



**BISHOP PAIUTE TRIBE  
ENVIRONMENTAL MANAGEMENT OFFICE**



TO: Gloriana Bailey, General Manager, Paiute Palace Casino  
FROM: Toni Richards, Air Quality Specialist  
**SUBJECT: INDOOR AIR MONITORING PROJECT – SUMMARY REPORT**  
DATE: March 12, 2004  
COPIES: Alan Spoonhunter, Environmental Manager

This report summarizes the results of the indoor air monitoring project that we undertook at the Casino in March and February 2004.

**WHAT ARE WE MEASURING?**

Particulate matter that is less than 2.5 microns in aerodynamic diameter, commonly called PM-2.5. Approximately 30 to 40 of these very small particles will fit along the diameter of a human hair.

**WHY ARE WE MEASURING PM-2.5?**

PM-2.5 is important because these small particles can lodge in the alveoli of the human lung if they are inhaled, and subsequently exacerbate a variety of health problems, particularly cardiac and respiratory problems.

At the Casino, we are primarily interested in cigarette smoke, which contains a number of pollutants, including particulates which are typically very small in aerodynamic diameter (PM-2.5), CO (carbon monoxide), PAH (poly aromatic hydrocarbons), and nicotine. The last two compounds are known carcinogens.

We are focusing on particulates because we have the equipment to measure this pollutant in real time, using a simple technology. The other compounds require more specialized equipment and may require expensive laboratory analysis to obtain results.

Measuring PM-2.5 is a rapid, cost-effective measure of the pollutants that may be coming from cigarette smoke. In addition, the particulates represent the visible component of cigarette smoke and may be most closely related to what clients observe.

We expect that these measurements will provide a useful indication of locations and times that have higher and lower concentrations.

**HOW ARE WE MEASURING PM-2.5?**

We are using a Dust Scan Scout that has been loaned to us for 90 days by the manufacturer, Rupprecht and Patashnick. It uses light scattering technology to measure the concentration of particles in a specified volume of air.

*Calibration relative to ambient monitor:* As noted above, the instrument uses light scattering technology to calculate particulate concentrations. This is not a true gravimetric method, where the weight of the particles is physically measured. At the suggestion of the manufacturer, we set up a simple calibration relative to the ambient monitor on the Environmental Management Office which measures PM-10. This sample calibration suggests that the Dust Scan concentration estimates may be approximately 10 percent low.

We set up the instrument used at the Casino to measure PM-10 and placed it next to the ambient monitor a TEOM/FDMS. We selected a “yes-burn” day when a large burn pile had recently been ignited to obtain the best approximation to a smoke environment.

### **HOW DO WE INTERPRET THE RESULTS?**

While ambient (outdoor) air is highly regulated through the Clean Air Act and its amendments, there is far less regulation of indoor air. Most of the regulations regarding indoor air relate to occupational exposure and focus on particular compounds that are present in specified industries.

After consulting experts on indoor air at the US EPA, the California Air Resources Board, the California Department of Health Services, the Great Basin Unified Air Pollution Control District, and the manufacturer, we have been unable to locate specific standards that relate to PM-2.5 for indoor air. The consensus of all these experts are that the ambient (outdoor) standards for PM-2.5 are most appropriate for indoor air.

In the results that we will discuss later in this report, we have included the two US EPA standards for PM-2.5 and a reference measurement at the Environmental Management Office. The EPA standards are health-based and are based on research that shows that exposure to concentrations higher than the specified standard is associated with increased health problems. States are required to implement plans to reduce PM-2.5 levels if they exceed these standards. The two EPA standards are:

- A three-year average below 0.015 milligrams per cubic meter. This value indicates a level which if exceeded on a daily basis over a long period may increase the risk of health problems.
- A 98<sup>th</sup> percentile average over a three-year period below 0.065 milligrams per cubic meter. This value indicates a value which if exceeded even occasionally may increase the risk of health problems.

Our summary results will also show results for the EMO office representing a “clean” indoor environment with levels that are typical of such environments.

### **WHERE DID WE SAMPLE?**

#### Main Gaming Floor

We sampled in ten locations, shown on the attached map, including Soft Count and the Arcade. Samples labeled Casino 1-8 are in the gaming area, Casino 9 is the Arcade, and Casino 10 is Soft Count.

Casino 8 is a repeat sample at the location Casino 4 during the Valentine's Day weekend (3 days).

All samples were taken for 24-hour periods with concentrations recorded every 30 minutes. The goal has been to cover the floor of the casino with a set of relatively comparable weekday samples.

Second Floor

We sampled in two locations at either end of this floor, the Fiscal (Casino 11) and the General Manager's Office (Casino 12).

Third Floor

We sampled in three locations, the Employee Lounge (Casino 14), the Gaming Commission (Casino 15) and the Surveillance Offices (Casino 17).

Fourth Floor

We sampled in a single location near the center of the 4<sup>th</sup> floor (Casino 18).

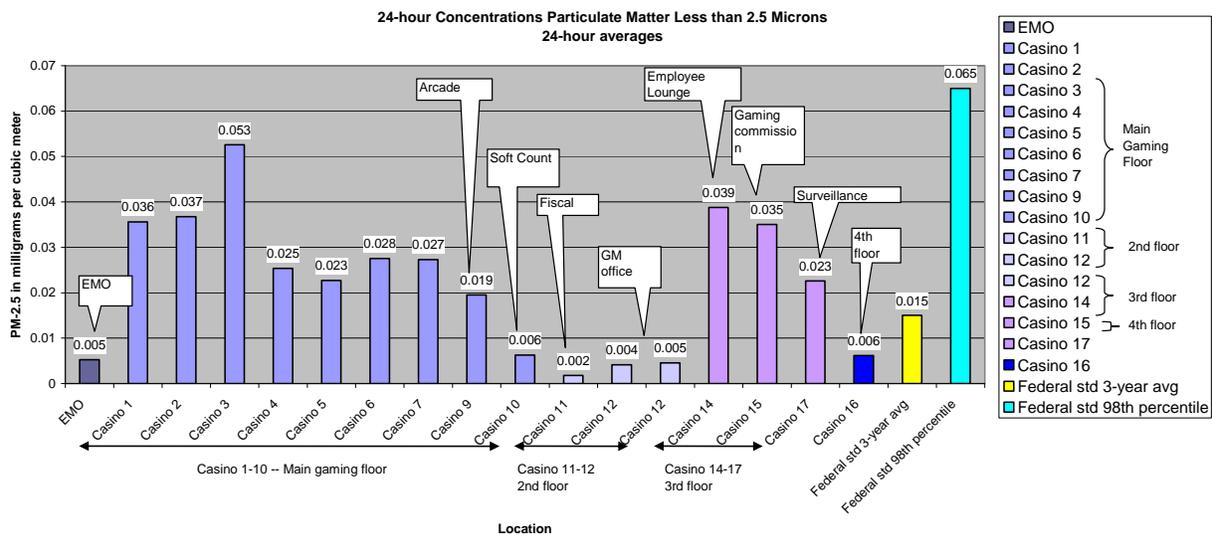
**WHAT ARE THE RESULTS?**

We examined both 24-hour averages and 30-minute results.

24-hour Averages

The first graph shows the 24-hour averages at each location in relation to the EMO office. All samples are weekday samples. The value of each 24-hour average is given above each sample point.

Overall, levels are lowest on the 2<sup>nd</sup> and 4<sup>th</sup> floor and higher on the main gaming and 3<sup>rd</sup> floors where smoking is occurring.



*Federal Standards:* Two federal standards are shown on the right hand side of the graph. A 3-year average, indicating a long-term exposure level which if exceeded may lead to health problems. The value is 0.015. A 98<sup>th</sup> percentile standard, indicating a level which if experienced even occasionally may lead to health problems. The value is 0.065.

*EMO:* The Environmental Management Office is used as a comparison to represent a non-smoking, low traffic indoor area. The 24-hour average is 0.005 micrograms per cubic meter, about one-third of the long-term federal standard.

*Main Gaming Floor:* Sample locations labeled Casino 1-7 are on the gaming floor itself. Averages ranged from 0.027 to 0.053, ranging from two to more than three times the long-term federal standard.

*Arcade and Soft Count:* The arcade and soft count area are both on the main floor but are in what is called the "tower" portion the Casino. Their averages are 0.019 for the Arcade and 0.006 for soft count. The levels in the Arcade, which is a non-smoking area, exceed the federal long-term standard.

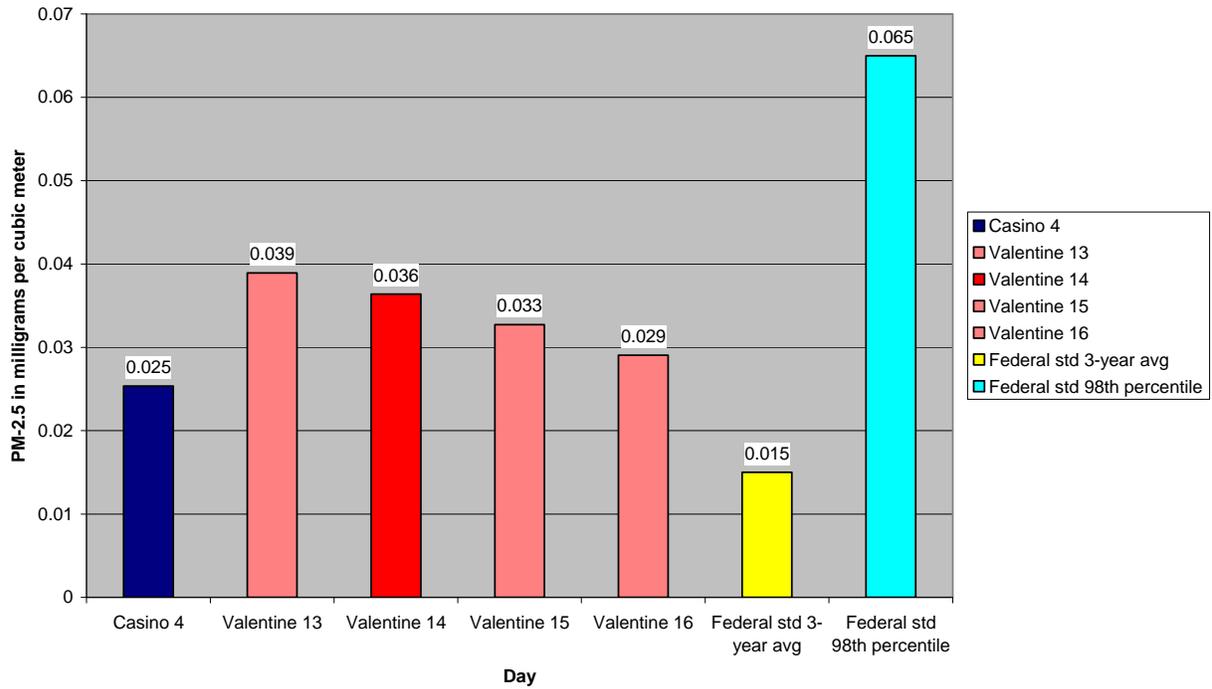
*2<sup>nd</sup> Floor:* Levels on the 2<sup>nd</sup> floor are in the range of 0.002 to 0.005, less than one-third of the federal long-term standard.

*3<sup>rd</sup> Floor:* The 3<sup>rd</sup> floor includes an employee lounge where smoking is permitted. Levels on the 3<sup>rd</sup> floor are in the range of 0.023 to 0.039, in the same range as on the main gaming floor.

*4<sup>th</sup> Floor:* The level on the 4<sup>th</sup> floor is 0.006, slightly higher than the 2<sup>nd</sup> floor, but in the same range.

*Valentine's Day Samples:* The second graph shows summary results during the Valentine's Day three-day event, with the same location on a weekday given for comparison. The weekday 24-hour average was 0.025. During the event 24-hour averages reached 0.039, over 50 percent higher than during a weekday.

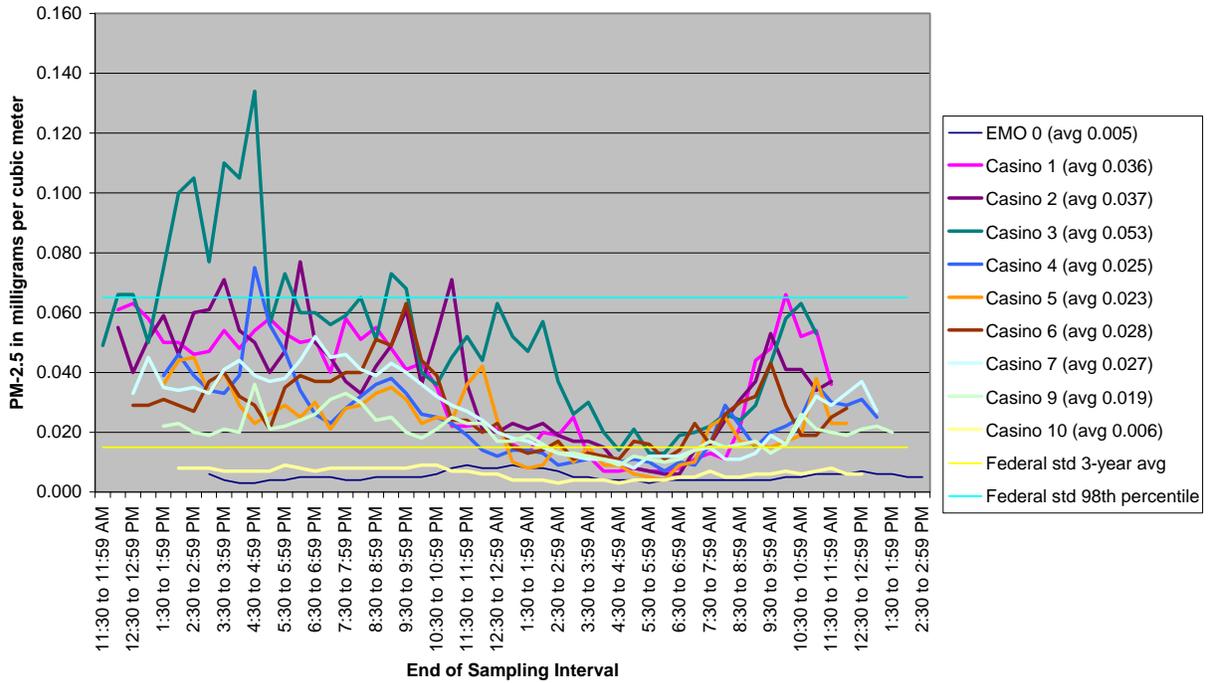
**Particulate Matter Less than 2.5 Microns  
24-hour Averages for Valentine's Weekend**



30-Minute Information

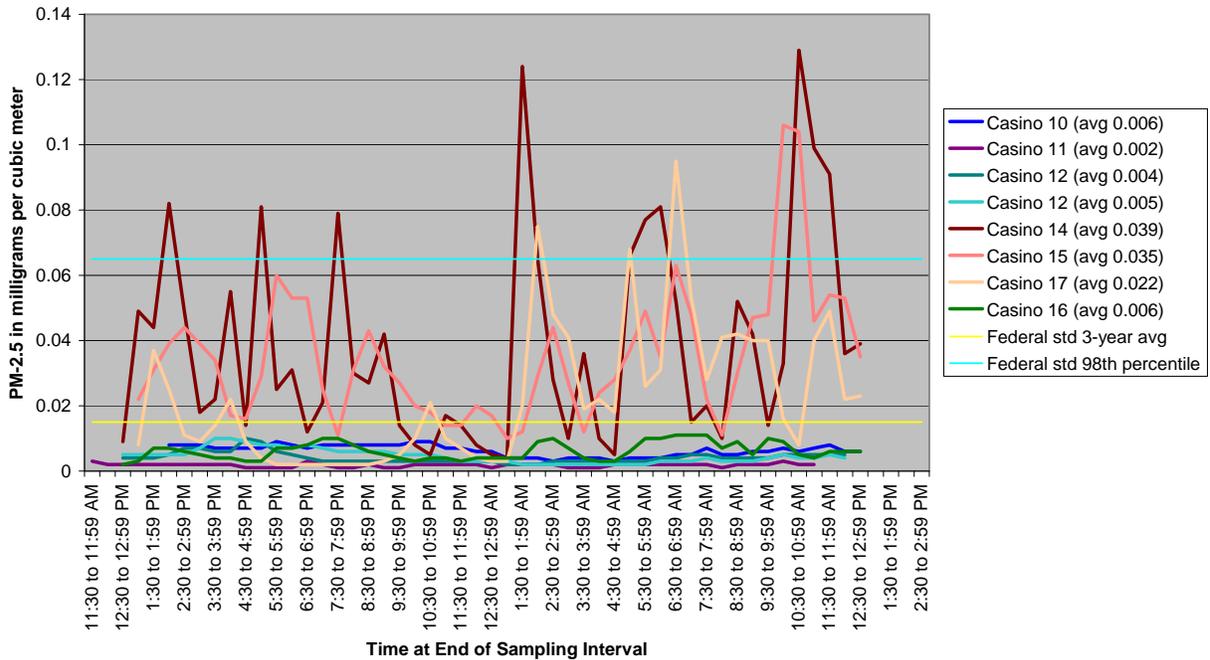
*Main Gaming Floor:* The third graph shows the 30-minute data for the main floor, with EMO and the two federal standards for comparison. There are some exceedances of the federal short-term standard, with the Keno area (Casino 3) having the highest concentrations.

**Particulate Matter Less than 2.5 Microns  
Casino Main Floor  
February 2004**



*2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> Floors:* The fourth graph shows the 30-minute data for the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> floors and the two federal standards. Levels on the 2<sup>nd</sup> and 4<sup>th</sup> floors are generally low. However, 3<sup>rd</sup> floor has substantially higher levels, comparable to the main gaming floor. In particular, the employee lounge on the 3<sup>rd</sup> floor has multiple exceedances of the short-term federal standard, indicating episodic high concentrations and both the Gaming Commission and Surveillance Offices have quite high levels for non-smoking offices.

**Particulate Matter Less than 2.5 Microns  
Casino 2nd, 3rd and 4th floors  
February-March 2004**



**WHAT ARE THE NEXT STEPS?**

The levels of particulate seen are most likely higher than is desirable from the point of view of protecting the health of employees and patrons. The smoke also appears to be annoying to clients due to its smell and because it is a respiratory irritant.

On the positive side, the levels are quite low on the 2<sup>nd</sup> and 4<sup>th</sup> floors which are non-smoking, suggesting that the air circulation system is keeping the smoke with the smokers. However, it may be desirable to consider improving the air circulation system with the goal of bringing the averages down to a level that is closer to the three year average EPA standard (0.015) and to reduce peaks so that there are few values that exceed the EPA 98<sup>th</sup> percentile standard (0.065) in the floors where smoking is occurring.

The following areas appear to be priorities. Casino 3 (Keno) may be a priority area on the main gaming floor because it has the highest concentrations. It would seem appropriate to attempt to reduce levels in the Arcade because it is a non-smoking area where children congregate. Finally, the 3<sup>rd</sup> floor is another area that may merit close examination.

Clearly any actions need to be taken in consultation with the Casino's board and a specialist in air circulation systems. One firm in the Reno area has been tentatively identified as appropriate to evaluate the system and is currently undertaking a project in the Mammoth area. The main difficulty appears to be locating competent firms who are willing to travel to the area.