of drawings and specifications used to construct the entire roof framing for this structure. In addition, with respect to the high roof framing, some of the original timber members were broken, cracked or missing. In addition, in the fall of 2013, structural modifications were made to the existing, high roof framing; but, unfortunately, some of these modifications were flawed with respect to their installation. Another issue that was presented in the assessment of the snow load capacities for this structure is the fact that prior to the modifications to the original roof framing in the fall of 2013, all of the roofs of the courthouse have historically withstood some very heavy snow loads, possibly in the range of 100 to 120 psf.

The net result of attempting to arrive at a precise answer for the snow load capacity of the original, high roof was to assume material properties for the original framing based on experience and engineering judgment. To that end, it is estimated from a theoretical point of view that the snow load capacity for this roof is 57 psf. However, it is still important to remember that two counter intuitive issues cloud this figure, namely that the roof has withstood some historically heavy snow loads and that some of modification installations made in the fall of 2013 are flawed.

It is recommended that the flaws in this work be corrected, preferably prior to the expiration of the warranty.

#### **BAT ERADICATION AND BAT GUANO REMOVAL (Full Report Attached – See AG Wassenaar Report date 10/13/2014)**

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In November 2014, County Administrator Bentley Henderson was notified of bat guano located in the attic of the Archuleta County Courthouse. The County Administration promptly responded to the concern and hired an outside company to remove the guano safely. ***However, concerns remain that nothing has been done to mitigate the roosting or entry of bats or other vermin in the building.***

## **JUDICIAL DEPARTMENT EXPECTATIONS UNDER C.R.S. 13-3-108**

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Under C.R.S. 13-3-108, the county, “shall continue to have the responsibility of providing and maintaining adequate courtrooms and other court facilities including janitorial service...”

The health and safety of staff and the public are of utmost concern. Below is a list of demands that require attention and resources from the County. After review of this report and all technical expert reports attached hereto, and the ability to ask questions of Judicial Department staff and technical experts at your Commissioners’ Meeting on December 16<sup>th</sup>, 2014, we request to engage in an interactive process to establish a plan of action that rectifies the following concerns:

### Space Demands:

It is estimated the courts and probation need almost 19,000 square feet of space, approximately 13,000 more square feet than currently exists.

1. Provide space, including reconfiguration of existing space, for:
  - a. Three courtrooms, corresponding jury rooms, holding cells and private prisoner access.
  - b. Three confidential meeting rooms for attorneys to meet with clients or for court ordered mediation.
  - c. Create a confidential space for a self help center and public access terminals.
  - d. Expand the queuing area for the public in the Clerk’s Office and waiting areas outside courtrooms.
  - e. Increase the number of restrooms and provide separate restrooms for public and employees.
  - f. Reconfigure space to allow for security screening of the public to occur on the first floor. Create one door access for the public and separate entrance and exit for staff to address security concerns.
  - g. Create a secure waiting area for probation clients.
  - h. Expand the probation office space.
  - i. Provide private office space for each probation officer and supervisor.

- j. Provide separate meeting space to meet with victims.
2. Repair and maintain the existing elevator to ensure proper ADA access to the building.
3. Create a scheduled maintenance plan for the building that includes and is not limited to:
  - a. Housekeeping requirements that includes cleaning and dusting of common space, bathrooms, vacuuming of entire facility, carpet cleaning etc.
  - b. Cosmetic attention for maintaining painting and repair of walls, trim and ceiling tiles.
4. Repair openings that allow vermin to enter the building.
5. Evaluate the feasibility of a building-wide ventilation control and monitoring system.
6. Repair all AC condensing units and heating coils.
7. Provide outside make-up air to all FCUs.
8. Direct all bathroom exhaust systems to the outside.
9. Roofing material be removed, including the decking in Area A. This would expose the framing members supporting the roof and make it possible to remove the existing 1 x 4 bracing in Span A and the 1 x 6 bracing in Span D and install a new bracing configuration.
10. Building inspection reports after completion of roof repairs are complete are shared with the Judicial Department.

We will plan to attend the December 16<sup>th</sup>, 2014 meeting in order to be available to answer questions pertaining to these reports. We also would like to schedule a follow up meeting discuss next steps no later than 1/30/15. Please contact Mindy Masias, Chief of Staff at [mindy.masias@judicial.state.co.us](mailto:mindy.masias@judicial.state.co.us) if you have any questions before then.

Sincerely,



Gerald Marroney  
State Court Administrator



# Office of the State Court Administrator

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## Colorado Judicial Facility Space Needs Assessment:

### Archuleta County Combined Court and Probation Department

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Judicial Business Integrated

*With Technology Services*

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Report prepared by Tom Franklin  
Colorado Judicial Facilities Planner

September 23, 2013

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# Archuleta County Combined Court Space Assessment

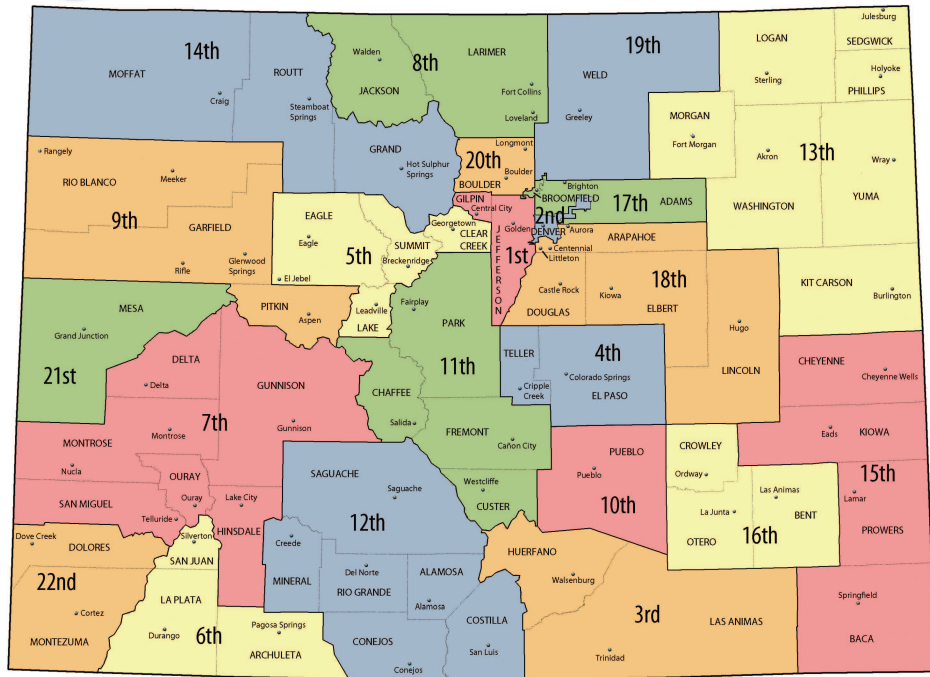


**Judicial Space Need Assessment** The following space needs exercise has been prepared by the State Court Administrators Office, the District Administrator, Chief Judge and Chief Probation Officer of the 6<sup>th</sup> Judicial District. The intent of this report is to compile and report the space requirements, building amenities, and potential construction scope of a new or remodeled Archuleta County Justice complex to achieve the immediate needs as well as 25 year projections of Archuleta County and the 6<sup>th</sup> Judicial District.

The 6th Judicial District is one of 22 in the State of Colorado and is a part of the Colorado Judicial Branch. All employees of the district are State Judicial Employees. All court operating budgets are allocated by the State Legislature through the State Judicial Department to the various judicial districts. All facilities and facility maintenance for the court operations are provided by the local governments per statute C.R.S. 13-37-108.



# COLORADO JUDICIAL DISTRICTS



The **6<sup>th</sup> Judicial District** is located along the central northern border of New Mexico and along the western edge of the Continental divide and is comprised of three counties. The member counties are La Plata, Archuleta and San Juan.

### Census and DOLA demographic information:

The population of Archuleta County has steadily increased over the last 30 years and was once one of the fastest growing counties in Colorado. During the economic downturn of the last decade the population had decreased. Currently, population growth is at 2% per year and this trend is predicted to increase to 4% over the next 10 years. The unemployment rate in Archuleta County currently stands at 9.7 %. The main economic drivers of Archuleta, are the service industry, retail, tourism, hospitality, governmental, education, construction and agriculture. 11% of the workforce of Archuleta County is employed in Mineral County at the ski resort.

**The current population in Archuleta County is 12,070. Under current trending, the Department of Local Affairs (DOLA) estimates that the population could increase by 6000 - 10,000 in the next 25 years.**

## **The Current Archuleta Court Facility Assessment**

The Archuleta County Courthouse at 449 San Juan Street, Archuleta, Colorado has served the judicial needs of the community for most of a century. This facility was originally constructed in 1928 to house the courthouse and county offices. A county jail was also constructed on the same block. Over the last few decades, both the jail and County administration has expanded increasing the justice footprint to most of the block. The original 2 story courthouse has maintained its judicial functions however the court offices have relocated all over the building. There had been two courtrooms in the building in the original floor plan however one was temporarily displaced by during a remodel and was never restored, leaving the courthouse with only one true courtroom.

The current office spaces by government are listed as follows:

### **County**

- Clerk and Recorder, County Treasurer, Tax Assessor, County Administration, BOCC, Public Hearing Room, Election Board , County Attorney, and Facilities Department.

### **Trial Courts**

- The State Courts occupies room and areas for 1 courtroom, 2 judge's chambers, one jury deliberation, clerks area, clerk of court office, one conference room, a storage closet and a public transaction counter

### **Probation**

- Probation has an open area used for waiting clerical and security screening and there are an additional 3 probation officer offices and a supervisor's office

### **Sherriff**

- The County Sheriff area has a detention facility with 32 beds, sheriffs administration and patrol headquarters

## **Courthouse Limitations and Building Deficiencies**

**The following is an objective description of current building conditions, size and infrastructure constraints.**

- The courthouse is a 3 story historical building which over time has expanded and evolved into a disjointed combination of County and judicial departments. There is only one true courtroom where two and sometimes three are needed. The Commissioners' Hearing has to function as second courtroom for three days a week when the District

Court judge sits in Archuleta County. This arrangement obviously creates scheduling conflicts for both the county and judicial docket.

- The building is in general disrepair due to aging, overcrowding and deferred maintenance and housekeeping. The cosmetics, paint, trim, ceiling tiles are in need of attention. Carpeting is discolored and worn and some stair treads have loose materials which could present trip hazards. The roof has been leaking for quite a while however the county has initiated repairs and replacement of both the roofing materials and the roof sub-structure. There are reported vermin, birds and bats gaining access through unknown penetrations. There is a viable concern that air quality within the facility could be compromised by the combination water infiltration, dust and organic materials creating a condition conducive to mold and bacteria.
- There are a total of 4 entrances to the building which hampers any ability to screen the public before entering. Currently security staff and x-ray equipment is posted near the second floor courtroom and probation department however public entering the first level hearing room and clerk's office is unscreened by security personal.
- Circulation zones, which are required to separate staff, public and in-custody traffic, are not possible in the current room configuration. For example, judges and staff which use the commissioners hearing room for court hearings are exiting the building from either the front entrance or rear fire escape to walk outside to access the BOCC hearing room.
- The mechanical / temperature control systems are outdated and inadequate and have diminished ability to balance heat and cool in a climate with extreme temperature swings. It is common for one sector the building to be far too hot while the other is too cold. The cooling system has locked up on occasion and has been inoperable for days at a time.
- The electrical systems in the building are undersized and outdated to meet the increasing demand of the courts technology systems. There are numerous extension cords and surface conduits to distribute power. Additional telephone and data cabling is problematic to install and upgrade because of a non-centralized floor plan.
- The court areas are not ADA compliant for judges, staff, or public, specifically jurors, witnesses, and litigants. There is an elevator however it has a history of breakdowns and entrapments. Frequently, wheelchair bound litigants must remain on the first level and court or probation staff come down to assist them

- There are no holding cells or secure prisoner traffic routes for in-custody defendants. This is a significant issue which has been a primary driver of other Colorado courthouses to remodel and sometimes rebuild. In Archuleta, prisoners appearing in court are walked to the courthouse where they are brought up the back fire escape or the interior public staircase to the courtroom level. There is no separate route for escorted prisoners to be delivered the courtroom. In all cases they are brought in through the public waiting area where they may contact family, friends, and victims. A disturbance or confrontation is always a possibility. Because there are no holding cells, all in-custody defendants are delivered directly to the courtrooms regardless of the readiness of the court.
- There are inadequate available restrooms. Increasing case loads and increased staff have increased the demand for restroom facilities
- The lack of adequate meeting and conferencing facilities creates compound conflicts for spaces designated for other uses such as jury rooms.
- There is inadequate queuing, lobby and waiting areas for public, attorneys and probationers to await their appointments.
- Probation services have far outgrown their allocated space and are lacking the essential accommodations to safely carry out their workload. There is no secured waiting area for probationers arriving for appointments; there are no classrooms, or conference/training areas. All probation offices are too small and overbooked.
- There is no provision or available space to separate waiting victims, witnesses, and defendants and families.
- **The overarching deficiency of the current Archuleta Justice facility is that the courts have simply outgrown the building and there is no viable option for expansion at the present location. Integral personnel are without permanent offices to prepare for the docket and conduct their business. There are insufficient meeting and interview rooms. Confidentiality is essential for our business but compromised under present conditions. There is no space available for judicially provided programs and services such as Mediation Services, First Appearance and Disposition, Litigant Self If Help Center and Public Access Terminals. Jury call is always a challenge due to insufficient assembly area. Because of limited courtroom availability, the Clerk of Court is constantly juggling the docket to meet the 180 day Speedy Trial requirement on criminal cases which ultimately pushes civil docket hearings further out on the calendar.**

**It is the opinion of the State Court Administrators office that, because of the combination of facility shortcomings, overcrowded conditions and rapidly growing case loads, the Archuleta County court is the most over-stressed and challenging, and potentially unsafe courthouse in Colorado for both staff and customers.**

**Trial Court Staffing**

The 6<sup>th</sup> Judicial District currently has 4 District Court Judges, 3 County Court Judges and a part time Domestic Relations Magistrate. The Archuleta Combined Court currently hosts 4 district court Judges at varying intervals as well as a part-time Domestic Relations Magistrate and the part-time Water Court Referee. The Potential Archuleta Judicial Officers are:

- Chief Judge & Water Judge Greg Lyman
- District Court Judge Suzanne Carlson
- District Court Judge William Herringer
- District Court Judge Jeff Wilson
- County Court Judge Jim Denvir
- Magistrate James A Casey
- The District Administrator, Eric Hogue, is appointed by the Chief Judge and is delegated the authority to perform administrative duties in the operation of the district. This Administrators office is responsible for the overall management of the personnel, budget and the operation of the three county combined courts in the district.

**Current and Projected Archuleta County Court FTE Staff (FTE or Full time Employee)**

<b>Current Trial Court Staff 2013</b>	<b>FTE</b>	<b>25 Year Projected Staff 2035</b>	<b>FTE</b>	<b>Change FTE</b>
<b>District Court Judge</b>	.75	District Court Judge	1.75	1. Increase
<b>County Court Judge</b>	.55	County Court Judge	1.2	.55 Increase
<b>District Court Magistrate</b>	.25	District Court Magistrate	.5	.2 5 Increase
<b>Clerical Staff</b>	4.5	Clerical Staff	10	5.5 Increase
<b>Jury Commissioner</b>	0	Jury Commissioner	0	No Change
<b>Collections Investigators</b>	.2	Collections Investigators	.25	.05 Increase



<b>Court Reporters</b>	0	Court Reporters	0	No Change
<b>Legal Research Attorney</b>	0	Legal Research Attorney	0	No Change
<b>Court Interpreter</b>	0	Court Interpreter	0	No Change
<b>Division Clerk</b>	0	Division Clerk	0	No Change
<b>Account Clerk</b>	0	Account Clerk	0	No Change
<b>Appeals Clerk</b>	0	Appeals Clerk	0	No Change
<b>Family Court Facilitator</b>	0	Family Court Facilitator	0	No Change
<b>Self-Represented Litigant Coordinator</b>	0	Self-Represented Litigant Coordinator	0	No Change
<b>Water Referee</b>	0	Water Referee	0	No Change
<b>Visiting/Contract Staff</b>	.5	Visiting/Contract Staff	.6	.1 change
<b>Administrative Staff</b>	0	Administrative Staff	0	No Change
<b>Total</b>	6.75		15.5	+ 8.25

\*The FTE staffing total does not reflect actual judicial (Trial Court) staff which occupies the facility but does account for their salary allocation for work in Archuleta. Some District staff work in all three counties of the 6th district. Note that the 25 year projected increase show a more than doubling of the current Trial Court staff allocation in Archuleta.

### **Trial Courts Space Projection**

From analysis of data and projections compiled in this report, a proposed new Archuleta County Trial Court will call for two courtroom sets, (Courtroom sets detailed later) Clerk's Office suite for 6 staff, which may include offices for Clerk of Court, Supervisor, Accountant, and Collections Investigator, a combined Jury Assembly / First Appearance Center. This assessment also calls for publically accessible offices suites and meeting rooms for Mediation Services and Family Court Facilitator as well as a Self Help Center for Pro Se litigants. There are also offices required for IT staff, Court Reporters and Managing Court Interpreter and a visiting Judge Chambers.

### **Probation Department Staffing**

Colorado Probation is committed to public safety and community reparation through offender accountability, skill and competency development. Commitment to these practices requires the implementation of innovative approaches to offender assessments, supervision, victim involvement and service to the community. Colorado Probation is a rapidly expanding program

shifting the focus from incarceration of offenders to proactive rehabilitative supervision, victim compensation and reduction of criminal behavior.

This Chief Probation Officer, Tom Harms is the administrative head of the probation department in the 6<sup>th</sup> and reports to the Chief Judge, Greg Lyman. Tom is assisted by two regional supervisors and a combined staff of 22 FTE district-wide

### Archuleta Probation Staffing

Current Probation Staff	FTE	25 Year Projected	FTE	Change FTE
Chief Probation Officer	0	Chief Probation Officer	1	Part Time
Probation Supervisors	1	Probation Supervisors	1	Part Time
Probation Officers	2.5	Probation Officers	4	21.5 Increase
Probation Clerical	.75	Probation Clerical	1	No Change
Visiting and Contract Positions	0	Visiting and Contract Positions	1	2 Increase
<b>Total</b>	<b>4.25</b>		<b>8</b>	<b>+3.75</b>

\*This chart denotes salary allocation for Archuleta and not actual staffing which will be higher due to visiting staff. Note that 25 year projections show a doubling of this allocation.

### Probation Department space projection

The Probation Department operates independent yet directly adjacent and accessible to the trial courts and can have a separate entrance. The Probation Department will reside in a separate office suite with a designated secured probationer waiting area. The projected Archuleta Probation Department will contain offices for the Supervising Probation Officer and 3 PO and clerical workstation. The suite will also include a secured check in and waiting area, staff meeting / break room, file storage, and a classroom for group probation sessions. Probationers are frequently scheduled for appointments at any time of day including weekends and evenings so a separate entrance is recommended when practical.

### Colorado Courthouse Circulation Requirements

Newly constructed courthouses in Colorado (and nationally) are designed with three separate zones of circulation.

- The first zone is the public circulation zone which includes lobbies, courtrooms, hearing rooms, jury assembly/First Appearance Center, clerk transaction windows and specialty offices.
- The second zone is for staff circulation: including private offices, judges' chambers, jury deliberation, and administration.
- The third is the secured zone for sheriff and prisoner entry and movement, holding area; private prisoner elevator and secured entrance into the courtrooms.

Separation of these circulation zones are typically controlled by electronic card access systems.

### **Space Assessment Method**

This space assessment will arrive at an estimated square footage calculation derived from judicial program requirements, current and projected staffing, current and projected court filings and other contributing factors such as weighted case load and specialty court docket impact. Room size calculation is determined using the **Colorado State Court Space Guidelines**. All room measurements are totaled to ascertain a gross building space model. This gross total is multiplied by a factor of 35% (Net Grossing Factor for Assembly Buildings) which accounts for circulation, bathrooms, mechanical, electrical, custodial rooms, waiting areas and restroom facilities.

*Note that some of the rooms factored into this plan can be examined and possibly combined as multipurpose with other office functions. This reevaluation can create overall space reductions as the Archuleta program becomes better defined.*

The following sections provide specific room descriptions:

#### **District and County Courtroom Set description**

- Judge's Bench - ADA accessible judge position elevated two risers
- Clerk Position - accommodating two courtroom clerks and elevated one riser
- Witness Box - elevated one riser or at floor level for ADA accessibility
- Jury Box - The jury box should seat 14 (12 plus 2 alternates). When possible the front row of seats should be at floor grade to accommodate jurors with wheelchairs. At least one juror seat shall be removable to create a space for wheelchair.
- Counsel Tables - space enough to accommodate 2-4 tables.
- Lectern
- Assure that all sightlines to witness, jury, lectern, evidence display devices and counsel tables are unobstructed.
- Audio Visual and Evidence Display - Controls at the judge's bench and input connections at the podium and counsel tables. Systems are capable of all audio sound reinforcement as well as teleconferencing, video evidence presentation and video court appearance to Jail.
- Court Reporter Station - portable desk unit but accessible to technology connections.
- Gallery Seating - At least one courtroom should have seating for 80 – 100 for heavy docket days and large jury pools. All other trial courtrooms should accommodate at least 50 spectators

*Note: It is our recommendation to design the jury box to accommodate 14 in all jury courtrooms to permit District and County Courtrooms to be interchangeable.*

*Note: It is recommended in a multi- courtroom facility to provide one larger courtroom for large capacity hearings, trials, jury selection and ceremonial functions.*

**Prisoner Holding Area:** Each holding pen will contain a pair of secured holding cells to hold up to 8 in- custody defendants. When practical, holding areas should be located between courtrooms to create a dedicated prisoner side entrance to the courtroom. Each cell will have a toilet and will be adjacent to a sheriff workstation. In a multi-story courthouse, the holding area should have a dedicated prisoner elevator.

**Judicial Chambers with Private Restroom:** The chambers will have a judge's desk, credenza and side table at which four to five parties can meet with the judge. Judges Chambers are equipped with restroom facilities.

**Attorney / Client Conference Room:** These rooms are essential to the efficient operation of all state courthouses. We recommend two attorney client rooms per courtroom set.

**Jury Deliberation:** The jury table will accommodate a standard 14 jurors, (12 jurors plus 2 alternates) for jury deliberation. Jury rooms are also used during recesses and breaks. Each jury deliberation room should have one restroom and preferably two. When practical, it is preferred that restroom doorways be concealed to the deliberation table. Jury deliberation rooms require a cabinet and sink area for coffee and refreshments.

**Clerk's Office Suite:** The Clerk's office is the interface between the public and the court and typically is located at ground level for ease of access. The Clerk's Office conducts all public transactions, court filings, payments and maintains all court records and oversees the court calendar. The Archuleta Clerk's office requires an ADA compliant transaction window, 6 workstations for staff, an internal private Clerk of Court office, condensed file shelving area, secured evidence and exhibit storage, mail and copier functions, break room for all staff and two bathrooms. An adjacent **File Viewing Room** is provided with a supervision window where customers can request and review court files. A public Access E-file computer is available in the File View Room for access to electronically filed cases.

**Collection Investigators:** The investigators will be located in a publically accessible part of the building near the Clerks Office. This office provides for confidential interviews to discuss incomes and payment plans to the court.

**Multi-Purpose Room - Jury Assembly/ First Appearance Center/ Disposition / Court Training / Alternate Hearing Room and Public Waiting:** This is a multifunction room being adopted in state courts throughout Colorado. This room will seat up to 100 for a jury assembly and also function as a check-in and disposition room for the District Attorney. This room can serve as a staff training room with audio visual support and can be converted into an overflow hearing room when a third hearing room is required.

**IT Support Office:** This is a secured room for computer premise equipment, distribution racks, telephone PBX, computer inventory storage and a workstation for the technician.

**Mediation Suite:** Mediation hearings often take place in two separate rooms, such as an office with adjoining conference room, so parties can maintain confidentiality while the mediator negotiates between the two rooms.

**Conference / Meeting Rooms:** Each floor of the courthouse requires a conferencing room for staff for meetings and video conferences. Conference rooms are often multi-function and can be used as mediation rooms and staff breaks rooms.

**Self Help Center:** The self help center is a room that offers a variety of legal information, brochures, interactive videos and resources to litigants.

**Victim Witness Waiting Room:** This is a District Attorney supervised space where witnesses and victims can await their appearance in court separated from other parties to the case.

**Exhibit, Evidenced and Archive File Storage:** This is room near the Clerk's office where non-active files and court exhibits can be shelved and secured. Active files are maintained within the clerk's office.

#### **The Probation Suite and Offices:**

The following rooms / offices are required to accommodate Probation functions:

- Probationer waiting and check in Room
- Reception / Clerical Work Room
- Probation Interview offices (Probation Officer offices)
- Supervisor Offices
- Classroom
- Secured File Storage
- Conference and Break Room

#### **Square Footage Space Summary for Archuleta Trial Court**

**The following outline represents the assessed quantity of offices and courtrooms with their recommended square footage requirements taken from Judicial Guidelines. It is this tabulation that serves as the basis of design and overall square footage requirements to accommodate the Court and Probation business operation This report will conclude with a**

**summary net and gross totals of the square footage for a courthouse to meet the projected needs for the next 25 years in Archuleta County.**

**Large Jury Courtroom Set** (Projected need of 1 for Archuleta)

**TOTALS**

- |  |         |
|--|---------|
| 1. Courtroom   | 1850 SF |
| 2. Chambers with restroom  | 450 SF  |
| 3. Jury Deliberation Room with Unisex Restroom                       | 420 SF  |
| 4. Attorney Client Conference Rooms 2 @ 100 SF                       | 200 SF  |
| 5. Entrance Vestibule w/ Evidence Storage                            | 150 SF  |
| 6. AV Support Closet   | 100 SF  |
| 7. Division Office suite Includes Clerks office, Reporter, Assistant | 600 SF  |

Total SF for Courtroom 3770 SF

Projected Total for 1 Large Jury Courtroom Sets (recommended for Archuleta Courts) **3770 SF**

**Standard Jury Courtroom Set** (Projected need of 1)

- |  |         |
|--|---------|
| 1. Courtroom                                   | 1850 SF |
| 2. Chambers with restroom                      | 450 SF  |
| 3. Jury Deliberation Room with Unisex Restroom | 420 SF  |
| 4. Attorney Client Conference Rooms 2 @ 100 SF | 200 SF  |
| 5. Entrance Vestibule w/ Evidence Storage      | 150 SF  |
| 6. AV Support Closet                           | 100 SF  |

Total SF for Courtroom 3170 SF

Projected Standard Jury Courtroom recommended for Archuleta Courts **3170 SF**

**Holding Cell Facilities** (To be shared between two courtrooms) 1 set required

Holding space typical includes 2 lockable cells with toilet, elevator and secured Atty conference room

Total SF 620 SF

Total for Archuleta **620 SF**

**Multi-Purpose FAC / Jury Assembly/ 3rd Hearing room / Disposition /Training**

One large assembly room including DA disposition office and public check in counter

Total SF **1000 SF**

**Clerk's Office** (For seven staff)

1. Clerk of Court Office 200 SF
2. Supervisor Office 0 SF
3. Accountant Office 0 SF
4. Public File View room and Public Access Terminal 200 SF
5. Workstation area/ Mailroom Workroom / File Storage/Public transaction Window / Copier
6. 700 SF

Total SF for Clerk's Office **1100 SF**

**Mediation Rooms**

Recommended two conferencing room in a single suite **0**

**Family Court Facilitator**

One office with adjoined meeting Room **0**

**Collection Investigator**

Three interview office suite with public access. **0**

**Technical Support Office**

Office space for regional tech support with storage space **240 SF**

**Court Staff Conferencing and Multipurpose Rooms** (3 Recommended)

1 rooms at 200 SF **600 SF**

**Vitim Witness Waiting Room**

This office is typically staffed and furnished by the District Attorney to provide sequestered waiting space for scheduled witness and victims. **200 SF**

**Break Room**

Kitchen counter / sink and fridge with table for 8 **240 SF**

**Self Help and Self Represented Litigant Support Office**

Office for distribution of self help materials and volunteer attorney assistance **200 SF**

**Family Friendly Waiting Area**

Secured room for child and family waiting **0**

**Managing Court Interpreter Office**

**0**



## Security Lobby

Space for public queuing and security screening equipment at the main public entrance **300 SF**

**Note:** Due to the part time and or job share nature of some of the professional services, space allocations may be listed as zero square feet with the understanding that such employees will have access to shared or multipurpose work areas when in Archuleta.

**Total estimated net building square footage for Archuleta Trial Court 11,640 Square Feet**

## Square Footage Space Summary for Archuleta Probation Department

Probationer Check-in and Waiting Area	200 SF
Reception and Clerical Workroom	240 SF
4 Probation Officer Interview Offices; 140 SF Each	560 SF
Chief Probation Officer	0 SF
1 Probation Supervisors Office 160 SF each	160 SF
Classroom	200 SF
Secured File Storage	240 SF
UA Lab	0 SF
Conference and Break Room	240 SF

**Probation Net Square Footage requirement 1,840 Square Feet**

**Combined Trial Court and Probation Net Square Footage 13,080 Square Feet**

## Net Building Grossing Factor

NBGF (Net Building Grossing Factor) This factor is a percentage multiplier that factors net building office square footage estimate by 35 % to ascertain the additional floor space needed for:

1. Public, Staff and in-custody circulation hallway
2. Staff and Public Restrooms



October 1, 2014

Colorado Judicial Courts and Probation  
1300 Broadway, Suite 1200  
Denver, Colorado 80203

Attention: Mr. John Gossett  
Architect and Facilities Planning Manager

Subject: Indoor Air Quality Evaluation  
Archuleta County Courthouse  
Pagosa Springs, Colorado  
AGW Project Number E14193.EC

Dear Mr. Gossett:

At your request, A.G. Wassenaar, Inc. (AGW) visited the Archuleta County Courthouse Building, located in Pagosa Springs, Colorado on April 14, 15, 16 and August 15, 2014. It was communicated to AGW that occupants of the building have voiced concern regarding poor indoor air quality and temperature control in the building. During this assessment, AGW conducted a visual evaluation of the indoor work areas and the building ventilation systems. AGW also conducted brief interviews with some of the building occupants. AGW collected mold/particulate/bioaerosol samples, to identify potential airborne irritants. AGW also conducted radon testing and measured general air quality parameters. During the August visit AGW assisted Mr. Bob Barrett, P.E., with B2CE, Inc., during his assessment of the building.

The following report summarizes our observations, findings, sampling results, and recommendations pertaining to this physical evaluation and air sampling event. Photographs depicting conditions observed during our evaluation are included as Attachment A to this report.

## **OBSERVATIONS AND FINDINGS**

On April 14, 15, 16 and August 15, 2014, AGW visited the Archuleta County Courthouse in Pagosa Springs. This building is comprised of three stories and houses various county offices and the Colorado Judicial offices and courthouse. The following findings were recorded during our site visit:

### **General Conditions**

- The office areas housing probation and the court staff are fully utilized and crowded.
- Some office areas such as Davilyn's office in Probation have no ventilation, although there is an operable window in the office.

- Staff bathrooms and break areas are sometimes located inside the office areas.
- The county meeting room is sometimes used as a courtroom. During a court session during the April visit the temperature in this room was too warm and court was adjourned while portable fans were relocated to the room.
- The roof structure in the attic of this building has been recently reinforced. Photographs of this framing condition are included at the end of this report. A new roof is planned for this building.
- One individual reported experiencing a burning/tingling sensation on her face, usually later in the day. Although this is difficult to directly correlate to the area, it is possible that sulfur present in the air is reacting with perspiration on the skin to form a mild acid. AGW discussed the situation with this individual and suggested that a small humidifier be operated in her office in order to increase the relative humidity.

### **Ventilation**

1. The courthouse and office areas are generally served by thermostat controlled heating and cooling fan coil units (FCUs) located either above the lay-in tile ceilings or in the attic.
2. There are several FCUs located throughout the building, each serving a different office or space. Although the temperature control is generally good at the thermostats the different offices can experience temperature swings based on outdoor temperatures and occupancy.
3. Some of the FCU's can only be accessed from the roof and others require that the ceiling grid be disassembled before they can be serviced.
4. Outside makeup air was not observed at the units and it appeared that the FCUs generally operated only as recirculating fan systems. This was confirmed during the August visit.
5. There is no centralized control system for monitoring and controlling the ventilation systems.
6. AGW observed heavy oxidation and corrosion on the FCUs and copper piping. The copper piping, even piping recently installed, was black. It is believed that the sulfur, sometimes present in the air from the hot springs and natural geothermal vents, is reacting with the condensation on the pipes to form sulfuric acid.

7. The FCU serving the Probation office and one of the FCUs serving the Treasurer's office were not operational. The FCU serving the Probation Office had been taken out of service due to a broken heating coil, however, it was restarted during AGW's April site visit. The heating coil was still broken at the time of the August visit.
8. The FCU serving the Treasurer's office had been turned off by the occupants because they were unable to control the temperature.
9. The FCU serving the Clerk's office was not operating but the staff said they could call maintenance to start the unit. The Clerk's office also has a portable air conditioner to cool the office in the summer. This air conditioner wouldn't operate during the August visit.
10. The FCUs in the Elections area were not operating.
11. The thermostat in the courtroom was not initially operating in April, however a service call was placed and it was repaired. This system was operating correctly in August.
12. Located above the lay-in tile ceilings are the original plaster ceilings.
13. The court staff reported that temperature control between April and August had been good and most people were comfortable.

### **AIR CONTAMINANT GUIDELINES**

Various regulatory and guidance agencies provide information regarding recommended contaminant levels and air quality within occupied commercial spaces. Listed below are the agencies and standards that may be pertinent to indoor air levels of particulate/fungal spores and VOC's at the Archuleta County Courthouse Building.

▶ ***Environmental Protection Agency (EPA)***

The EPA has set standards for indoor radon levels. Radon is a naturally occurring, inert, radioactive gas that can cause lung cancer and is colorless, odorless and tasteless. It can enter buildings via pathways in the foundation and building slab including, but not limited to cracks, holes and wall to floor joints. The results of the radon testing can be found below in the Air Sample Analysis and Results section of this report.

▶ ***American Conference of Governmental Industrial Hygienists (ACGIH) and Indoor Environmental Standards Organization (IESO)***

Air sampling can identify the types of biological and non-biological particles present in the indoor air, including molds. There are no standards that have been developed to delineate a “safe” concentration of a specific particulate that may be present in the indoor air, such as fiberglass, dust, or pollen. Similarly, there are currently no regulations established in Colorado that indicate "safe" or "normal" levels of fungal concentrations in the indoor air. Bioaerosol (fungal spore) sample interpretation commonly utilizes a comparison between samples collected indoors and those collected outdoors. Both the ACGIH and the IESO have developed guidelines to assist in the interpretation of airborne fungal spore sampling results. These guidelines indicate that a hidden suspect condition may exist if sample results identify indoor fungal spore and/or fungal structure levels that are significantly higher (a factor of 10 times higher) than the outdoor concentrations. The majority of the environmental fungi encountered both indoors and in the outdoor environment are benign with regard to human health.

## **AIR SAMPLE ANALYSIS and RESULTS**

### ***Bioaerosol/Particulate Sampling***

On April 14 and 15, 2014, non-viable bioaerosol/particulate samples were collected to determine indoor airborne levels of fungal particles and other potential irritants, in the Archuleta County Courthouse Building. On both dates, a sample was also collected from outdoors for comparison purposes.

Each air sample was collected onto a Zefon Air-O-Cell™ cassette, over a period of ten minutes, using a calibrated Zefon BioPump™ operating at 15 liters per minute. This sampling method allows for calculation of the particle concentration (particles per cubic meter of air), as well as identification of particles present in the sample. Samples were submitted to Reservoirs Environmental, Inc (REI), located in Denver, Colorado, for analysis. REI is accredited through the American Industrial Hygiene Association (AIHA) Environmental Microbiology Laboratory Accreditation Program (EMLAP), #101533. The laboratory results for this air sampling event are presented in Tables I and II below, and the laboratory analytical data is included as Attachment B to this report.

**TABLE I**  
**Particulate/Non-Viable Spore Sampling**  
**Archuleta County Courthouse**  
**Pagosa Springs**  
**April 14, 2014**

Sample Number	Sample Location/Description	Non-Viable Bioaerosol Population (Spores/M <sup>3</sup> )	Other Identified Airborne Particulate (Raw Total)
93-1	Court Clerk's Office Temperature: 65°F; Relative Humidity: 27%	6.7 (Myxomycetes/ Periconia/ Smuts/ Rusts)	Cellulose - 120 Clay / dust - 600 Resin - 40 Skin cells - 440 Crystilline - 2880 Aspen pollen - 1
93-2	Magistrate's Office Temperature: 70°F; Relative Humidity: 28%	13 (Basidiospores, <i>Cladosporium</i> )	Cellulose - 120 Soot - 40 Clay / dust - 800 Resin - 120 Starch - 40 Skin cells - 680 Crystilline - 3800 Mica - 40 Aspen pollen - 1
93-3	Clerk's Office Temperature: 71°F; Relative Humidity: 20%	6.7 ( <i>Cladosporium</i> )	Cellulose - 440 Clay / dust - 1520 Resin - 40 Skin cells - 720 Insect - 40 Crystilline - 2800
93-4	Trey Roberts Office - Probation Temperature: 74°F; Relative Humidity: 17%	<b>130</b> ( <i>Cladosporium</i> , Myxomycetes/ Periconia/ Smuts/ Rusts, Non-Specified Spores, Hyphal Fragments)	Cellulose - 880 Soot - 40 Clay / dust - 2360 Resin - 80 Skin cells - 4360 Gypsum - 80 Crystilline - 6360
93-5	Barb's Office - Probation Temperature: 77°F; Relative Humidity: 16%	<b>490</b> (Ascospores, Basidiospores, <i>Chaetomium</i> , <i>Cladosporium</i> Myxomycetes/ Periconia/ Smuts/ Rusts, <i>Torula</i> , Non-Specified Spores, Hyphal Fragments)	Cellulose - 360 Soot - 720 Clay / dust - 7800 Resin - 120 Skin cells - 3480 Crystilline - 18720 Aspen pollen - 1 Ash pollen - 1
93-6	Outdoor Comparison Temperature: 57°F; Relative Humidity: 12%	ND	Clay / dust - 720 Skin cells - 40 Crystilline - 4760

Legend:

M<sup>3</sup> = cubic meter of sampled air  
ND = none detected



**TABLE II**  
**Particulate/Non-Viable Spore Sampling**  
**Archuleta County Courthouse**  
**Pagosa Springs**  
**April 15, 2014**

Sample Number	Sample Location/Description	Non-Viable Bioaerosol Population (Spores/M <sup>3</sup> )	Other Identified Airborne Particulate (Particles/M <sup>3</sup> )
93-7	County Attorney's Office	7 (Non-Specified Spore)	Cellulose - 40 Soot - 40 Clay / dust - 320 Resin - 40 Starch - 40 Skin cells - 280 Crystilline - 2120
93-8	County Administrator's Office Temperature: 66°F; Relative Humidity: 18%	ND	Clay / dust - 120 Skin Cells - 240 Crystilline - 1000
93-9	Election's Office	7 (Non-Specified Spore)	Cellulose - 200 Soot - 120 Clay / dust - 760 Resin - 160 Skin cells - 960 Insect - 40 Crystilline - 5320 Toner - 1
93-10	Outdoor Comparison Temperature: 62°F; Relative Humidity: 12%	140 (Ascospores, <i>Cladosporium</i> Myxomycetes/ Periconia/ Smuts/ Rusts, Non-Specified Spores)	Cellulose - 40 Clay / dust - 1080 Resin - 320 Skin cells - 40 Crystilline - 4480 Pine pollen - 1 Aspen pollen - 1 Ash pollen - 2

Legend:

M<sup>3</sup> = cubic meter of sampled air

**Bioaerosol / Airborne Particulate Discussion**

Airborne particulate screening indicated that the primary airborne particles in the sampled locations are crystalline (crystal like) and clay/dust. These particles were also the predominant particulate observed on the outdoor air samples and are likely associated with the local geology. Infiltration from the outdoors, especially on windy days could result in higher dust levels indoors.

Cellulose fibers (paper dust) and skin cells were also prevalent on the indoor samples. These particulates are introduced by the building occupants and office activities. The very low humidity levels measured indoors and outdoors allow these particles to remain airborne.

Low levels of pollen, a common irritant in sensitive individuals, was detected indoors and outdoors during this sampling event. The laboratory quantified the background debris (dust in the air) on the samples using a scale of 0 to 4, with a level of 4 indicating a greater concentration of airborne dust. The sample collected in the Probation area in Barb's office had a background debris rating of 3, the highest reported for the indoor samples. The other indoor sample areas were rated between 1 and 2 which is typical of occupied indoor environments.

Interpretation of the non-viable fungal spore sample information for this sampling event is based on review of the microbiological genera that are present in the samples and a comparison to the outdoor control samples. The mold genera identified on the indoor samples were consistent with the normal outdoor populations for Colorado. No fungal spores of *Stachybotrys* (referred to by the media as "toxic black mold") were identified on the indoor samples. The samples collected in Trey Roberts office and in Barb's office, both in the Probation area, were elevated compared to other areas of the building and when compared to the outdoor sample collected on the same date. Although not conclusive, these air sample results may be indicative of periodic water infiltration at these locations.

### **Indoor Air Quality (IAQ) Parameter Screening**

Utilizing a Q-Trak Plus™ indoor air quality monitor, AGW recorded the temperature, relative humidity, carbon monoxide (CO) concentrations, and carbon dioxide (CO<sub>2</sub>) concentrations at work areas within the Archuleta County Courthouse building. Results of this screening event are summarized in Table III below.

**TABLE III**  
**IAQ Parameter Screening**  
**Archuleta County Courthouse**  
**Pagosa Springs**  
**April 14, 15 and 16 2014**

<b>Location</b>	<b>Date/Time</b>	<b>Temperature</b>	<b>Relative Humidity</b>	<b>Carbon Monoxide (CO) Concentration</b>	<b>Carbon Dioxide (CO<sub>2</sub>) Concentration</b>
Outdoors	4/14/14 10:42AM	56°F	3.5% - 9.6%	0 ppm	520 ppm
Clerk's Office	4/14/14 11:04AM	72°F	18%	0 ppm	1100 ppm
Magistrate Office	4/14/14	70°F	21%	0 ppm	1182 - 1275 ppm
Magistrate Office	4/15/14 9:00AM	67°F	15%	0 ppm	690 ppm
Probation Office	4/15/14 9:15AM	70°F	17%	0 ppm	1079 ppm
Court Room	4/14/14 afternoon	68-78°F	13% - 20%	0 ppm	600 - 1573 ppm
Note: the doors to the outdoors were open and portable fans were being operated in the area					
Clerk's Office	4/14/14 afternoon	72-77°F	15% - 18%	0 ppm	957 - 1250 ppm
Note: the doors to the outdoors were open and portable fans were being operated in the area					
Clerk's Office	4/15/14 9:40AM to 4/16/14 9:00AM	65°F	18%	0 ppm	770 - 1000 ppm
Liz's Office - Probation	4/15/14 2:00PM	74°F	16%	0 ppm	1068 ppm
Davilyn's Office	4/15/14 2:10PM	74°F	16%	0 ppm	1247 ppm

**Legend:**

ppm = parts per million

Carbon dioxide is a colorless gas that is generated by living organisms as a byproduct of respiration. Exposure to very high levels of carbon dioxide can result in a sour taste in the mouth, and a stinging sensation in the nose and throat. Carbon dioxide levels in an occupied office areas can be used as an indicator to determine if the ventilation system is adequately exchanging the air in the work space (removing carbon dioxide, and introducing fresh air). The American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) recommends that carbon dioxide levels (CO<sub>2</sub>) remain below 1,000 parts per million (ppm) in occupied areas. Elevated levels of carbon dioxide were identified in all indoor sample locations. The FCUs do not appear to provide outdoor make-up air to the offices and the CO<sub>2</sub> levels generally exceeded 1,000 PPM very soon after occupancy in the morning.

The ASHRAE also recommends comfort ranges for temperature and humidity in indoor office environments (ASHRAE Std. 55-2004). The recommended temperature ranges have been found to meet the needs of at least 80% of individuals, although some people may feel uncomfortable even if these values are met. Values for temperature are 69 to 78°F during winter / heating periods, and the recommended relative humidity range is 30 - 60%. It is further recommended that indoor temperatures not drift more than 4-6°F in order to ensure occupant comfort. The relative humidity in this office building was very low, but typical for southern Colorado. Temperature control was intermittent and some occupants elected to turn off the FCUs because of erratic temperature swings.

Carbon monoxide is a colorless, odorless, tasteless, flammable, and highly 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 be experienced beginning at levels of 100 ppm, including a slight headache within two to three hours. Unconsciousness and death can occur when exposure to carbon monoxide exceeds 800 ppm. The Occupational Safety and Health Administration (OSHA) regulates carbon monoxide exposure in the workplace, and has established a permissible exposure limit (PEL) of 50 ppm as an 8-hour time weighted average. However, the National Institute of Occupational Safety and Health (NIOSH) recommends an 8-hour exposure not to exceed 35 ppm in the workplace, and the American Conference of Governmental Industrial Hygienists (ACGIH) recommends an 8-hour exposure not to exceed 25 ppm in the workplace. During the this screening event, carbon monoxide levels were found to be lower than 1 ppm in all areas of the building.

**Radon Testing**

On April 14, 2014, AGW began the radon testing and on April 16, 2014, completed the testing. Eight (8) EPA approved canisters were placed in various locations throughout the building. Canisters were placed at a height of at least two feet above the floor level and were located at least three feet from any interior or exterior wall, doorway, or window. Once the canisters were placed, they were activated and passively exposed to the environment for the duration of the testing time.

Radon canisters were submitted to EMSL Analytical, Inc., in Westmont, New Jersey for analysis. EMSL is a National Radiation Safety Board (NRSB) accredited radon laboratory, certification number NRSB ARL6006. Laboratory results are summarized in Table IV below and included in Attachment C at the end of this report.

**TABLE IV  
Radon Testing  
Archuleta County Courthouse  
Pagosa Springs  
April 14 - 16 2014**

<b>Sample Location</b>	<b>Sample Result Average (pCi/L)</b>
Elections Ground Floor	0.8
Ground Level - HR Break Room	1.0
Maintenance Room - Ground Level	2.6
Trey Robert's Office - Third Floor Probation	1.3
Barb Eakler's Office - Third Floor Probation	1.0
Judge Denvir's Chambers	1.2
Clerk's Office	1.5
Court Clerks Office	1.3

**Radon Testing Discussion**

Radon is measured in picocuries per liter of air (pCi/L), a measurement of radioactivity. In the United States, the average indoor radon level in homes is about 1.3 pCi/L. The average outdoor level is about 0.4 pCi/L. The U.S. Surgeon General and the EPA recommend controlling indoor radon levels to 4 pCi/L or less. Although the EPA guidelines are not directly applicable to commercial buildings the current best practices recommend controlling indoor radon levels in occupied office buildings to 4 pCi/L or less. All of the radon levels measured in this building were less than 4 pCi/L.

## **CONCLUSIONS and RECOMMENDATIONS**

AGW identified slightly elevated fungal spore levels in the Probation offices. Although no obvious mold growth was observed the occupants did report that water leaks had previously occurred in the area. Additional observations and testing may be needed in this area to address these conditions. It is likely that the absence of outdoor make-up air, the lack of heating in the winter, and higher fungal/particulate levels in the Probation area will aggravate allergies and result in more complaints of poor air quality.

Indoor air quality screening identified elevated carbon dioxide (CO<sub>2</sub>) concentrations in all areas of the Archuleta County Courthouse Building. This condition indicates that outside air is not being adequately introduced into the work areas by the current ventilation system. Carbon monoxide (CO) was not detected. The temperature was generally measured within the ASHRAE comfort guidelines while relative humidity levels were very low, but consistent with outdoor ambient conditions. Temperature control issues and temperature swings during the heating season were a common complaint by the building occupants.

The presence of carbon dioxide concentrations in excess of 1,000 ppm and the elevated “dust” levels in this workplace should be addressed to assist in increasing the comfort level and helping to alleviate respiratory irritation and odors for the occupants. AGW provides the following recommendations for your consideration (**BOLD items should be considered a priority**):

1. Evaluate the feasibility of a building-wide ventilation control and monitoring system.
2. **Repair all AC condensing units and heating coils.**
3. **Provide outside make-up air to all FCUs.**
4. **Increase the frequency of housekeeping in all occupied areas.**
5. **Direct all bathroom exhaust systems to the outside.**
6. Have the roof framing system evaluated by a structural engineer during the roof replacement project.

In AGW’s opinion, this building, in its current condition, would not be considered unhealthy, but rather uncomfortable. Consistent temperature control remains an issue during all seasons. Because some of the FCUs have not operated properly the occupants have attempted to address their comfort using space heaters and circulating fans. Although this is sometimes successful, the use of individual appliances is a distraction and can contribute to the occupant’s dissatisfaction with the building.

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Outside (fresh) air is not provided to the occupied spaces through the ventilation systems and this can result in the accumulation of odors, an increase in CO<sub>2</sub> levels, and a perception that the ventilation systems are not working properly. Housekeeping is infrequent which leaves building occupants to perform some housekeeping tasks during the day or at the end of their shift. The potential for roof leaks persists which is evident by the plastic sheeting covering some areas of the roof.

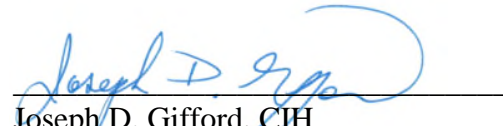
Thank you for the opportunity to assist you in this matter. Please telephone us at (303) 759-8373 if you have any questions regarding this report.

Sincerely,

A.G. WASSENAAR, INC.



Jenni N. Azuogu-Lewis  
Industrial Hygienist



Joseph D. Gifford, CIH  
Principal Project Manager

JNA/JDG/dd

Attachments

# **ATTACHMENT A**

## **Photographs**





Archuleta County Courthouse Building

Existing Roof Conditions

April 2014

Project E14193.EC





Archuleta County Courthouse Building

Window Sash and Attic Framing

April 2014

Project E14193.EC





Archuleta County Courthouse Building

Interior conditions

April 2014

Project E14193.EC





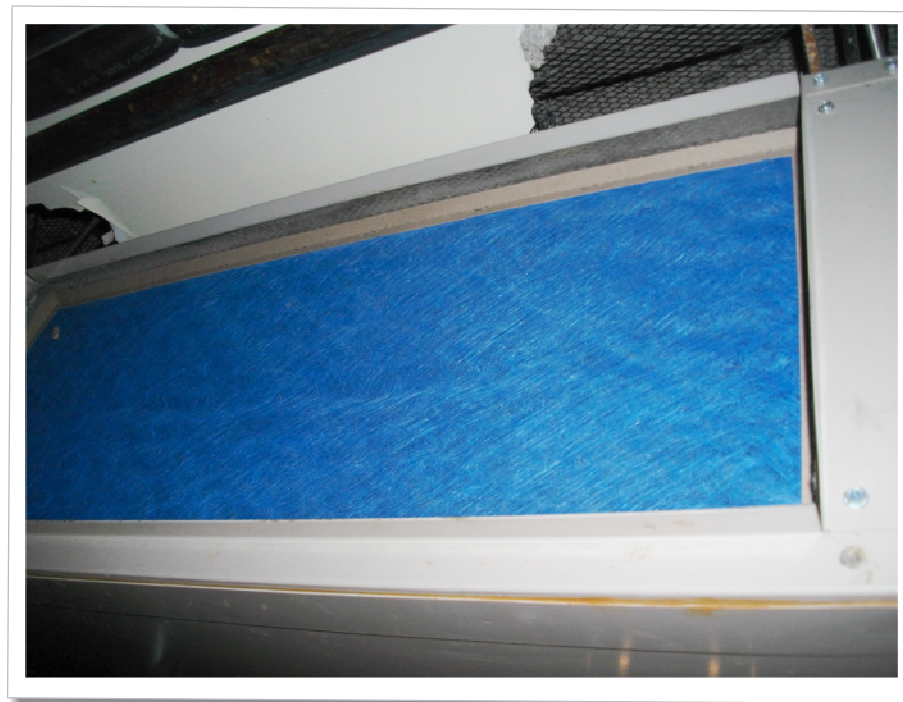
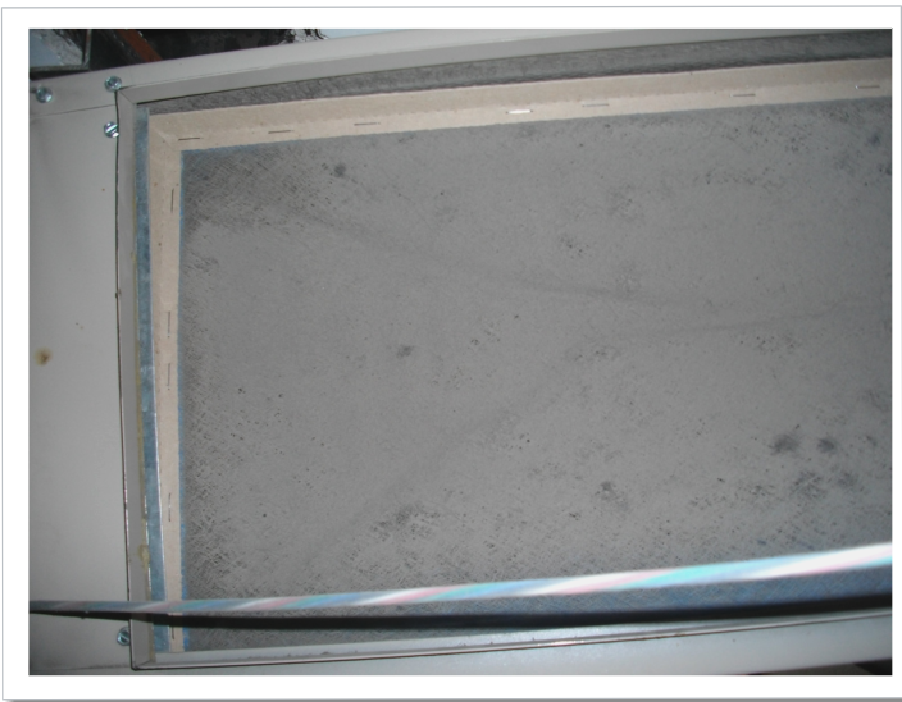
Archuleta County Courthouse Building

FCU serving the Probation Office

April 2014

Project E14193.EC





Archuleta County Courthouse Building

Diffusers with towels in them and FCU filters

April 2014

Project E14193.EC



# **ATTACHMENT B**

## **Laboratory Analytical Data Fungal Spores and Particulates**



April 25, 2014

**Laboratory Code:** RES  
**Subcontract Number:** NA  
**Laboratory Report:** RES 287575-1  
**Project # / P.O. #** E14193  
**Project Description:** Pagosa Springs

Joe Gifford  
A. G. Wassenaar Inc.  
2180 S. Ivanhoe Suite 5  
Denver CO 80222

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of pathogenic, non-pathogenic and environmental microorganisms by the American Industrial Hygiene Association, Lab ID 101533 - Accreditation Certificate #480. The laboratory is currently proficient in both EMPAT and FOODLAP programs.

Reservoirs has analyzed the following sample(s) per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the analysis table. Reported sample results were not blank corrected. Results have been sent to your office.

**RES 287575-1** is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

A handwritten signature in blue ink that reads "Jeanne Spencer". The signature is fluid and cursive, with the first name "Jeanne" being more prominent than the last name "Spencer".

Jeanne Spencer  
President



**RESERVOIRS ENVIRONMENTAL, INC.**  
5801 Logan St. Suite 100, Denver CO, 80221  
AIHA EMPAT #101533

RES Job Number: **RES 287575-1**  
Client: **A. G. Wassenaar Inc.**  
Client Project Number / P.O.: **E14193**  
Client Project Description: **Pagosa Springs**  
Date Samples Received: **April 18, 2014**  
Date Samples Analyzed: **April 24, 2014**  
Date Sampled: **April 14, 2014 & April 15, 2014**  
Analysis Type: **Spore Trap, Non-Viable Methodology**  
Spore Trap Type: **Air O Cell**  
Turnaround: **5 Day**  
Analyst: **JOE**

Client ID Number:	93-1			93-2			93-3			93-4			93-5		
Lab ID Number:	1161574			1161575			1161576			1161577			1161578		
Sample Volume (liters)	150			150			150			150			150		
	% Analyzed	Raw Count	Spores/M <sup>3</sup>	% Analyzed	Raw Count	Spores/M <sup>3</sup>	% Analyzed	Raw Count	Spores/M <sup>3</sup>	% Analyzed	Raw Count	Spores/M <sup>3</sup>	% Analyzed	Raw Count	Spores/M <sup>3</sup>
Acremonium - Like	100	ND		100	ND		100	ND		100	ND		100	ND	
Alternaria	100	ND		100	ND		100	ND		100	ND		100	ND	
Arthrinium	100	ND		100	ND		100	ND		100	ND		100	ND	
Ascospores - Non-Specified	100	ND		100	ND		100	ND		100	ND		100	1	7
Aspergillus/Penicillium - Like	100	ND		100	ND		100	ND		100	ND		100	ND	
Basidiospores - Non-Specified	100	ND		100	1	7	100	ND		100	ND		100	4	27
Bipolaris/Drechslera - Like	100	ND		100	ND		100	ND		100	ND		100	ND	
Botrytis	100	ND		100	ND		100	ND		100	ND		100	ND	
Cercospora-like	100	ND		100	ND		100	ND		100	ND		100	ND	
Chaetomium	100	ND		100	ND		100	ND		100	ND		100	3	20
Cladosporium	100	ND		100	1	7	100	1	7	100	1	7	100	11	73
Curvularia	100	ND		100	ND		100	ND		100	ND		100	ND	
Epicoecum	100	ND		100	ND		100	ND		100	ND		100	ND	
Fusarium	100	ND		100	ND		100	ND		100	ND		100	ND	
Ganoderma	100	ND		100	ND		100	ND		100	ND		100	ND	
Memnoniella	100	ND		100	ND		100	ND		100	ND		100	ND	
Myxomycetes / Periconia / Smuts / Rusts	100	1	7	100	ND		100	ND		100	3	20	100	46	307
Nigrospora	100	ND		100	ND		100	ND		100	ND		100	ND	
Oidium (powder mildew)	100	ND		100	ND		100	ND		100	ND		100	ND	
Pestalotiopsis / Pestalotia	100	ND		100	ND		100	ND		100	ND		100	ND	
Pithomyces	100	ND		100	ND		100	ND		100	ND		100	ND	
Scopulariopsis	100	ND		100	ND		100	ND		100	ND		100	ND	
Spegazzinia	100	ND		100	ND		100	ND		100	ND		100	ND	
Stachybotrys	100	ND		100	ND		100	ND		100	ND		100	ND	
Tetraploa	100	ND		100	ND		100	ND		100	ND		100	ND	
Torula	100	ND		100	ND		100	ND		100	ND		100	1	7
Trichoderma-like	100	ND		100	ND		100	ND		100	ND		100	ND	
Ulocladium / Stemphylium	100	ND		100	ND		100	ND		100	ND		100	ND	
Non-specified spore	100	ND		100	ND		100	ND		100	15	100	100	8	53
Hyphal Fragments	100	ND		100	ND		100	ND		100	3	20	100	4	27
Pollen	100	1	7	100	1	7	100	ND		100	ND		100	2	13
Analytical Sensitivity	100	1	7	100	1	7	100	1	7	100	1	7	100	1	7
Background Debris		2			2			2			2			3	
Total Spores/M <sup>3</sup>			6.7			13			6.7			130			490
Raw Total			1			2			1			19			74
Comments															

\* Sample analyses have not been blank corrected.  
ND = Not Detected  
NA = Not Analyzed  
TNTC = Too Numerous To Count  
Minimum Reporting Limit (MRL) = 1 Cell

Common Allergen  
Water Loss Indicator

## RESERVOIRS ENVIRONMENTAL, INC.

5801 Logan St. Suite 100, Denver CO, 80221  
AIHA EMPAT #101533

RES Job Number: **RES 287575-1**  
 Client: **A. G. Wassenaar Inc.**  
 Client Project Number / P.O.: **E14193**  
 Client Project Description: **Pagosa Springs**  
 Date Samples Received: **April 18, 2014**  
 Date Samples Analyzed: **April 24, 2014**  
 Date Sampled: **April 14, 2014 & April 15, 2014**  
 Analysis Type: **Spore Trap, Non-Viable Methodology**  
 Spore Trap Type: **Air O Cell**  
 Turnaround: **5 Day**  
 Analyst: **JOE**

Client ID Number:	93-6			93-7			93-8			93-9			93-10		
Lab ID Number:	1161579			1161580			1161581			1161582			1161583		
Sample Volume (liters)	150			150			150			150			150		
	% Analyzed	Raw Count	Spores/M <sup>3</sup>	% Analyzed	Raw Count	Spores/M <sup>3</sup>	% Analyzed	Raw Count	Spores/M <sup>3</sup>	% Analyzed	Raw Count	Spores/M <sup>3</sup>	% Analyzed	Raw Count	Spores/M <sup>3</sup>
Acremonium - Like	100	ND		100	ND		100	ND		100	ND		100	ND	
Alternaria	100	ND		100	ND		100	ND		100	ND		100	ND	
Arthrinium	100	ND		100	ND		100	ND		100	ND		100	ND	
Ascospores - Non-Specified	100	ND		100	ND		100	ND		100	ND		100	1	7
Aspergillus/Penicillium - Like	100	ND		100	ND		100	ND		100	ND		100	ND	
Basidiospores - Non-Specified	100	ND		100	ND		100	ND		100	ND		100	ND	
Bipolaris/Drechslera - Like	100	ND		100	ND		100	ND		100	ND		100	ND	
Botrytis	100	ND		100	ND		100	ND		100	ND		100	ND	
Cercospora-like	100	ND		100	ND		100	ND		100	ND		100	ND	
Chaetomium	100	ND		100	ND		100	ND		100	ND		100	ND	
Cladosporium	100	ND		100	ND		100	ND		100	ND		100	15	100
Curvularia	100	ND		100	ND		100	ND		100	ND		100	ND	
Epicoccum	100	ND		100	ND		100	ND		100	ND		100	ND	
Fusarium	100	ND		100	ND		100	ND		100	ND		100	ND	
Ganoderma	100	ND		100	ND		100	ND		100	ND		100	ND	
Memnoniella	100	ND		100	ND		100	ND		100	ND		100	ND	
Myxomycetes / Periconia / Smuts / Rusts	100	ND		100	ND		100	ND		100	ND		100	2	13
Nigrospora	100	ND		100	ND		100	ND		100	ND		100	ND	
Oidium (powder mildew)	100	ND		100	ND		100	ND		100	ND		100	ND	
Pestalotiopsis / Pestalotia	100	ND		100	ND		100	ND		100	ND		100	ND	
Pithomyces	100	ND		100	ND		100	ND		100	ND		100	ND	
Scopulariopsis	100	ND		100	ND		100	ND		100	ND		100	ND	
Spegazzinia	100	ND		100	ND		100	ND		100	ND		100	ND	
Stachybotrys	100	ND		100	ND		100	ND		100	ND		100	ND	
Tetraploa	100	ND		100	ND		100	ND		100	ND		100	ND	
Torula	100	ND		100	ND		100	ND		100	ND		100	ND	
Trichoderma-like	100	ND		100	ND		100	ND		100	ND		100	ND	
Ulocladium / Stemphylium	100	ND		100	ND		100	ND		100	ND		100	ND	
Non-specified spore	100	ND		100	1	7	100	ND		100	1	7	100	3	20
Hyphal Fragments	100	ND		100	ND		100	ND		100	2	13	100	ND	
Pollen	100	ND		100	ND		100	ND		100	ND		100	4	27
Analytical Sensitivity	100	1	7	100	1	7	100	1	7	100	1	7	100	1	7
Background Debris		2			1			1			1			2	
Total Spores/M <sup>3</sup>			ND			7			ND			7			140
Raw Total			0			1			0			1			21
Comments															

\* Sample analyses have not been blank corrected.

ND = Not Detected

NA = Not Analyzed

TNTC = Too Numerous To Count

Minimum Reporting Limit (MRL) = 1 Cell

Common Allergen  
Water Loss Indicator

**RESERVOIRS ENVIRONMENTAL, INC.**  
5801 Logan St. Suite 100, Denver CO, 80221  
AIHA EMPAT #101533

RES Job Number: **RES 287575-1**  
 Client: **A. G. Wassenaar Inc.**  
 Client Project Number / P.O.: **E14193**  
 Client Project Description: **Pagosa Springs**  
 Date Samples Received: **April 18, 2014**  
 Date Samples Analyzed: **April 24, 2014**  
 Date Sampled: **April 14, 2014 & April 15, 2014**  
 Analysis Type: **Particulates, Non-Viable Methodology**  
 Spore Trap Type: **Air O Cell**  
 Turnaround: **5 Day**  
 Analyst: **JOE**

Client ID Number:	93-1	93-2	93-3	93-4	93-5	
Lab ID Number:	1161574	1161575	1161576	1161577	1161578	
	Raw Count	Raw Count	Raw Count	Raw Count	Raw Count	
Cellulose	120	120	440	880	360	
Hair	----	----	----	----	----	
Talc	----	----	----	----	----	
Cotton Fibers	----	----	----	----	----	
Synthetic Fibers	----	----	----	----	----	
Soot	----	40	----	40	720	
Clay / Dust	600	800	1520	2360	7800	
Resin	40	120	40	80	120	
Fiber Glass	----	----	----	----	----	
Starch	----	40	----	----	----	
Skin Cells	440	680	720	4360	3480	
Insect	----	----	40	----	----	
Welding Spheres	----	----	----	----	----	
Gypsum	----	----	----	80	----	
Crystilline	2880	3800	2800	6360	18720	
Mica	----	40	----	----	----	
Ash	----	----	----	----	----	
Pollens:						
Pine	----	----	----	----	----	
Juniper	----	----	----	----	----	
Ragweed	----	----	----	----	----	
Grass	----	----	----	----	----	
Aspen	1	1	----	----	1	
Cotton Wood	----	----	----	----	----	
Oak	----	----	----	----	----	
Ash	----	----	----	----	1	
Pollen	----	----	----	----	----	
Raw Total		4,081	5,641	5,560	14,160	31,202
Comments						

\* Sample analyses have not been blank corrected  
 ND = Not Detected  
 NA = Not Analyzed  
 TNTC = Too Numerous To Count  
 Minimum Reporting Limit (MRL) = 1 Cell

**RESERVOIRS ENVIRONMENTAL, INC.**  
5801 Logan St. Suite 100, Denver CO, 80221  
AIHA EMPAT #101533

RES Job Number: **RES 287575-1**  
 Client: **A. G. Wassenaar Inc.**  
 Client Project Number / P.O.: **E14193**  
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 Date Samples Received: **April 18, 2014**  
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 Analysis Type: **Particulates, Non-Viable Methodology**  
 Spore Trap Type: **Air O Cell**  
 Turnaround: **5 Day**  
 Analyst: **JOE**

Client ID Number:	93-6		93-7		93-8		93-9		93-10	
Lab ID Number:	1161579		1161580		1161581		1161582		1161583	
	Raw Count		Raw Count		Raw Count		Raw Count		Raw Count	
Cellulose	----		40		----		200		40	
Hair	----		----		----		----		----	
Talc	----		----		----		----		----	
Cotton Fibers	----		----		----		----		----	
Synthetic Fibers	----		----		----		----		----	
Soot	----		40		----		120		----	
Clay / Dust	720		320		120		760		1080	
Resin	----		40		----		160		320	
Fiber Glass	----		----		----		----		----	
Starch	----		40		----		----		----	
Skin Cells	40		280		240		960		40	
Insect	----		----		----		40		----	
Welding Spheres	----		----		----		----		----	
Gypsum	----		----		----		----		----	
Crystalline	4760		2120		1000		5320		4480	
Mica	----		----		----		----		----	
Toner	----		----		----		1		----	
Pollens:										
Pine	----		----		----		----		1	
Juniper	----		----		----		----		----	
Ragweed	----		----		----		----		----	
Grass	----		----		----		----		----	
Aspen	----		----		----		----		1	
Cotton Wood	----		----		----		----		----	
Oak	----		----		----		----		----	
Ash	----		----		----		----		2	
Pollen	----		----		----		----		----	
Raw Total		5,520		2,880		1,360		7,561		5,964
Comments										

\* Sample analyses have not been blank corrected  
 ND = Not Detected  
 NA = Not Analyzed  
 TNTC = Too Numerous To Count  
 Minimum Reporting Limit (MRL) = 1 Cell

### ANALYTICAL INFORMATION

Spore traps are a sampling devices that collect aeroallergens such as pollens, mold and fungal spores, fibers, dander, insect components and other air-borne contaminates. Samples are analyzed using light microscopy at 600X magnification with the entire sample trace or a percentage of the trace is counted. The results include both viable and non-viable fungal spores. This technique does not allow for the differentiation between Aspergillus and Penicillium spores. Small (1-3um) spherical fungal spores that cannot be identified and may included Aspergillus, Penicillium and Paecilomyces and others. Sample traces with greater than 500 spores per slide are difficult to count accurately due to overcrowding and should be considered estimations. Excessive non-microbial particulate debris can mask the presence of fungal spores, thereby reducing counting accuracies. All samples are graded with the following debris scale for data qualification.

#### AIHA EMPAT #101533

Background Debris Rating	Description	Interpretation
0	No Particles Detected	No particles were observed on slide. The absence of particulates could indicate improper sampling, as most air samples typically contain some particulate
1	Minimal non-microbial debris present.	Reported values are not affected by debris
2	Up to 25% of the slide occluded with particulate debris	Particulate debris could mask the presence of spores but do not provide significant interference with the analyses
3	26 to 50% of the slide occluded with particulate debris	Particulate debris could mask the presence of spores and begin to interfere with the analytical count. As a result actual values could be somewhat higher than reported.
4	51 to 90% of the slide occluded with particulate debris	Particulate debris are heavy and would mask the presence of some fungal spores if present. As a result, the count could be higher than reported.
CBR	Cannot Be Read	Sample could not be read due to excessive debris. Spores observed on the perimeter of debris are reported as present or abundant. The sample should be collected at shorter time interval or other measures taken to reduce the collection of non-microbial debris.

Qualitative Reporting Limits	Description
Infrequent	1 to 5 Structures per 22 x 22 mm
Occasional	5 to 50 Structures per 22 x 22 mm
Moderate	1 to 10 Structures per Field of View
Abundant	10+ Structures per Field of View

**INVOICE TO: (IF DIFFERENT)**

Company: AG WASS ENAR Contact: Joe Gifford  
 Address: 2150 S. IVANKHOE Phone: 303 759 8373  
DENVER 80222 Fax: \_\_\_\_\_  
 Project Number and/or P.O. #: EK193 Cell pager: 303 981 3931  
 Project Description/Location: Pagosa Springs Final Data Deliverable Email Address: gifford@agwassepar.com

**CONTACT INFORMATION:**

Company: \_\_\_\_\_ Contact: \_\_\_\_\_  
 Address: \_\_\_\_\_ Phone: \_\_\_\_\_  
 \_\_\_\_\_ Fax: \_\_\_\_\_  
 Cell pager: \_\_\_\_\_ Final Data Deliverable Email Address: \_\_\_\_\_

Client sample ID number	Sample Volume (L) / Area	Matrix Code	Date Collected m/d/yyyy	Time Collected hr/mm ap	EM Number Laboratory Use Only	REQUESTED ANALYSIS		VALID MATRIX CODES		LAB NOTES
						PLM - Short report, Long report, Point Count	TECHNICAL ANALYSIS	Air = A	Bulk = B	
1	150 A	1	4/14/14		1161574	✓	Microbiology	✓		
2	150 A	1				✓	Microbiology	✓		
3	150 A	1				✓	Microbiology	✓		
4	150 A	1				✓	Microbiology	✓		
5	150 A	1				✓	Microbiology	✓		
6	150 A	1				✓	Microbiology	✓		
7	150 A	1				✓	Microbiology	✓		
8	150 A	1				✓	Microbiology	✓		
9	150 A	1				✓	Microbiology	✓		
10	150 A	1				✓	Microbiology	✓		

Client sample ID number	Sample Volume (L) / Area	Matrix Code	Date Collected m/d/yyyy	Time Collected hr/mm ap	EM Number Laboratory Use Only	REQUESTED ANALYSIS		VALID MATRIX CODES		LAB NOTES
						PLM - Short report, Long report, Point Count	TECHNICAL ANALYSIS	Air = A	Bulk = B	
1	150 A	1	4/14/14		1161574	✓	Microbiology	✓		
2	150 A	1				✓	Microbiology	✓		
3	150 A	1				✓	Microbiology	✓		
4	150 A	1				✓	Microbiology	✓		
5	150 A	1				✓	Microbiology	✓		
6	150 A	1				✓	Microbiology	✓		
7	150 A	1				✓	Microbiology	✓		
8	150 A	1				✓	Microbiology	✓		
9	150 A	1				✓	Microbiology	✓		
10	150 A	1				✓	Microbiology	✓		

Number of samples received: 10  
 NOTE: REI will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with payment terms of NET 30 days, failure to comply with payment terms may result in a 1.5% monthly interest surcharge.

Relinquished By: Joe Gifford Date/Time: 4/18/14 11:30  
 Laboratory Use Only: Joe Gifford Date/Time: 4/18/14 9:50  
 Carrier: Ag Waste  
 Results: \_\_\_\_\_ Phone Email Fax \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Contact: \_\_\_\_\_ Phone Email Fax \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_  
 Initials \_\_\_\_\_ Date \_\_\_\_\_ Time \_\_\_\_\_

# **ATTACHMENT C**

## **Radon Laboratory Results**

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-0327

<http://www.EMSL.com>[RadonLab@emsl.com](mailto:RadonLab@emsl.com)

EMSL Order:	381401903
CustomerID:	AGWA78
CustomerPO:	
ProjectID:	

Attn: **Joe Gifford**  
**A.G. Wassenaar, Inc.**  
**2180 South Ivanhoe Street, Ste. 5**  
**Denver, CO 80222**

Phone: (303) 759-8100  
 Fax: (303) 756-2920  
 Received: 04/22/14 1:46 PM  
 Analysis Date: 4/23/2014  
 Collected: 4/14/2014

Project: **E14193**

Test Site: **Judicial Center**  
**Pagosa Springs, CO 81147**

**Test Report: Radon in Air Test Results****Samples for EMSL Kit 88592**

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
148085		1.1	4/14/2014	4/16/2014	68	18	Customer
381401903-0001			10:14:00 AM	10:18:00 AM			

**Sample Notes:** No Location

148002		1.4	4/14/2014	4/16/2014	68	18	Customer
381401903-0002			10:14:00 AM	10:18:00 AM			

**Sample Notes:** No Location**Summary for EMSL Kit 88592**      **Average Radon Result: 1.3 pCi/L****Samples for EMSL Kit 88582**

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
147935		1.2	4/14/2014	4/16/2014	68	18	Customer
381401903-0003			9:44:00 AM	9:59:00 AM			

**Sample Notes:** No Location

148009		1.3	4/14/2014	4/16/2014	68	18	Customer
381401903-0004			9:44:00 AM	9:59:00 AM			

**Sample Notes:** No Location**Summary for EMSL Kit 88582**      **Average Radon Result: 1.3 pCi/L****Samples for EMSL Kit 88587**

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
147995		2.8	4/14/2014	4/16/2014	68	18	Customer
381401903-0005			9:35:00 AM	9:53:00 AM			

**Sample Notes:** No Location

147985		2.3	4/14/2014	4/16/2014	68	18	Customer
381401903-0006			9:35:00 AM	9:53:00 AM			

**Sample Notes:** No Location**Summary for EMSL Kit 88587**      **Average Radon Result: 2.5 pCi/L**



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-0327

<http://www.EMSL.com>[RadonLab@emsl.com](mailto:RadonLab@emsl.com)

EMSL Order: 381401903

CustomerID: AGWA78

CustomerPO:

ProjectID:

Attn: **Joe Gifford**  
**A.G. Wassenaar, Inc.**  
**2180 South Ivanhoe Street, Ste. 5**  
**Denver, CO 80222**

Phone: (303) 759-8100  
 Fax: (303) 756-2920  
 Received: 04/22/14 1:46 PM  
 Analysis Date: 4/23/2014  
 Collected: 4/14/2014

Project: **E14193**

Test Site: **Judicial Center**  
**Pagosa Springs, CO 81147**

**Test Report: Radon in Air Test Results****Samples for EMSL Kit 88588**

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
148026		0.8	4/14/2014	4/16/2014	68	18	Customer
381401903-0007			9:18:00 AM	9:33:00 AM			

**Sample Notes:** No Location

147875		0.7	4/14/2014	4/16/2014	68	18	Customer
381401903-0008			9:18:00 AM	9:33:00 AM			

**Sample Notes:** No Location**Summary for EMSL Kit 88588 Average Radon Result: 0.8 pCi/L****Samples for EMSL Kit 88581**

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
147967		1	4/14/2014	4/16/2014	68	18	Customer
381401903-0009			9:48:00 AM	9:58:00 AM			

**Sample Notes:** No Location

148121		1	4/14/2014	4/16/2014	68	18	Customer
381401903-0010			9:48:00 AM	9:58:00 AM			

**Sample Notes:** No Location**Summary for EMSL Kit 88581 Average Radon Result: 1.0 pCi/L****Samples for EMSL Kit 88593**

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
147897		0.9	4/14/2014	4/16/2014	68	18	Customer
381401903-0011			9:28:00 AM	9:35:00 AM			

**Sample Notes:** No Location

148067		1	4/14/2014	4/16/2014	68	18	Customer
381401903-0012			9:28:00 AM	9:35:00 AM			

**Sample Notes:** No Location**Summary for EMSL Kit 88593 Average Radon Result: 0.9 pCi/L**

**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077

Phone/Fax: (800) 220-3675 / (856) 786-0327

<http://www.EMSL.com>[RadonLab@emsl.com](mailto:RadonLab@emsl.com)

EMSL Order:	381401903
CustomerID:	AGWA78
CustomerPO:	
ProjectID:	

Attn: **Joe Gifford**  
**A.G. Wassenaar, Inc.**  
**2180 South Ivanhoe Street, Ste. 5**  
**Denver, CO 80222**

Phone: (303) 759-8100  
 Fax: (303) 756-2920  
 Received: 04/22/14 1:46 PM  
 Analysis Date: 4/23/2014  
 Collected: 4/14/2014

Project: **E14193**

Test Site: **Judicial Center**  
**Pagosa Springs, CO 81147**

**Test Report: Radon in Air Test Results****Samples for EMSL Kit 88591**

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
147976		1.3	4/14/2014	4/16/2014	68	18	Customer
381401903-0013			10:11:00 AM	10:18:00 AM			

**Sample Notes:** No Location

148177		1.6	4/14/2014	4/16/2014	68	18	Customer
381401903-0014			10:11:00 AM	10:18:00 AM			

**Sample Notes:** No Location**Summary for EMSL Kit 88591**      **Average Radon Result: 1.5 pCi/L****Samples for EMSL Kit 88590**

Liquid Scintillation ID	Location	Radon Activity pCi/L	Start	Stop	Temperature F	Humidity %	Sample Type
147982		1.1	4/14/2014	4/16/2014	68	18	Customer
381401903-0015			9:56:00 AM	10:00:00 AM			

**Sample Notes:** No Location

147936		1.3	4/14/2014	4/16/2014	68	18	Customer
381401903-0016			9:56:00 AM	10:00:00 AM			

**Sample Notes:** No Location**Summary for EMSL Kit 88590**      **Average Radon Result: 1.2 pCi/L**

The radon test was performed using a liquid scintillation radon detector/s and counted on a liquid scintillation counter using approved EPA testing protocols for Radon in Air testing. The EPA recommends fixing your home if the average of two short-term tests taken in the lowest lived-in level of the home show radon levels that are equal to or greater than 4.0pCi/L.

The EPA recommends retesting your home every two years.

Please contact EMSL Analytical, Inc. or your State Health Department for further information.

All procedures used for generating this report are in complete accordance with the current EPA protocols for the analysis of Radon in Air.

**Report Note**



**EMSL Analytical, Inc.**

200 Route 130 North, Cinnaminson, NJ 08077  
Phone/Fax: (800) 220-3675 / (856) 786-0327  
<http://www.EMSL.com> [RadonLab@emsl.com](mailto:RadonLab@emsl.com)

EMSL Order: 381401903  
CustomerID: AGWA78  
CustomerPO:  
ProjectID:

Attn: **Joe Gifford**  
**A.G. Wassenaar, Inc.**  
**2180 South Ivanhoe Street, Ste. 5**  
**Denver, CO 80222**

Phone: (303) 759-8100  
Fax: (303) 756-2920  
Received: 04/22/14 1:46 PM  
Analysis Date: 4/23/2014  
Collected: 4/14/2014

Project: **E14193**

Test Site: **Judicial Center**  
**Pagosa Springs, CO 81147**

**Test Report: Radon in Air Test Results**

Analyst(s)

Theresa Adamson (16)

Garrett A. Ray, Laboratory Manager  
Certified Radon Measurement Specialist NRSB 5SS0093  
NJ MES12264, FL R2001, NE 116, PA 2572

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Samples analyzed by EMSL Analytical, Inc. Cinnaminson, NJ

Initial report from 04/25/2014 13:43:40

Please visit [www.radontestinglab.com](http://www.radontestinglab.com)



CHAIN OF CUSTODY  
RADON LABORATORY SERVICES  
(COMMERCIAL USE)

AGWA78  
5-day

EMSL ANALYTICAL, INC.  
107 HADDON AVENUE M#1  
WESTMONT, NJ 08108  
PHONE: 856-858-4800  
FAX: 856-858-3502  
www.RadonTestingLab.com

EMSL Job #: 381401903

EMSL ANALYTICAL, INC.

COMPANY INFORMATION:

Company Name: A.G. Wassenaar  
EMSL Account #: AGWA78  
Contact: Joe Gifford  
Address: 2180 S. Ivanhoe St  
City: DENVER  
State: CO Zip Code: 80222  
Phone: 303 759 8373 Fax: \_\_\_\_\_

Email Results to: giffordj@agwassenaar.com

PROPERTY INFORMATION:

Name: Judicial Center  
Address: \_\_\_\_\_  
City: \_\_\_\_\_  
Municipality: \_\_\_\_\_ County: \_\_\_\_\_  
State: \_\_\_\_\_ Zip Code: 81147

Please check box if this is a Post Mitigation Test

Special Instructions / Notes:

PROJECT INFORMATION:

Project Number / P.O.: E14193  
Turnaround Time: 3-5 work days  
Technician Name: \_\_\_\_\_  
Technician Certification #: \_\_\_\_\_  
Technician Signature: Joseph Gifford

Disclaimer

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Box Number	Device Number	Location	Exposure Period Beginning Date and Time	Exposure Period Ending Date and Time	Temperature, °F	Humidity, %
88592	148085		4/4 10:14	4/16 10:18	68°	78
"	148002		4/14 10:14	4/16 10:18		
88582	147935		4/14 0944	4/16 0959		
"	148009		4/14 0944	4/16 0959		
88587	147995		4/14 0935	4/16 0953		
"	147985		4/14 0935	4/16 0953		
88588	148026		4/14 0918	4/16/14 0933		
"	147875		4/14/14 0918	4/16/14 0933		
88581	147967		4/14 0948	4/16 0958		
"	148121		4/14 0948	4/16 0958		
88593	147897		4/14/14 0928	4/16/14 0935		
"	148067		4/14/14 0928	4/16/14 0935		

Relinquished by (Sign): Joseph Gifford Date: 4/18/14 Time: 1430  
Received by EMSL (Sign): [Signature] Date: 4/22/14 Time: \_\_\_\_\_





EMSL ANALYTICAL, INC.

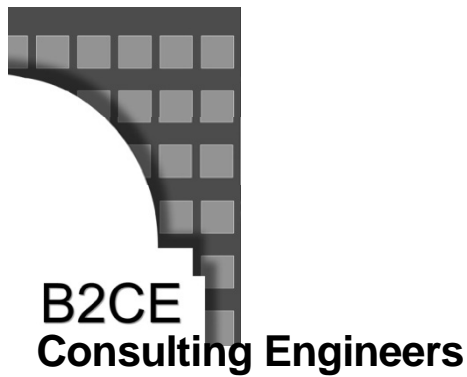
### CHAIN OF CUSTODY RADON LABORATORY SERVICES (COMMERCIAL USE)

EMSL Job #: 381401903

EMSL ANALYTICAL, INC.  
107 HADDON AVENUE  
WESTMONT, NJ 08108  
PHONE: 856-858-4800  
FAX: 856-858-3502  
www.RadonTestingLab.com

Box Number	Device Number	Location	Exposure Period Beginning Date and Time	Exposure Period Ending Date and Time	Temperature, °F	Humidity, %
88591	147976		4/4 1011	4/6 1018	68	18
"	148177		4/4 1011	4/6 1018		
88592	147982		4/4 0956	4/6 1000		
"	147936		4/4 0956	4/6 1000		

Relinquished by (Sign): Joseph G Date: 4/18/14 Time: 1430  
Received by EMSL (Sign): Andrew Date: 4/22/14 Time: \_\_\_\_\_ 2 Page of 2



Bob Barrett – B2CE, Inc.

(303) 526-1800 (main)  
(303) 526-1805 (fax)  
Bob.Barrett@b2ce.com

# Memorandum

**Date:** August 26, 2014  
**To:** John Gossett - Architect and Facilities Planning Manager  
**From:** Bob Barrett – B2CE, Inc.  
**RE:** Pagosa Springs Courthouse Building HVAC System Assessment  
**Preliminary Findings Memo**

B<sup>2</sup>CE Job No.: 14031.00

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This memo summarizes my document review, testing and site observation of the facility that houses the Colorado State Judicial system for Archuleta County in Pagosa Springs, Colorado. This report is provided at your request in accordance with my email dated June 28, 2014 (including Terms & Conditions).

## I. EXECUTIVE SUMMARY

The HVAC system for the building consists of distributed fan-coil unit (FCU) air-handlers with DX cooling coils, connected to roof mounted condensing units (CU). The system is similar to a typical residential “forced-air” system except the FCUs take the place of the typical gas-fired furnace. In air handlers include a filter section, blower section and controls – similar to a furnace (except a hydronic heating water coil takes the place of the gas-fired burner assembly). Like a furnace, cooling is provided by a separate cooling coil, in the discharge air from the FCU.

The FCUs are typically located above the ceiling. Air is ducted to ceiling diffusers and generally returned through grilles in the ceiling (using the above-ceiling space as a “return air plenum”).

Like a typical residence, each FCU serves a variety of occupancies and exterior exposures – with a single air handler, with a single thermostat. The system is generally uncomfortable where there are significant differences between the occupancy and/or interior and exterior “cooling loads” within different rooms, which are controlled by the same thermostat.

There is currently no sub-zoning in the building. More typical commercial office HVAC systems generally include sub-zoning controls (and allow individual offices, or banks of offices, to have their own thermostat).

There are four active FCU units that serve the State’s current areas. There are two more FCUs that would serve the basement and/or County admin areas that are proposed for expansion. All the FCUs suffer from inadequate zoning. None of the units include outside air for ventilation and all show signs of inadequate maintenance.

Joe Gifford's previous investigation found that several units were inoperable. All of the units were running at the time of my observation, but not all of the components were functional. By report, some formally inoperable FCU systems appear to have been made operational during the testing (per Ms. Tully's report). This may have been prompted by the datalogging, itself.

However, the FCUs generally appear to be responsive to their thermostats (during cooling). The thermostats are programmable and can be selected for different setpoint and modes of operation depending on time of day. They can be selected for "auto" or continuous fan operation; and they can be placed into "heating", "cooling" or "automatic changeover" modes of operation. In general, the FCUs maintained "average" space temperature (as measured at the thermostat) within an acceptable tolerance (+/- 2°F). As you can see in the narrative below, temperature control in the building (where measured) was generally adequate. However, we did not measure performance in areas that were likely to have significant load deviation (and therefore temperature deviation) from the "average" conditions measured at the thermostats.

The biggest issue is maintenance. The County's HVAC maintenance man, Frank Martinez, is very accommodating, but over-matched by the complexity and number of "moving parts" in the HVAC system, his limited time, and his other duties.

The County has at least one third party HVAC service company that is familiar with the system, which could maintain the system (better). However, the County may have just started using a different service company. I do not think they have a Preventative Maintenance (PM) service agreement of any kind – the service companies are only called to "fix" a specific problem in the building. It may take a pretty loud complaint, with lots of follow up, to get something constructive completed (due to budget and manpower issues).

What is really needed is a PM contract that will keep the State's HVAC system operational – before there is a problem to "fix". The County needs to confirm that all equipment is operational and properly serviced. Of immediate concern is if the building will have operational heating for this winter.

At least two of the FCUs have leaking heating coils. One of these units serves the Probation office. The geothermal-based heating system that serves the building is not working either. Therefore, the County also needs to get the hydronic heating system for the entire complex running. They may have to use a backup boiler (which is in place).

At least one of the condensing units is failing and/or has leaking refrigerant. This unit serves the Clerk's office.

Ventilation is inadequate. However, despite the lack of code-compliant ventilation, the CO2 level in the one place it was measured was acceptable.

I do not think performance will be adequate during the heating season, when the very high CO2 levels that Joe measured will return (since occupants will tend to keep their windows closed).

Also, the lack of heat will be pretty noticeable within a couple months.

## II. RECOMMENDATIONS:

I am generally aware that the Archuleta County is responsible for maintaining and operating the State's HVAC systems. I do not understand what the County has for a budget, or its available resources, or what level of HVAC system and/or comfort is required by this understanding. Nevertheless, I make the following general recommendations:

### A. Mechanical Ventilation Should be Installed

In my proposal for engineering services, I imagined a Dedicated Outside Air Conditioning (DOAC) unit might be installed for the entire building. This is still a possibility. However, I think a single unit would be difficult to route to all State areas.

I am inclined to recommend four air-to-air Energy Recovery Ventilators (ERV) be provided – one for each FCU. The ERVs would introduce tempered air directly into the space, or into the return air system for the FCUs. They would operate year round. They would temper the air with exhaust air (from toilet rooms, copy areas or other odor-producing areas of the building).

In areas with fixed windows – like the Courtroom – the County might be “forced” to provide the ventilators to meet the minimum ventilation requirements required by the model building codes. By code, mechanical ventilation can only be eliminated in areas with operable windows. However, in my opinion, the Clerk's area and the Probation office do not have adequate operable windows to meet the minimum ventilation requirement, either. But this is open to interpretation.

### B. Minimum Maintenance

There are building code mandated requirements that a building be maintained in a safe manner. There is also a minimum heating requirement in the code, but that really has to do with the design capacity of a system – not it's actual performance.

There may be some workplace or OSHA requirements that would “force” the County to better maintain the HVAC system (and, for example, fix the leaking heating coils).

### C. Comfort

Comfort would be improved if zone dampers were added for certain zones (e.g., the office next to the vault – which has a high interior load from IT server equipment as well as a high afternoon solar load). However, sub-zoning cannot be mandated by minimum code requirements.

## III. TESTING OF THE HVAC SYSTEM

Debbie Tully and the facilities custodian, Frank Martinez set data loggers around the Pagosa Springs Courthouse building at my direction. The sensors recorded temperatures and relative humidity (RH) at various locations throughout the building and Carbon Dioxide (CO<sub>2</sub>) levels in the “bullpen” area of the Clerk's offices.

These readings were recorded on certain intervals (between 1 and 15 minutes) to provide some objective measurements of how the existing Heating, Ventilating and Air Conditioning (HVAC) system(s) were performing.

Some graphs of those readings are included at the end of this memo.



## A. SUMMARY OF WEATHER DURING TESTING

Testing started in the early afternoon of Monday, July 21<sup>st</sup> and concluded at various times on August 15<sup>th</sup>. I collected the data loggers during my observation, which started about 9:00 on Friday, August 15<sup>th</sup>. Frank Martinez and Joe Gifford generally accompanied me.

Outside conditions during the testing were typically “hot summer”, with higher humidity (for Pagosa).

See the attached graph of weather during testing. It shows maximum, average and minimum temperatures. It also shows “absolute moisture content” of the air, which is a measure of “humidity”. This is measured by dewpoint temperature. (Relative humidity is dependent on temperature and is not shown).

Maximum outside air temperatures varied between 93° and 74°F. The average “diurnal range” (“daily temperature fluctuation”) was 31°. The diurnal range typically increases with very dry weather and/or weather front movement. The maximum diurnal range was 44° (the week before My site observation), when the minimum relative humidity was only 13%. The minimum temperature during the testing was 42°, and occurred at that time.

There were at least five rainstorms (probably thunderstorms) during the testing with moderate winds (maximum daily wind velocity was just over 20 mph).

## IV. SUMMARY OF DATALOGGING & SPECIFIC OBSERVATIONS REGARDING THE HVAC SYSTEM

My only direct observation of the project was from about 8:00 to 4:00 on August 15<sup>th</sup>. I did not observe very much of the entire system.

However, information on the operation of the system(s) monitored can be gleaned by the datalogging.

### A. “Clerk’s office”

1. Datalogger information:

a) CO2 sensor with data logger and 2 temperature sensors.

i. Datalogger Serial Number: 10232575 (Onset Computer Corp Product: HOBO U12-006 4-Channel Ext.)

2. Located in “Court Clerk Staff” area (“bullpen”) with one temperature sensor near the CO2 sensor and one sensor in the discharge air of the nearest supply air (SA) diffuser.

Datalogging for the Clerk’s area is shown in the attached graphs.

3. General Observations:

a) FCU location: There are two FCUs located above the Clerk’s “public window” area, with poor access. The Clerk’s “public window” area, itself, is served by the FCU that primarily serves the County Clerk’s area to the north. There are at least three logical control zones in this area (including the State’s zone).

The other FCU is dedicated to the Clerk offices (less the public window area). It has at

least two logical control zones. There are 2 exterior exposures and at least 3 different interior schedules on this FCU.

Like all of the rest of the systems, there is no sub-zoning – and each FCU has only one thermostat. The thermostat for this FCU is in the corridor near the two private offices and break room.

Performance is probably marginally acceptable except for the south-facing office (Ms. Tully's office).

- b) Ventilation air: None of the FCUs has ducted outside air. In this area, effective ventilation (as measured by CO<sub>2</sub> levels) was “adequate” where measured in the bullpen area. I am sure CO levels in other areas – such as the BOCC Meeting Room and Courtroom – are too high (at times of high occupancy).

There are operable windows in the Clerk's private office and break room, and can be used to provide code-mandated minimum ventilation. However, actual ventilation with operable windows is impractical in an office occupancy. It is impossible in areas with fixed windows.

Most operable windows were closed during my observation.

#### 4. Temperature Control Observations

- a) Supply air temperature control in the Clerk's area was acceptable when capacity was adequate (i.e., before the refrigerant leaked out of the system). For example, there were 16 “on” cycles in 5 hours (during the early morning hours) at the start of the testing.

However, the minimum supply air temperature (SAT) was only 56° and could only be achieved in the early morning, at the beginning of the testing – when outside air temperatures (OAT) were low.

The SAT (in cooling mode) climbed when outside air temperatures (OAT) were highest, and toward the end of the testing. The graph of the minimum temperature shows a gradual trend from about 56° up to about 70° at the end of testing.

The CU was likely “on”, continually during daylight hours, even when outside air temperatures were moderate (mid-80s), and the system was starting to run out of capacity. Cooling is probably marginal now.

#### **CONCLUSION:**

A new condensing unit (CU) may be required for this FCU. At minimum, a complete cleaning, and adjustment is required (including refrigerant charge management). A probable leak in the refrigerant piping must be located.

- b) The thermostat is not in the bullpen area. This area is served by the thermostat in the south corridor. See discussion in section 0 below.
- c) Max recorded temp: 76° (this happened briefly for a few days before my site observation – after hours). The SAT was higher during this time, so it is possible the FCU was in heating mode at this time.

Typical maximum temperatures were 74° with about 68° over-night. The exhibited temperature “control” in this area, during testing, was acceptable.

**CONCLUSION:**

South office and south break room probably over-heats in summer and is too cool in winter.

5. Ventilation:

- a) CO2 levels are a “diagnostic measurement” that may be used as a general guide to ventilation effectiveness. CO2 itself is not dangerous at levels that indicate inadequate ventilation.
- b) Ms. Tully noted an outside CO2 concentration of 485 ppm (indicative of the busy road and thermal springs nearby). She calibrated the sensor to my specifications and it appeared to have produced reliable readings.
- c) See the attached graph. CO2 levels climbed during the day, and reduced over-night (as expected). The highest level measured was over 1150 ppm at about 4:20 on the day before my site observation. Typical maximum CO2 levels varied between 600 and 1000 ppm. The maximum CO2 level for an adequately ventilated area is typically 1200 ppm or less. 800 ppm would be considered “good ventilation”.

However, the bullpen area is lightly occupied – less than one person per 250 sq.ft. – so adequate ventilation is a function of light occupancy and lots of traffic in and out of the office – it is not due to (non-existent mechanical) ventilation by the HVAC system.

**CONCLUSION:**

Mechanical ventilation should be added.

The FCUs do not have adequate capacity to accommodate untampered outside air (as could be provided by ducting a small OA intake duct on the return air ductwork – directly to the outside). I recommend installation of an air-to-air heat recovery unit in this area (ERV). The unit should probably be located toward the south, where the outside wall may be accessed. Unit may possibly be located above the ceiling – though may need a dedicated closet.

Similar units are recommended for each of the other three current State’s areas (and any future additional space).

**B. “Clerk’s office T-stat”**

1. Datalogger information:

- a) Temperature and Relative Humidity (RH) sensor
- b) Datalogger Serial Number: 2005211 (Onset Computer Corp Product: HOBO U10-003 Temp/RH)

2. Located in “Court Clerk Staff” area’s corridor near the offices, just outside the break room. Measured temperature and humidity near the existing thermostat.

3. General Observations:

- a) Served by system described above.

#### 4. Temperature Control Observations

- a) Space humidity generally fluctuated with outside humidity. Humidity is not directly controlled, but high humidity can be a sign of poor temperature control, poor condensate management, inadequate ventilation, or other problems.

Inside humidity is indirectly controlled by dehumidification at the cooling coil.

Humidity levels for the Clerk's areas were acceptable.

- b) The thermostat's setpoint was 71° and it was not noted to change during the testing. It was set to "cooling only" operation on the 15<sup>th</sup>.
- c) Measured space temperatures were "acceptable" with 76° maximum at the hottest part of the previous week). Typical "swing" was about +/- 2°. This would be considered "good" system response to the "average" temperature sensed at the t-stat.

#### C. "Courtroom T-stat"

##### 1. Datalogger information:

- a) Temperature and Relative Humidity (RH) sensor
- b) Datalogger Serial Number: 697068 (Onset Computer Corp Product: H08 Logger Temp/RH)

2. Located in Courtroom on interior wall in Jury box. Measured temperature and humidity near the existing thermostat. Note that this single thermostat serves the entire courtroom area including the jury room, judge's chambers and security areas.

(The Probation area is served by a separate unit as described below).

##### 3. General Observations:

- a) FCU location: There is a single working FCU for this area. It is located in a closet near the stairwell with adequate, though tight, access. An abandoned FCU (that formerly served the Probation area) is also in the closet.

Like the other FCUs, it uses the area above the ceiling as a "plenum" to return air from the occupied spaces to the closet (which also acts as a return air plenum). It also uses the "attic" area as a return plenum.

- b) Attic Conversion

The attic was formerly ventilated. It has now been converted into "interior space" by application of approximately 1-1/2" of low density spray foam against the roof deck – though not the exterior wall. This provides minimum insulation for the extended volume of the building.

However, the low-density insulation used (similar to "Icynene") is not recommended for this application. The lack of insulation on the above-ceiling walls and minimal insulation on the roof deck also provides inadequate thermal resistance.

The Icynene:

(1) Absorbs Moisture

The insulation is open cell – like a sponge. It absorbs moisture from roof leaks – and is difficult to dry out.

(2) Not Rated for Return Air

All return air plenums must have certain smoke-developed and flame spread ratings which plastic foam cannot meet.

(There are other materials in the plenum that do not meet these criteria).

c) Zoning:

There are at least eight logical control zones in this area. The single FCU is controlled by a single thermostat (in the Courtroom).

Temperature control is unacceptable due to large (fixed) windows and variable occupancy in the various zones.

4. Ventilation Air: Ventilation is not code-compliant, as there are no operable windows in the Courtroom area. However, the existing closet (and adjacent attic) are ideal for installation of a new (ERV).

5. Temperature Control Observations

- a) Supply air temperature was not measured at this FCU.
- b) The thermostat was set to 70° and “cooling” mode. No changes to the setting were noted.
- c) Humidity generally followed outside air with dehumidification through cooling coil. Control was adequate.
- d) Space temperature control (as measured at the thermostat) was “good” with 71° maximum measured temperature. Typical “swing” was about +1° / - 3° - which would be considered “good” system response to the “average” temperature sensed at the t-stat.

However, no other locations were monitored. I would expect fairly intolerable deviations in temperature in spaces with a lot of occupancy change and/or east or south solar exposure. Even the County and district judge areas are influenced by large windows (though their exposure is generally north).

e) Other Observations:

- (1) The Condensate drain system for this unit includes an overflow that consists of a trash can. This is unacceptable.
- (2) The condensate drain system for the Probation area runs through the FCU closet area and also includes an overflow condensate trashcan.
- (3) There are control panels and wiring for critical systems (like security cameras and fire alarm system) that are located in the FCU closet area. Some of this wiring is not plenum-rated and the power connections are unacceptable (power strip) with heavy

transformers being pulled out of the outlets due to their weight.

The closet probably should have had a dedicated smoke detector. It probably is not required by code with the relocation of the Probation FCU. However, it should be better monitored and maintained, given its content and the area it serves.

#### D. "Probation Office T-stat"

##### 1. Datalogger information:

- a) Temperature and Relative Humidity (RH) sensor
- b) Datalogger Serial Number: 2005212 (Onset Computer Corp Product: HOBO U10-003 Temp/RH)

##### 2. Located in the central "corridor" of the Probation area just outside of the entrance door (from the central elevator/stairway). Measured temperature and humidity near the existing thermostat.

Note that this single thermostat serves the entire Probation area, which includes three "private" offices with southern exposure and the "CPO" office, **which has no supply or return air devices in it whatsoever**, and which has a western exposure (including window). The CPO office is "conditioned" by opening its privacy door as well as the nearby exit door. The exit door is a wooden fire escape.

##### 3. General Observations:

The SAT cycled considerably, even during warmer outside conditions. The condensing unit is probably over-sized.

However, this FCU showed adequate temperature response in the vicinity of the thermostat.

Supply air temperature changes were acceptable and capacity was adequate throughout the day. The minimum supply air temperature (SAT) was 48°, and 53° could be achieved at the hottest part of the day.

Although no change of thermostat setting was noted in the provided form, it is obvious that the thermostat was reset from approximately 71° to approximately 74° or higher (and back and forth, again) over the course of the testing.

The thermostat appears to have been set to heating for at least three days (from the 9<sup>th</sup> through the morning of the 11<sup>th</sup>) - even though heating is not available in this unit.

These observations show that the occupants are uncomfortable. Lack of adequate zoning is often a cause of "thermostat wars".

- a) FCU location: see the discussion in section IV.E below.

#### E. "Probation Office Diffuser"

##### 1. Datalogger information:

- a) Temperature sensor with remote data logger

- b) Datalogger Serial Number: 10232574 (Onset Computer Product: HOBO U12-006 4-Channel Ext)
2. Located in the western-most supply diffuser (just outside of the CPO office).
3. General Observations:

Average discharge air velocity from this diffuser was lower than would be expected (possibly indicating inadequate airflow). However, the hysteresis in the SAT and the apparent close-control to the thermostat setpoint indicate that airflow is adequate.

## V. FUTURE STATE OFFICE AREAS

Ms. Tully also installed several sensors in areas that are currently used for County functions, but which may be used for the state system in the future.

### A. "Basement: SE: Current Human Resources office T-stat"

1. Datalogger information:
  - a) Temperature and Relative Humidity (RH) sensor
  - b) Datalogger Serial Number: 2005213 (Onset Computer Corp Product: HOBO U10-003 Temp/RH)
2. Located in the "Human Resources" office on the south east corner of the building. Measured temperature and humidity near the existing thermostat.
3. Temperature Control Observations

Relative humidity was acceptable, though generally higher than anticipated (up to 50% RH).

The thermostat is not noted to have been changed (set at 77° on the 21st – on the sheet provided). However, the setpoint was changed, or there may have been some service on the unit on approximately July 30<sup>th</sup>. Prior to July 30<sup>th</sup>, the maximum space temperature approached 81° with a minimum temperature of approximately 78°. After July 30<sup>th</sup>, temperature response to this thermostat was generally good with an apparent 75° setpoint and control to within +2°/-1° of setpoint.

4. General Observations:
  - a) The FCU of this for this area is located above the ceiling in the nearby janitor's closet with poor access. This single FCU appears to serve the entire basement area of the building. This unit also appears to have a leaking heating coil.
  - b) Ventilation

Outside air may have been ducted to the plenum via soffit grilles just outside of the main entrance. However the ductwork for this "ventilation" system terminates in the ceiling plenum (not at the unit) and the duct was stuffed with a plastic bag. This was probably to reduce infiltration of outside air.

Mr. Martinez said that there had been a pipe freeze in this area (which includes the public restrooms).

Therefore, like the rest of the building, this area has no mechanical ventilation.

**B. "Basement: S: Current Elections office"**

1. Datalogger information:

- a) Temperature and Relative Humidity (RH) sensor
- b) Datalogger Serial Number: 2005210 (Onset Computer Corp Product: HOBO U10-003 Temp/RH)

2. Located in the "Elections" office on the south of the building. Measured temperature and humidity on a column in the center of the room. The thermostat for this area is in the Human Resources office.

3. Temperature Control Observations

Relative humidity was acceptable, though generally higher than anticipated (up to 50% RH).

Recorded temperatures were generally higher by a few degrees and had greater temperature fluctuation, than the office. The maximum recorded temperature was 83° and occurred on July 25 (about 8 PM). After July 30, the maximum temperature recorded was 77° (at about noon on August 8).

4. General Observations:

- a) There is a supplemental cooling unit in this area (with ducted condenser air through the south window). This unit is a Comfort-Aire model PD-91B portable air conditioner (rated at ¾ ton nominal cooling capacity).

For this unit to operate correctly, the condensate it creates must be periodically drained. It stops working if the tank is full (and a warning light illuminates).

**C. "Sheriff's office Corridor (lower level entrance corridor T-stat)"**

1. Datalogger information:

- a) Temperature and Relative Humidity (RH) sensor
- b) Datalogger Serial Number: 390877 (Onset Computer Corp Product: HOBO 1999 v. Temp/RH)

2. Located in the entrance corridor for the Sherriff's office, well away from the entrance door, near a thermostat behind a "gymnasium" (anti-tamper) cover.

This thermostat may serve the entire BOCC Meeting area and County Admin areas (on the same floor as the Clerk's office). I did not observe this FCU.

The sensor measured temperature and humidity near the thermostat (and the HVAC system response to this thermostat).



### 3. Temperature Control Observations

Relative humidity was acceptable (up to 38% RH).

Like the other areas, there was generally "good" response to the thermostat (+/-2° deviation from setpoint). The thermostat measured "average" temperature in the corridor.

Like the other near-thermostat data loggers, it does not measure deviation in a given thermal zone controlled by the thermostat. Actual temperatures in the rest of the area served by this FCU were not measured. Temperature control in these other areas is likely poor given their different occupancy.

### 4. General Observations:

#### a) State Overflow "Courtroom"

The BOCC meeting room is sometimes used as an overflow courtroom for State functions. It has an inoperable thermostat. By Mr. Martinez' report, airflow to this room actually "rides along" with the Sherriff's FCU, which is probably controlled by the thermostat monitored by the datalogger described in section V.C above.

Ms. Tully reported very warm temperatures in this area during meetings (as did Joe Gifford). Mr. Martinez said that the volume dampers for the diffusers in this area had been cut back. (This was probably to induce more airflow to more constantly occupied areas served by this single FCU).

This probably indicates an air balance or total capacity problem for this FCU.

This area undoubtedly also lacks mechanical ventilation.

### D. "County Admin Area (interior office, bullpen area, in diffuser)"

#### 1. Datalogger information:

a) Temperature sensor with remote data logger

b) Datalogger Serial Number: 425622 (Onset Computer Product: HOBO 4-Channel Ext v. 1998).

#### 2. Located in a supply air diffuser (just inside the County Admin office).

#### 3. Temperature Control Observations:

The SAT cycled considerably, even during warmer outside conditions. This may be because the controlling thermostat is inappropriately located. It is easily satisfied with short "bursts" of cooling.

This may be the case even though other parts of the building are overheating (for under heating in winter time).

However, this FCU showed adequate temperature response in the vicinity of the thermostat (see section V.C above).

The minimum supply air temperature (SAT) was about 58°, at the hottest part of the day (on the warmest days monitored). This is marginal – especially given the low airflow observed.

4. General Observations:

Average discharge air velocity from this diffuser was lower than would be expected (possibly indicating inadequate airflow).

The datalogging indicated operation primarily in cooling mode, with a possible brief excursion into heating mode (including a supply air temperature up to 85° on July 22<sup>nd</sup>).

**CONCLUSION:**

At minimum, a complete cleaning, and adjustment is required (including refrigerant charge management) for the FCU/CU units that serve this area. The BOCC Meeting area should be provided with a control damper (and its own thermostat), and balanced to provide adequate cooling when occupied.

Like all of the other areas, DOAC or ERV ventilation is required for the unit and the BOCC Meeting room.

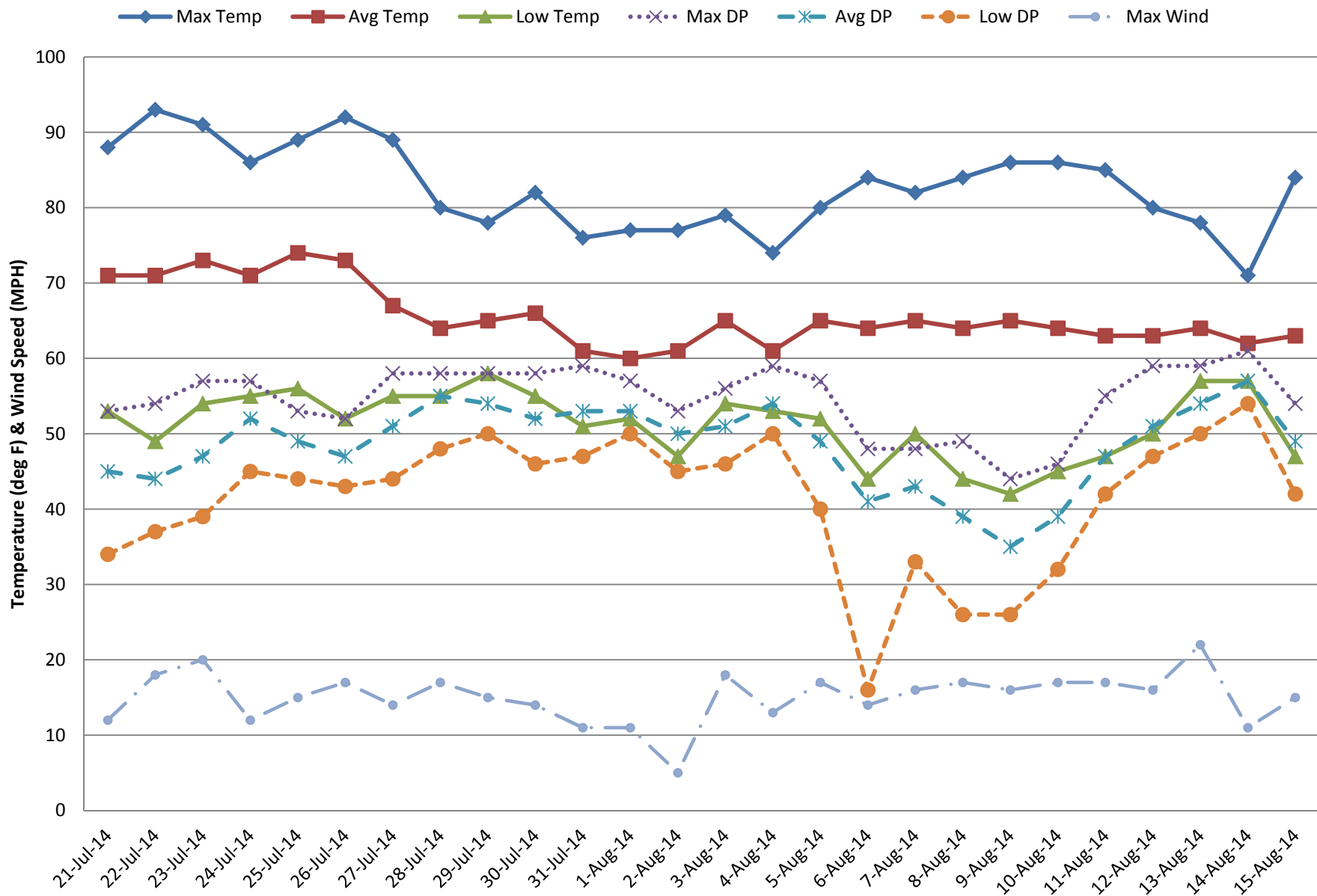
**END OF MEMO**

Attachments:

Weather Graph	(1 page)
Typical raw data print out (Temp, RH & DP for 42562)	(1 page)
Hourly performance for Clerk's Office	(2 pages)

Other graphs, and/or raw data available on request.

# Pagosa Weather During Testing



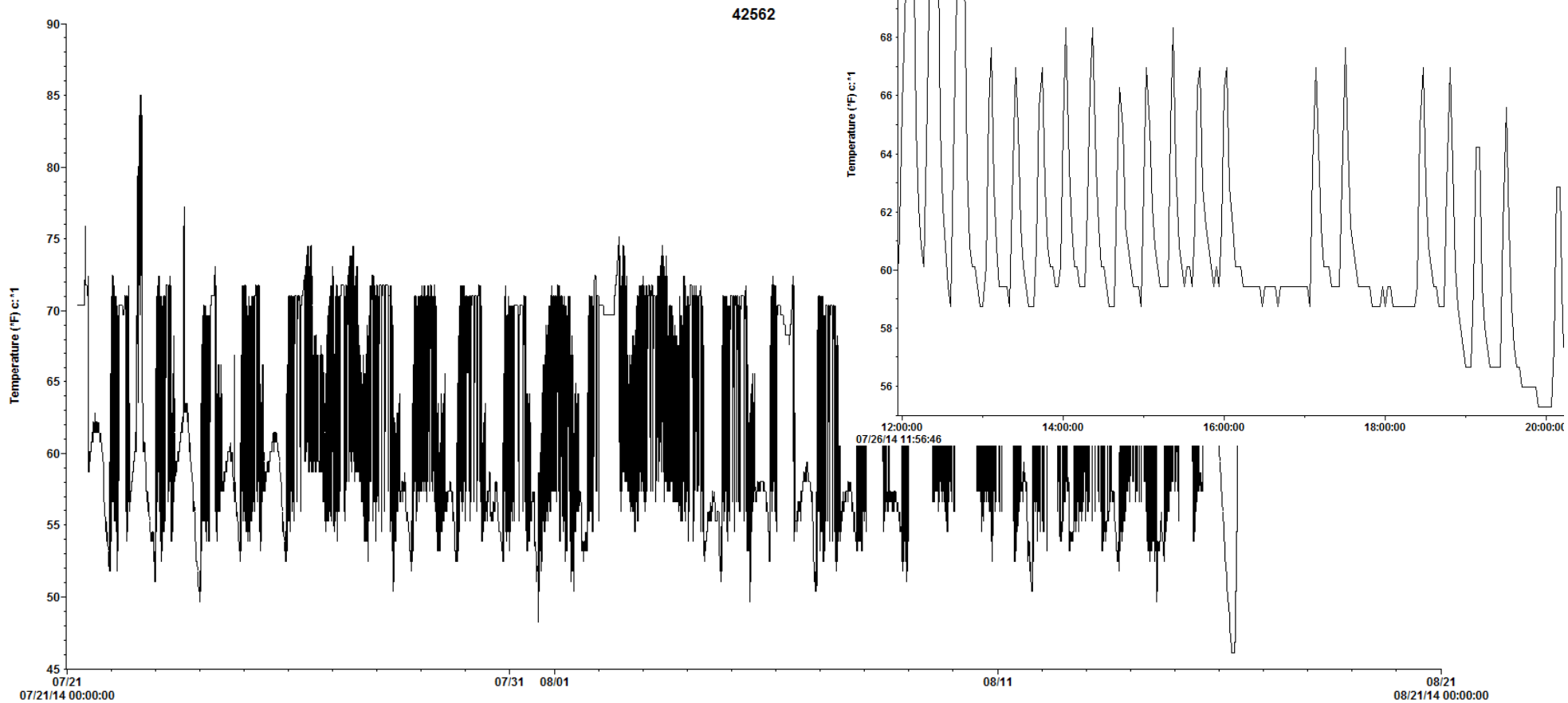
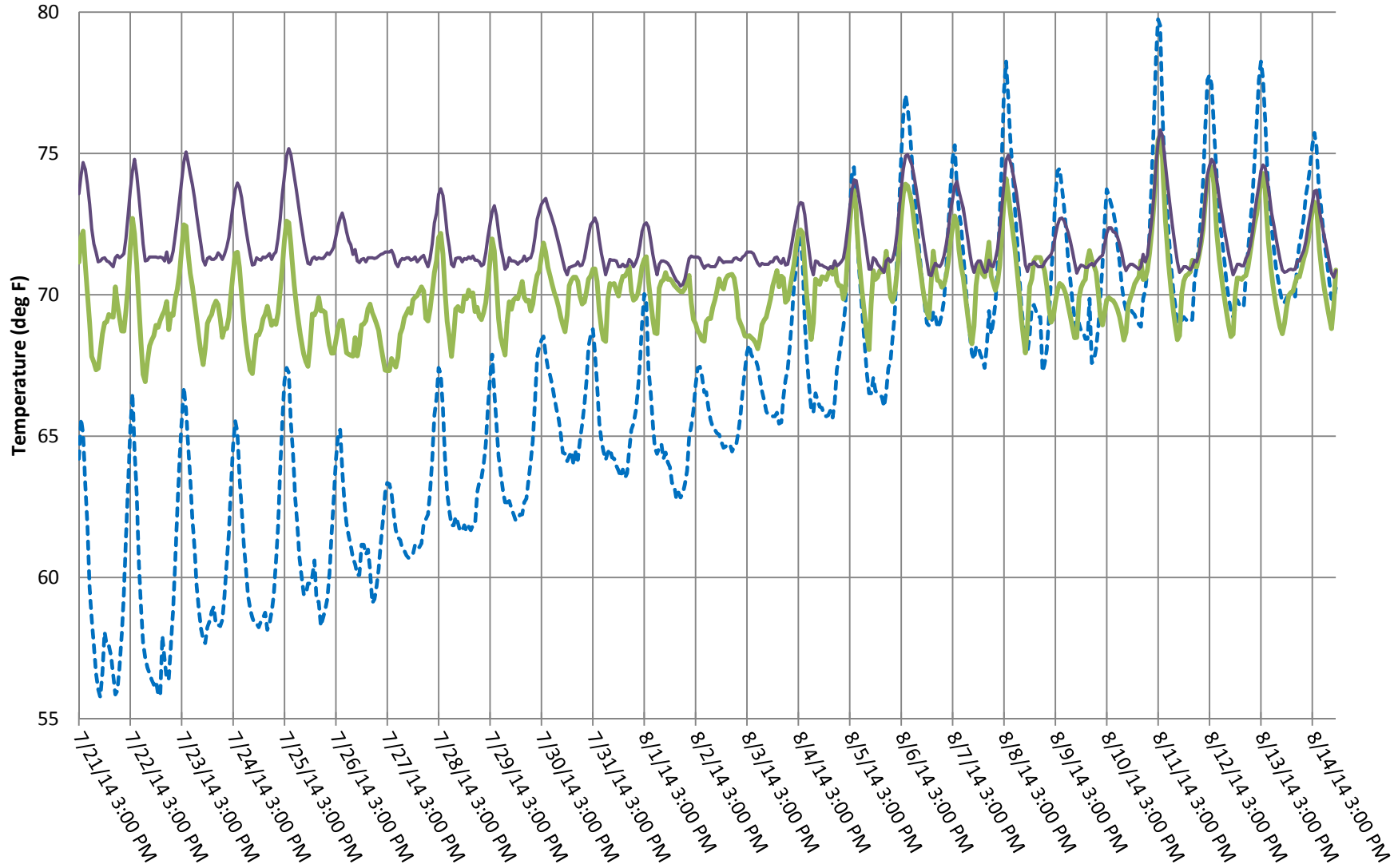


Figure 1: Raw data print out for Ser. No. 42562 (diffuser in County Admin Area). Note temperature fluctuation as associated FCU energizes, then de-energizes associated outdoor cooling condensing unit. INSET: Detail for 12:00 noon to 8:00 pm on July 26<sup>th</sup> (one of the hottest days monitored).

Average Hourly Space, Min. SAT and Max CO2 from 3:00 pm July 21st through 7:00 am August 15th

# Pagosa Courthouse Clerk's Area

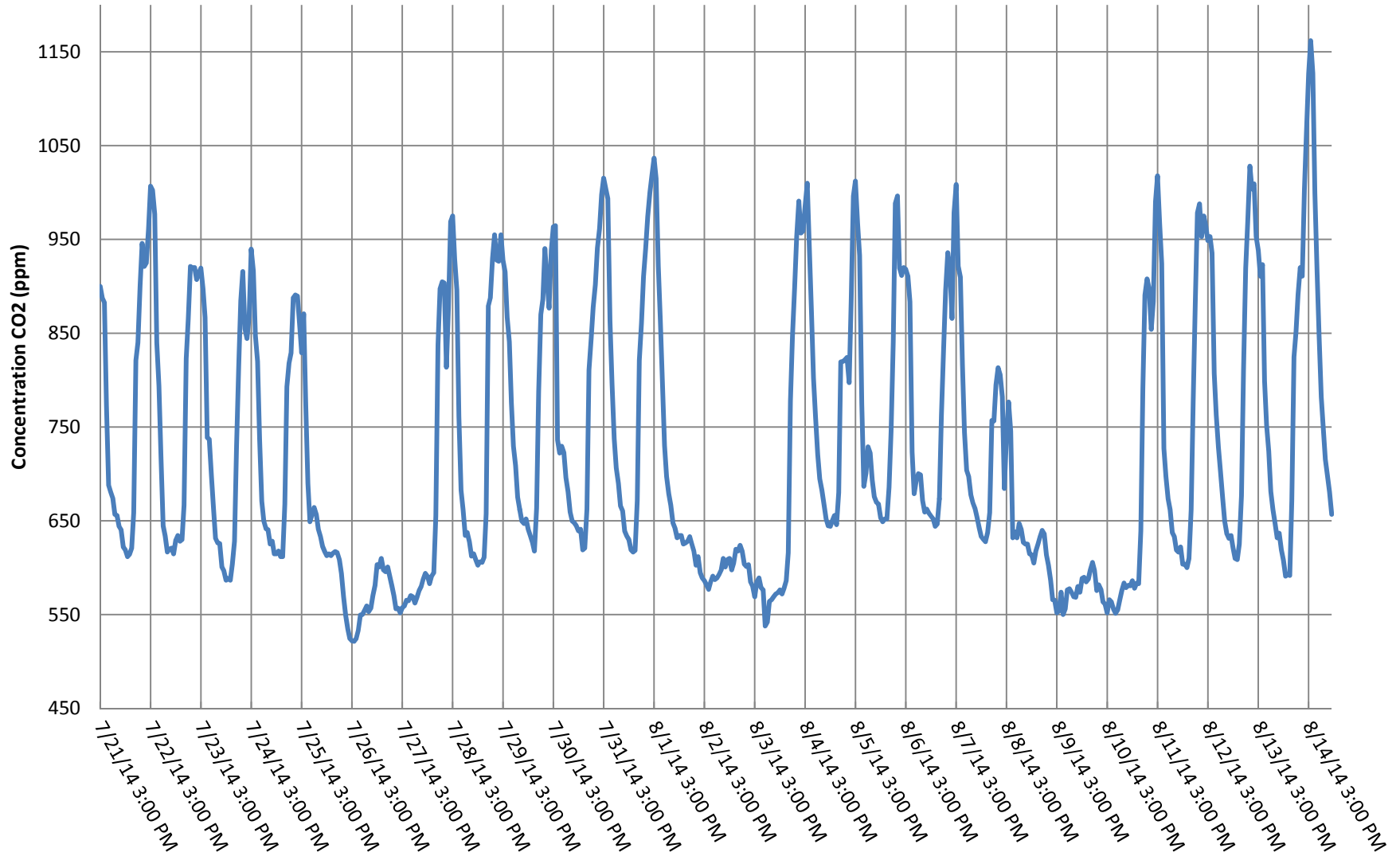
--- Min. SATemp    — Avg. Space Temp    — Avg Temp (@ T-stat)



Avg Hourly Space Temp (in "Bullpen" and at T-stat); and Min. Hourly SAT from 3:00 pm July 21st through 7:00 am August 15th

# Pagosa Courthouse Clerk's Area

— Max CO2, ppm



Hourly Maximum CO2 from 3:00 pm July 21st through 7:00 am August 15th

**A STUDY TO ASSESS THE SNOW LOAD CAPACITY  
OF THE ARCHULETA COUNTY COURTHOUSE ROOFS**

**PREPARED FOR THE**

**ARCHITECTURAL AND FACILITIES PLANNING  
DEPARTMENT  
OF  
COLORADO JUDICIAL COURTS AND PROBATION**

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**Project No. 2185**

**November 12, 2014**

**Copy \_\_\_\_ of \_\_\_\_**

# ARCHULETA COUNTY COURTHOUSE

## ROOF FRAMING ASSESSMENT

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# **ARCHULETA COUNTY COURTHOUSE**

## **ROOF FRAMING ASSESSMENT**

### **I. EXECUTIVE SUMMARY**

As requested by the Colorado Judicial Courts and Probation Department of the State of Colorado, this report is prepared for the purpose of estimating the snow load capacity of the roofs, especially the original, high roof, of the Archuleta County Courthouse in Pagosa Springs, Colorado.

To arrive at an accurate and precise answer has proved to be a difficult task because of the lack of drawings and specifications used to construct the entire roof framing for this structure. In addition, with respect to the high roof framing, some of the original timber members were broken, cracked or missing. In the fall of 2013, structural modifications were made to the existing, high roof framing; but, unfortunately, some of these modifications were flawed with respect to their installation. Another issue to be considered in the assessment of the snow load capacities for this structure is the fact that prior to the modifications to the original roof framing in the fall of 2013, all of the roofs of the courthouse have historically withstood some very heavy snow loads, possibly in the range of 100 to 120 psf.

The net result of attempting to arrive at a precise answer for the snow load capacity of the original, high roof was to assume material properties for the original framing based on experience and engineering judgment. To that end, it is estimated from a theoretical point of view that the snow load capacity for this roof is 57 psf. However, it is still important to remember that two counter intuitive issues cloud this figure, namely that the roof has withstood some historically heavy snow loads and that some of modification installations made in the fall of 2013 are flawed. Thus, it does not appear reasonable to vacate this building unless it is obvious by visual observations that a significant amount of snow has accumulated on the roofs, especially the high roof.

Inasmuch as the work performed in fall of 2013 is still under warranty, it is recommended that the flaws in this work be corrected prior to the expiration of the warranty.

### **II. HISTORY AND BACKGROUND**

Prior to commencing the preparation of this report, attempts were made to locate any historical documents relating to the construction of the Archuleta County Courthouse in Pagosa Springs, Colorado. Unfortunately, no actual construction documents were found except for a brochure stating that the Courthouse was opened for business in 1929. Thus, based on conversations with local, long-time residents, having worked with local contractors for the past nine years and having over 40 years of experience dealing with issues of this nature, the author of this report has formed the following opinion concerning the construction of the Archuleta County Courthouse.

In the late 1800's and early 1900's Archuleta County and the Pagosa Springs area was greatly involved in the lumbering industry because the surrounding area contains the second largest forest of Ponderosa pine in the United States. Many of the homes built in Denver in the early 1900's used lumber from Archuleta County. After the 1930's, the lumbering industry in this area started to decline and finally ended sometime in the 1950's. Thus, it makes sense, that the original lumber used in the construction of the Courthouse was native Ponderosa pine.

Prior to 1924, there was no attempt on the part of lumber producers to standardize the size of lumber. The only requirement was that a rough-cut (RC) piece of lumber be at least its stated size in a dry condition. Thus, a 2 x 4 had to be at least two inches by four inches but could be slightly greater than two inches thick and four inches wide. The first national size standard was initiated in 1924 and revised in 1926, 1928, 1939, 1953 and 1964.

Sometime after the 1870's, sawmills started using planers, but only if the customer paid an extra charge. Most of the time only one side of a board was planed, which became known as surfaced one-side (S1S). Occasionally, a customer ordered two sides to be planed (S2S) and paid another extra charge.

From 1924 on there was also much discussion among the lumber mills, marketers and consumers concerning the grading and strength of lumber. The National Forest Laboratory had been doing a lot of research and prepared a report entitled "Guide to the Grading of Structural Timbers and the Determination of Working Stresses". In 1934, the Department of Agriculture issued this guide as its Publication No. 185 (6).

With respect to building codes, the first model building code was developed in 1915 by the Building Officials and Code Administration (BOCA). However, the first model building code to be published was the Uniform Building Code in 1927. Other building codes have been published since then, with the latest being the International Building Code that more or less is a compilation of previous building codes.

It is interesting to note that although there are published building codes, not all governing entities use them. In fact, Archuleta County did not establish a building department nor adopt a building code until sometime in the early 1980's.

### **III. ORIGINAL CONSTRUCTION OF THE COURTHOUSE**

From the discussion above, it can be seen that more than likely the design for the Courthouse was probably started in 1927 or 1928, and construction started in 1928 or 1929. The lumber sizes in the initial construction of the Courthouse are RC 2 x 6's, RC 2 x 8's, RC 2 x 10's, RC 2 x 12's, S1S 1 x 4's, S1S 1 x 6's, S1S 1 x 8's and S1S 1 x 10's. Unfortunately, inasmuch as any type of grading and allowable stress standards were not published until 1934, the designers of the Courthouse had no way of specifying the grade of the lumber materials to be used. The question now becomes- what is the grade of the

original lumber used in the roof framing for the Courthouse and what method was used to design and select the sizes for the members?

Because the local mills had been supplying a large amount of lumber for construction in the Denver area in the early 1900's, it is reasonable to assume that some knowledge and experience regarding the selection of the framing members was available. However, it is very doubtful that the roof framing design was "engineered" simply because Archuleta County did not have a building department, did not have a building code, it was (and still is) somewhat isolated geographically, and the actual construction of the roof framing did not follow the fundamental principles of engineering known to be available at that time. Specifically, the configuration of the 1 x 4, 1 x 10 and 1 x 6 bracing members used in Spans A, B and D respectively of Area A (see Figure Nos. 1 & 2) contribute or increase very little to the load carrying capacity of the overall roof framing. As originally framed, these bracing members were subjected to compression forces far above their compression capacity; hence, this is the reason some of them suffered severe bowing, and in some cases, were broken or split.

It is the "opinion" of the author of this report that the original design was based on the "by guess and by golly" method, also sometimes known as the "my brother-in-law in Cortez" method or "that looks like about the right size" method. These methods can be best explained as the designer or contractor having been told of or having seen similar construction in the past selected the framing members based on "it worked before so it should work here." The mention of these methods may seem a little facetious but it is the experience of the author that these methods are quite prevalent in Archuleta County and the town of Pagosa Springs. It is interesting to note that in Span A, a distance of 23'-8", 2 x 10 members were used in the top chord; and in Span D, a distance of 20'-6", 2 x 12 members were used in the top chord.

(As a last piece of history, during the winter of 2007-08, Pagosa Springs received an unusually large amount of snow since a winter sometime in the late 80's. Old-timers said it was the worst they had seen in many years. There were approximately 35 structures consisting of full buildings, carports, decks and bridges that collapsed. The author conducted his own snow studies and found that the snow loads at his residence varied between about 100 to 120 psf on his roof.)

#### **IV. EMPLOYEE INTERROGATIONS**

On the morning of November 4, 2014, Mr. Martinez, custodian of the building, and Ms. Debbie Tully, Clerk of the Court, both of whom were present during the winter of 2007-08, were questioned concerning their knowledge and experience during their time of employment in the structure. Specifically, they were asked if at any time they or any of their fellow employees had ever heard snapping, cracking or popping noises in the building, especially during the winter of 2007-08. Their answer was no. Mr. Martinez was asked about the maximum depth of snow that he had ever observed on the roof of the structure

and if he or any other persons had ever had to shovel snow off the roof. His answer to shoveling was no, and the maximum depth of snow that he observed on the roof during the winter of 2007-08 was about four feet. Based on the author's research and studies during this period, the snow load on the Courthouse roofs was probably in the range of 85 to 100 psf.

## **V. ON-SITE OBSERVATIONS – AREA A OVER THE COURTROOM**

After interviewing Ms. Tully and Mr. Martinez on the morning of November 4, 2014, the author and his assistant, in the company of Mr. Martinez, entered the spaces above the ceilings in Spans A and B for the purpose of observing the original roof framing and the modifications constructed in the fall of 2013. These structural modifications are shown on the drawings entitled "ARCHULETA COUNTY COURTHOUSE, RE-ROOF PROJECT, PHASE 1, as prepared by Reynolds + Associates, Job No. 13073, dated 2013-09-11.

### **A. SPAN 'A' OVER THE COURTROOM PHOTOS**

Photo No. 1 shows the typical original framing and the typical modification of the added vertical 2 x 6's toward the east side of the structure. Notice that the fourth, lower diagonal member is shorter than the rest of lower, diagonal members.

Photo No. 2 shows the typical original framing and the typical modification of the added vertical 2 x 6's toward the west side of the structure. Notice the location and attachment of the third diagonal brace.

Photo No. 3 shows the typical attachment of the original braces and the attachment of the new 2 x 6 vertical member to the top chord.

Photos Nos. 4 thru 7 show the four broken original diagonal braces observed. There may be others that have small unobservable cracks or splits or that may be on the verge breaking under a heavy snow load.

Photo No. 8 shows that a short diagonal brace was never installed correctly.

Photo No. 9 shows a short diagonal brace connected to the bottom chord at the wrong location.

Photo No. 10 shows an original diagonal brace connected at the wrong location plus two added 2 x 6 braces.

Photo No. 11 shows the installation of an added 2 x 6 vertical brace on the diagonal brace side of the bottom chord. See Photo No. 18 for a typical connection to the other side of the bottom chord.

Photo Nos. 12 thru 14 three extremely bowed original diagonal braces.

Photo No. 15 shows three original diagonal braces that appear to be in sound condition but have added members for some unknown reason.

Photo No. 16 shows a typical added 2 x 6 connection on the bottom chord at mid-span of the truss.

Photo No. 17 shows correctly connected added 2 x 6's at the top chord at mid-span of the truss.

Photo No. 18 shows a bottom chord connection of an added 2 x 6 without the nails passing thru a diagonal brace.

Photo No. 19 shows a correctly connected added 2 x 6 to the top chord.

Photo No. 20 shows an added 2 x 6 correctly connected to the original diagonal bracing at their intersection point.

Photo No. 21 shows three incorrectly connected vertically added 2 x 6's at the top chord at mid-span. It is questionable as to whether or not these connections would be effective under a heavy snow load even though there are nails holding these members in place.

Photo Nos. 22 thru 24 show other top chord connections similar to those shown in Photo No. 21.

Photo Nos. 25 thru 28 show bottom chord connections that are also questionable as to their effectiveness.

Photo No. 29 shows a 3 1/2-inch knot in the original 2 x 10 top chord. According to WWPA, knots may not exceed 4 1/2" in a 10-inch member.

Photo No. 30 shows a pile of bat droppings.

Photo No. 31 shows an original 1 x 4 brace used for testing.

Photo No. 32 shows the test of the original 1 x 4 brace.

## **VI. MATERIALS AND ALLOWABLE STRESSES**

**AREA - A:** Due to the lack of documentation for the construction of the original structure, it was impossible to ascertain the species and grade of the materials used. Based on the discussion in Section III above, it is reasonable to assume that all of the lumber used in the original construction of the Courthouse was Ponderosa pine. Research on the internet resulted in the table of *Physical and Mechanical Properties and Design Values for Visually*

*Graded Structural Lumber* for Ponderosa pine from the Colorado State Forest Service (see Page 21).

As can be seen from the table, there is a classification for members 2" to 4" thick and 5" and wider, a classification that would cover the 2 x 6's to the 2 x 12's as originally used in the structure. The maximum allowable bending stress under this classification for a grade of Select Structural is 1200 psi for Single Use and 1400 psi for Repetitive Use. Based on the history of the area, it is very likely that this was the material used in the original construction of the Courthouse. However, it is interesting to note that there another classification for Select Structural members 2" to 3" thick and 2" to 4" wide that lists the maximum bending stress for Single Use members as 1400 psi and for Repetitive Use members as 1650 psi.

Modern day building codes recognize several adjustment factors for the use of timber as a major construction material. The two most important adjustment factors for this assessment are the Duration of Load and Repetitive Use. The Duration of Load Factor accounts for the fact that timber has the ability to sustain an increase in stress over a defined period of time without any detrimental effects. The generally accepted factor for snow for a two-month period is 1.15, i.e., the allowable stress may be increased by 15 percent. In view of what the original roof framing has sustained since its construction and based on the author's experience, it seems reasonable to assume a one month duration for snow in this area that results in a Duration of Load Factor of 1.20.

The Repetitive Use factor, 1.15, is based on the assumption that if a member fails the adjacent members will pick up the load that the failed member was carrying.

For this report, two nominal, allowable stress values were assumed for the top and bottom chord members, 1200 psi and 1400 psi, for the determination of the estimated maximum snow load.

The original diagonal members were S1S 1 x 4's that appeared to had been used as concrete form boards prior to using them as diagonal web members. Again, the species was assumed to be Ponderosa pine. Because the grade was unknown, and because an unused 1 x 4 was found in the plenum area, a home-devised test on the piece was conducted (see Photo Nos. 31 & 32). Based on this test specimen that was 13/16<sup>th</sup> of an thick, 3 5/8" wide and 11'-6" long, a value for the Modulus of Elasticity (E) was determined to be about 1,100,000 psi. Based on the previously mentioned table of values for Ponderosa pine, this appeared to be Commercial grade decking material. Because no values were listed for the allowable tension stress or the allowable compression stress parallel to the grain, it was assumed that this was Grade 3 material with an allowable tension value of 325 psi and an allowable compression value of 400 psi.

For the new vertical 2 x 6 members installed in the fall of 2013, a grade stamp was found that indicated that the material was Douglas Fir, Grade 2. The allowable compression

stress for this material is 1350 psi, which far exceeds the calculated stress under a snow load greater than 200 psf.

In Span A it appears that the original 1 x 4 braces were nailed to the top and bottom chords with 8d nails that have a lateral resistance of about 73 pounds per nail. The actual number of nails used per connection varied from one to four, providing a total lateral resistance of 73 to 292 pounds, assuming full-length penetration. However, because the calculated force in the 1 x 4 bracing varied from about 1 to 11 pounds, the strength of original nailed connections becomes a moot point.

The lateral resistance for 16d nails in a vertical 2 x 6 is specified as 122 pounds. The actual number of 16d nails used varied from three to five, but in some cases not all of these nails had full penetration (see Photo Nos. 25 thru 28). In Span A the force in the added 2 x 6 members varied from 145 to 212 pounds so three 16d nails with full penetration could carry a force of 366 pounds.

In Span B, the calculated maximum load in the added 2 x 10 was 591 pounds, which is less than 610 pounds, the capacity of five 16d nails.

In Span D (which could not be observed) the calculated force in the 2 x 6 added members varied from 48 to 616 pounds; thus, assuming all five 16d nails called for were used, a resisting force of 610 pounds was provided, which is acceptable if the Cd and Cr factors are applied to the resisting capacity of 610 pounds.

### **AREAS - B & C**

The roof framing for these two areas consist of open web timber joists (trusses) spaced 19.2 inches apart. Open web timber joists are constructed with timber top and bottom chords and steel pipes for web members. The bottom chord was stamped as "IPI DEN.SEL.STR.KD" and appeared to be "S\*P". These joists were 16-inches deep and had 1 1/2" x 3 5/8" chords top and bottom. No information was available concerning the manufacturer. However, with data available and using fundamental structural theory, it was estimated that these joists were capable of supporting an 85 psf snow load. If the Cd and Cr factors are applied, the snow load capacity increases to about 117 psf.

### **AREA - D**

This area was inaccessible; however, according to Mr. Frank Martinez, in the winter of 2007-08, the snow was approximately 3 1/2 feet deep, which indicates that it probably supported an estimated snow load of 85 psf to 100 psf.

## **VII. DEAD LOADS USED IN THE STRUCTURAL ANALYSIS**

The following is a list of the dead loads assumed and used in the structural analyses to estimate the snow load capacities of the various areas.

### **AREA – A**

Built-up roofing:	4.4 psf
1 x 6 Decking:	2.2 psf
Total top chord:	6.6 psf x 16" spacing = 8.8 plf Use 10 plf for the top chord DL
1" thick plaster ceiling:	8.0 psf
Suspended tile ceiling:	1.8 psf
Miscellaneous loads:	2.2 psf
Total bottom chord:	12.0 psf x 16" spacing = 16.0 plf Use 20 plf for the bottom chord DL

### **AREAS – B & C**

Metal roofing:	2.0 psf
5/8" OSB decking:	2.1 psf
Insulation:	1.0 psf
Joists:	3.4 psf
5/8" Gyp board ceiling:	2.5 psf
Suspended tile ceiling:	1.8 psf
Miscellaneous loads:	2.0 psf
Total Dead Load:	15.0 psf x 19.2" spacing = 24 plf

## **VIII. STRUCTURAL ANALYSIS PROCEDURE**

### **AREA – A**

Spans A, B and D were analyzed using the computer program RISA-2D, Version 5.5. Span C was hand calculated. To facilitate the analyses and easily record the results, the procedure was separated into three stages. Stage 1 consisted of applying only the dead load to the original roof framing; Stage 2 consisted of applying only a 65 psf snow load to the original roof framing; and Stage 3 consisted of only applying a 65 psf snow load to the modified framing constructed in the fall of 2013. To arrive at the estimated snow load capacity, the dead load results (Stage 1) were subtracted from the capacity of the members, which then resulted in the remaining capacity to support a snow load. These results were then prorated to the 65 psf snow load to arrive at the estimated snow load remaining.

It is interesting to note that for Spans A, B and D, the original 1 x 4 web members in Stages 1 and 2 did not contribute any significant support for the overall roof framing. The web member configuration as installed, especially the members from the center of the top chord to the ends of the bottom chord, had any compression strength. The L/d ration for these types of compression members is limited to 50 by design codes. Thus, the calculated L/d ratio of 160 greatly exceeds the maximum; hence, under a heavy snow load these members buckled (bowed), and in some cases broke. Essentially, these members were



useless in this structure under the original design. Consequently, assuming an allowable, nominal bending stress of 1200 psi, including allowable adjustment factors, the estimated snow load capacity for Span A is **37** psf. Assuming an allowable, nominal bending stress of 1400 psi, the estimated snow load capacity for Span A is **45** psf.

For Stage 3, the vertical 2 x 6's theoretically help the situation by increasing the snow load capacity to **56** psf for an allowable, nominal stress of 1200 psi multiplied by Cd and Cr. For an allowable, nominal stress of 1400 psi multiplied by Cd and Cr, the snow load capacity is **69** psf. Unfortunately, because some of the members are broken, cracked or missing (see Photos 4 thru 10), and because some of the modifications made in the fall of 2013 are flawed (see Photos 21 thru 28), it seems reasonable to take the average of 45 plus 69 psf equal to 57 psf as the useable capacity for the snow load. Because there are about 64 trusses in the high roof area over the courtroom, it became impossible to analyze all of the possible combinations of broken, cracked, missing and flawed installations making up the as-built condition of these trusses. Hence, a perfect truss was assumed, and the results modified based on experience and engineering judgment. In Stage 2 the maximum snow load deflection is 3.25 inches and in Stage 3 the maximum snow load deflection is 2.17 inches.

For the remaining spans (B, C and D) of Area A, the snow capacities exceed 57 psf, so it seems reasonable to use **57** psf as the governing value.

### **AREAS B & C**

The roofs for Areas B and C were supported by modern, open web timber joists as discussed in Section VI. The snow load capacity for these roofs was calculated to be 85 psf. In view of the discussion above, it seems reasonable to use 57 psf as the governing value for these areas as well. In Stage 2 the maximum snow load deflection is 0.36 inches and in Stage 3 the maximum snow load deflection is 0.17 inches.

### **AREA D**

Based on Reynolds's report, including photos, of July 18, 2013 and the fact that accessibility would have required the moving of file cabinets, this area was not observed. However, judging from the fact that the span for this area was the same as the span for Areas B and C and the same type of joists were used (based on Reynolds' report date 18 July 2013), it seems reasonable to assume that the roof for this area is capable of also supporting a snow load of 85 psf. As discussed for Areas B & C, it seems reasonable to again use 57 psf as the governing value. In Stage 2 the maximum snow load deflection is 1.09 inches and in Stage 3 the maximum snow load deflection is 0.87 inches.

## **IX. SUMMARY & CONCLUSIONS**

Based on calculations, personal observations and experience, the most critical area for determining the snow load capacity for the roofs of this building is Span A of Area A over the courtroom. It appears that a reasonable useful value for snow load capacity for this

structure is 57 psf. If the flawed connections are corrected then a higher reasonable value for the snow load capacity is 69 psf. Inasmuch as the warranty has not yet expired for the work performed in the fall of 2013, it is still possible to make these corrections at no cost to Archuleta County.

The primary objective of this study was to estimate at what point the building should be vacated based on a critical snow load. Exactly how this critical snow load is to be determined, where it is to be sampled, who is to sample it and who is to make the final decision remains to be decided. Quite obviously, vacating the building will create problems with respect to interruption of any court proceedings and public business; consequently, this decision cannot be taken lightly.

It is beyond the scope of this report to provide the answers to the issues discussed above. However, it is very possible to take physical samples of the snow and determine its weight in pounds per square foot on the roofs of the structure. It is also possible to do this electronically. There are several companies making this equipment, but as to which one is the right one for this building is beyond the scope of this report.

In summary, it does not appear reasonable to vacate this building unless it is quite obvious by visual observations that a significant amount of snow has accumulated on the roofs, especially the high roof.

## **X. RECOMMENDATIONS**

Inasmuch as the roofing for this building is scheduled to be replaced next year, it is recommended that not only the roofing material be removed, but also the decking in Area A. This would expose the framing members supporting the roof and make it possible to remove the existing 1 x 4 bracing in Span A and the 1 x 6 bracing in Span D and install a new bracing configuration as shown in Figure Nos. 9 and 10. This bracing configuration, known as a Pratt truss, has been used for many years prior to 1929 and has many advantages. Specifically, the shorter vertical members are in compression and the longer diagonal members are in tension. This also places the top chord in compression and the bottom chord in tension. With the deck removed, it would be fairly easy and economical to modify the existing roof framing.



**PHOTO NO. 1**



**PHOTO NO. 2**





**PHOTO NO. 3**



**PHOTO NO.4**





**PHOTO NO. 5**



**PHOTO NO. 6**





**PHOTO NO. 7**



**PHOTO NO.8**





**PHOTO NO. 9**



**PHOTO NO. 10**





**PHOTO NO. 11**



**PHOTO NO. 12**



October 13, 2014

Colorado Judicial Courts and Probation  
1300 Broadway, Suite 1200  
Denver, Colorado 80203

Attention: Mr. John Gossett  
Architect and Facilities Planning Manager

Subject: Archuleta County Courthouse - Bat Impact  
Pagosa Springs, Colorado  
AGW Project Number E14193.EC

Dear Mr. Gossett:

On October 7, 2014 A.G. Wassenaar, Inc. (AGW) observed bat droppings in the east attic of the Archuleta County Courthouse Building, located in Pagosa Springs, Colorado. Although previous reports from building occupants had mentioned bats inside the building, their roosting area was unknown. This bat roosting area was discovered when the roof access hatch at the southeast side of the building was opened for observation.

## **DISCUSSION**

Exposure to bat droppings can result in fungal infections such as *Histoplasmosis* and *Cryptococcosis*. Generally people don't experience illness unless the guano is physically disturbed and they are exposed to the dust. Cleaning bat droppings from an attic is not an endeavor for the untrained. Only an experienced and trained pest control or mitigation company should attempt to clean the attic in this building.

## **RECOMMENDATIONS**

Our first and most important recommendation regarding the cleanup and removal of the bat droppings in the attic is that the building be unoccupied, especially the probation area. Hire an experienced pest control company to clean the attic where the roosting is occurring. Make sure the ventilation system serving the probation area is turned off. Operate a HEPA (high efficiency particulate air) filtered air scrubbing unit, in the probation department while the cleaning is occurring.

The workers performing the attic mitigation should wear ½ face P-100 respirators, disposable coveralls, work boots and rubber gloves. The droppings should be misted with water or water and a biocide solution prior to disturbance. Re-apply as necessary to minimize visible dust. Transfer the droppings to 6-mil plastic bags for disposal. After gross removal is accomplished, the area should

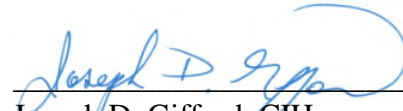
Colorado Judicial Courts and Probation  
Archuleta County Courthouse - Bat Impact  
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October 13, 2014  
Page 2

be cleaned with a HEPA vacuum. A detergent/biocide or enzymatic solution can be used to clean urine and staining on the walls and ceiling. If possible, close or block the pathways the bats are using to enter the attic.

Thank you for the opportunity to assist you in this matter. Please telephone us at (303) 759-8373 if you have any questions regarding this report.

Sincerely,

A.G. WASSENAAR, INC.



---

Joseph D. Gifford, CIH  
Principal Project Manager

JDG/dd

Attachment

## Working around bird and bat droppings

During a work project to demolish an old city hall, a colony of bats was seen nearby and a buildup of bat guano or droppings was found. Workers did not use personal protective equipment. Within three weeks, a total of nineteen people had been diagnosed with *Histoplasmosis* and developed severe breathing problems that required hospitalization. Some of these people worked on the demolition, some only visited the site, while others only lived or worked nearby.

### Explain dangers

When working around areas contaminated with bird and bat droppings, workers can be exposed to fungi that can cause serious infections called *Histoplasmosis* or *Cryptococcosis*.

While fresh bird droppings are not expected to contain the fungi, fresh bat droppings may be contaminated.

Disturbing the droppings or contaminated soil may release tiny particles into the air called “spores”. The spores can be inhaled and infect a worker’s lungs.

Most people who become infected with the fungi experience no symptoms, but some may experience mild flu-like symptoms.

For some people, especially those with weakened immune systems, the disease can be life-threatening because it can spread to other areas of the body, become severe, and eventually cause death.

### Identify controls

Always assume droppings are contaminated. Take the following precautions to reduce your risk of infection.

- If you have a weakened immune system, you should consult your doctor before working in the area.

- When removing large amounts of droppings, use the following types of personal protective equipment (PPE):
  - rubber boots
  - disposable gloves under work gloves
  - disposable coveralls
  - respiratory protection.
- Respirators should always be worn when working around bird or bat droppings. Appropriate respirators could range from an N95 filtering facepiece for low-risk tasks to a full facepiece air-purifying respirator or powered air-purifying respirator for high-risk tasks.

Follow these additional procedures to minimize the risk of infection.

- Eliminate the roost (nest) if the building is not going to be demolished and seal entry points if possible.
- Avoid disturbing material that could be contaminated to prevent the generation of dust and inhalation of spores.
- Never dry-sweep or dry-shovel material. Soak the material with water or a wetting agent to keep dust and spores down.
- Use a HEPA vacuum to clean up the contaminated material (if available).
- Dispose of the waste in 6-ml disposal bags and follow the disposal procedures outlined in your company’s health and safety policy.

For larger contamination, a disinfectant may be used. For these applications, consult the manufacturer’s directions.

### Demonstrate

Review the PPE requirements for the job with workers. Ensure they understand how to use each piece of equipment correctly. Make sure respirators have been fit tested, and show workers how to do a seal check. (Refer to the chapter on PPE in IHSA’s *Construction Health and Safety Manual*, M029).



# HISTOPLASMOSIS

## ***What is histoplasmosis?***

Histoplasmosis is an infectious disease caused by inhaling spores of a fungus called *Histoplasma capsulatum*. Histoplasmosis is not contagious; it cannot be transmitted from an infected person or animal to someone else.

## ***What are the symptoms of histoplasmosis?***

Histoplasmosis primarily affects a person's lungs, and its symptoms vary greatly. The vast majority of infected people are asymptomatic (have no apparent ill effects) or they experience symptoms so mild they do not seek medical attention. If symptoms do occur, they will usually start within 3 to 17 days after exposure, with an average of 10 days. Histoplasmosis can appear as a mild, flu-like respiratory illness and has a combination of symptoms, including malaise (a general ill feeling), fever, chest pain, dry or nonproductive cough, headache, loss of appetite, shortness of breath, joint and muscle pains, chills, and hoarseness. A chest X-ray of a person with acute pulmonary histoplasmosis will commonly show a patchy pneumonitis, which eventually calcifies. Chronic lung disease due to histoplasmosis resembles tuberculosis and can worsen over months or years. The most severe and rare form of this disease is disseminated histoplasmosis, which involves spreading of the fungus to other organs outside the lungs.

## ***Who can get histoplasmosis?***

Anyone working at a job or present near activities where material contaminated with *H. capsulatum* becomes airborne can develop histoplasmosis if enough spores are inhaled. After an exposure, how ill a person becomes varies greatly and most likely depends on the number of spores inhaled and a person's age and susceptibility to the disease. The number of inhaled spores needed to cause disease is unknown. Children younger than 2 years of age, persons with compromised immune systems, and

older persons, in particular those with underlying illnesses such as diabetes and chronic lung disease, are at increased risk for developing symptomatic histoplasmosis.

People with weakened immune systems are at greatest risk for developing severe and disseminated histoplasmosis. Included in this high-risk group are persons with AIDS or cancer and persons receiving cancer chemotherapy; high-dose, long-term steroid therapy; or other immuno-suppressive drugs.

Before 2000, a person could learn from a histoplasmin skin test whether he or she had been previously infected by *H. capsulatum*. However, the manufacturing of histoplasmin was discontinued in 2000, and the skin testing reagents were still unavailable in 2004. A previous infection can provide partial immunity to reinfection. Since a positive skin test does not mean that a person is completely immune to reinfection, appropriate exposure precautions should be taken regardless of a worker's past skin-test status whenever disturbances of materials that might be contaminated with *H. capsulatum* occur.

## ***What is the treatment for histoplasmosis?***

Mild cases of histoplasmosis are usually resolved without treatment. For severe cases, special antifungal medications are needed to arrest the disease. Disseminated histoplasmosis is fatal if untreated, but death can also occur in some patients even when medical treatment is received.

## ***Where are *H. capsulatum* spores found?***

*H. capsulatum* grows in soils throughout the world. In the United States, the fungus is endemic (more prevalent) and the proportion of people infected by *H. capsulatum* is higher in central and eastern states, especially along the Ohio and Mississippi River valleys. The fungus seems to grow best in soils having a high nitrogen content, especially

those enriched with bat droppings or bird manure. Disturbances of contaminated material cause small *H. capsulatum* spores to become airborne or aerosolized. Once airborne, spores can easily be carried by wind currents over long distances.

### ***How can someone know if soil or droppings are contaminated with *H. capsulatum* spores?***

To learn whether soil or droppings are contaminated with *H. capsulatum* spores, samples must be collected and cultured. Presently, the method used to isolate *H. capsulatum* is expensive and requires several weeks to complete. If not enough samples are collected, small but highly contaminated areas can be overlooked. Until a less expensive and more rapid method is available, testing samples for *H. capsulatum* will continue to be impractical for most situations. Consequently, when thorough testing is not done, the safest approach is to assume soil in endemic regions and any accumulations of bat droppings or bird manure are contaminated with *H. capsulatum* and take appropriate exposure precautions.

### ***What jobs and activities have risks for exposure to *H. capsulatum* spores?***

Below is a partial list of occupations and hobbies with risks for exposure to *H. capsulatum* spores. Appropriate exposure precautions should be taken by these people and others whenever contaminated soil, bat droppings, or bird manure is disturbed.

- ◆ Bridge inspector or painter
- ◆ Chimney cleaner
- ◆ Construction worker
- ◆ Demolition worker
- ◆ Farmer
- ◆ Gardener
- ◆ Heating and air-conditioning system installer or service person
- ◆ Microbiology laboratory worker
- ◆ Pest control worker
- ◆ Restorer of historic or abandoned buildings
- ◆ Roofer
- ◆ Spelunker (cave explorer)

### ***How can exposure to *H. capsulatum* be controlled and histoplasmosis prevented?***

The best way to prevent exposures to *H. capsulatum* spores is to avoid situations where material that might be contaminated can become aerosolized and subsequently inhaled. This is especially important for persons with weakened immune systems.

Dust suppression methods, such as carefully wetting with a water spray, may be useful for reducing the amount of material aerosolized during an activity. For some activities, such as removing an accumulation of bat droppings or bird manure from an enclosed place such as an attic, wearing a NIOSH-approved respirator and other items of personal protective equipment may be needed to further reduce the risk of *H. capsulatum* exposure. However, only persons trained in the proper selection and use of personal protective equipment should undertake work where this equipment is needed

Disinfectants have occasionally been used to treat soil and accumulated bat manure when removal was impractical or as a precaution before a removal process was started. There is no product or chemical that is registered by the EPA that has the specific claim of being effective against *H. capsulatum*. A manufacturer of a product claiming to disinfect soil contaminated with *H. capsulatum* will have to meet the EPA's regulatory requirements and complete the registration process.

### ***Where can I get more information about histoplasmosis?***

This histoplasmosis fact sheet was prepared by the National Institute for Occupational Safety and Health (NIOSH) and the National Center for Infectious Diseases (NCID), both of the Centers for Disease Control and Prevention. For answers to other questions about histoplasmosis or histoplasmin skin-testing, please contact your physician, your local health department, or NCID in Atlanta, Georgia. NCID's Internet address is <http://www.cdc.gov/ncidod/>. For other questions about worker health and safety precautions during disturbances of soil, bat droppings, or bird manure that might be contaminated with *H. capsulatum* spores, call NIOSH in Cincinnati, Ohio, at (800) 356-4674.





**PHOTO NO. 13**



**PHOTO NO. 14**





**PHOTO NO. 15**



**PHOTO NO. 16**





**PHOTO NO. 17**



**PHOTO NO.18**





**PHOTO NO 19**



**PHOTO NO. 20**





**PHOTO NO. 21**



**PHOTO NO. 22**





**PHOTO NO. 23**



**PHOTO NO. 24**





**PHOTO NO. 25**



**PHOTO NO. 26**





**PHOTO NO. 27**



**PHOTO NO. 28**





**PHOTO NO. 29**



**PHOTO NO. 30**





**PHOTO NO. 31**



**PHOTO NO. 32**