



**U.S.D.A. FOREST SERVICE
PACIFIC NORTHWEST REGION (R6)**



Facilitated Learning Analysis (FLA) Summary

Employee Suffers Carbon Monoxide Poisoning



Sunday May 23rd was to be the employee's first day in the Lookout Tower, which was also to be the employee's residence for the remainder of the season. On Saturday May 22nd while moving in, setting up and preparing the lookout for work the next day the employee was overcome by carbon monoxide (CO) poisoning.

Sequence of Events

Friday May 21st - 1430: Employee made first trip to Lookout and on arrival could hear the CO Detector sounding. Went up and opened the door to a strong smell of Propane then opened the windows to air the room out. Also turned off the valve to the stove because last year there had been a concern about how hot the stove top became with the pilot lights lit. Employee closed the Lookout then returned to Bend and reported the CO alarm incident.

Saturday May 22nd - 1400: Employee arrived back at lookout and the CO detector was silent so turned heat up to high and lit the 3 gas lights for added heat, then began moving supplies and gear in for the season. In the process, made around 20 trips up and down the tower steps in the next couple hours.

1600 - Employee started to feel short-winded and seemed to be developing a headache. As employee moved around the headache became more severe. Windows had been closed and the door was only open when entering and leaving while bringing in supplies.



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Sequence of Events - Continued

1930 - When the CO detector started sounding the gas heat and lights were turned off with the door and window opened to air out the room. Employee also took the detector outside to clear it. The outside temp was in the mid to upper 20s at this time.

1945 - Brought the detector back in as it had cleared and closed the room back up. The pilot light for the refrigerator and the heater were the only gas units being used. The heat was not turned back up or the lights back on.

2000 - CO detector sounded off again. Employee opened the door and windows and took detector outside to clear it again. Knew something was wrong with headache and nausea getting worse. At this time the decision was made to spend the rest of the night with the door and windows open. The outside temp was still in the mid to upper 20s.

2030 - Employee used two sleeping bags, doubled, with a heavy cap on and tried to sleep.

2300 - No sleep yet and feeling confused.

2330 - Fell asleep.

2400 - Woke up by dog trembling from the cold, only 25 degrees in the room. Closed the door and windows but did not turn the heat or lights on.

Sunday May 23rd

0005 - CO detector goes off again. At this time, employee decides to go to a motel in Bend.

0015 - Started preparing to leave. Called motel to make sure they had a room and closed up the Look-Out.

0108 - Started driving to Bend in heavy snow squalls.

0253 - Arrived at motel.

0800 - Got up and called supervisor to report events and the employee's whereabouts.

Factors That Influenced Decisions

As we began discussing the incident with the employee, a larger picture developed and several factors that may have influenced the decision to stay at the Lookout, even with the CO detector continuing to sound, surfaced. These are important in determining procedures or process to preventing reoccurrence.



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Factors That Influenced Decisions - Continued

- The employee was aware that when the Lookout was opened up for the season the gas system had been leaked checked and pilot lights lit by maintenance.
- The detector was silent after having been reset the day before.
- This was to be the employee's residence for the season and not being from the local area, the employee was unaware of other lodging options.
- The next day was the first duty day and with strong work ethic the employee wanted to be in place to perform their duties.
- After all the trips up and down the steps physical fatigue set in and a strong urge to get rested.
- **These also helped in developing the lessons learned and recommendations here in.**

Lessons Learned/ Recommendations

- Warning devices such as CO detectors, heat and smoke alarms should never be treated as a nuisance and clear, concise procedures should be established and followed regarding any warning device that emits an alarm.
- These procedures should cover emergency communications, egress, response, reentry, and determining the cause of the alarm or other procedures to provide for safe occupancy.
- Research CO monitors for dependability, limitations.
- Reinstall refrigerator with outdoor venting. This would provide an extra barrier between the occupant and the emissions from the refrigerator.
- Employees should be provided specific training related to gas appliances that includes their installation, operation, servicing and other manufactures requirements.
- Consider having gas company provider or appliance service technician inspect and startup systems prior to seasonal operation. Having gas systems started and tested by qualified technicians that perform this service professionally may be more efficient and thorough.
- Reassess need to man Lookouts and other remote locations under certain seasonal conditions.
- Inspect storage tanks and research the benefits of leasing vs. owning in order to determine the most efficient process to ensure these systems are properly maintained and serviced.
- Provide alternative living site or authorization for motel if Lookout is not available or safe for occupancy.
- Research and pursue alternative energy sources such as solar, wind and the use of LED lights as these types of energy sources will not only help to provide a healthy work environment but may also assist the region towards achieving Forest Service sustainability goals.

Facilitator's Observations

When deciding to commit to the FLA process it is extremely important to allow sufficient time for the team to remain together long enough to complete at least the rough draft so that the lessons learned and recommendations can be distributed in a timely manner.