Monitoring Wood Fiber Piles for Off-Gassing, Self-Heating, and Internal Fire Risk

1. PURPOSE

To establish a consistent monitoring process for the early detection of off-gassing, self-heating, hotspots, and internal fires within wood-fiber storage piles (chips, sawdust, shavings, biomass fines, hog fuel). Early detection reduces fire risk, protects personnel, and preserves product quality.

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2. SCOPE

This SOP applies to all personnel responsible for yard operations, environmental monitoring

- Temperature monitoring
- Gas/off-gassing monitoring
- Visual inspection
- Infrared scanning
- Data recording
- Response actions when elevated readings occur

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3. RESPONSIBILITIES

3.1 Yard Operators

- Perform daily visual inspections
- Conduct surface IR scans
- Insert temperature probes and record readings
- Report abnormalities immediately

3.2 Supervisor

- Review all inspection logs
- Confirm that elevated readings trigger required response actions
- Coordinate pile breakup operations if needed

3.3 Safety Team

- Maintain gas-monitoring equipment
- Train employees on proper monitoring techniques
- Ensure all data logs are stored and trended

3.4 Emergency Response Team

- Respond to confirmed hotspots or fires
- Coordinate with fire department as required

4. REQUIRED EQUIPMENT

- Infrared (IR) camera or handheld IR thermometer
- Temperature probes (1–2 m)
- Portable multi-gas detector capable of CO, CO_2, and VOC detection
- Shovel and hand tools
- Loader or excavator for pile breakup
- **PPE:** hard hat, boots, gloves, safety glasses, high-visibility vest, and respiratory protection as required.

5. PROCEDURE

5.1 Daily Visual Inspection

Performed once every shift.
Inspect for:

- Steam, smoke, or warm air emissions
- Surface discoloration or sinkholes
- Unusual odors (sweet, burnt, or chemical)
- Cracking or settling of pile structure
- Recent rainfall, drainage issues, or wet zones

Record findings in the **Wood Fiber Pile Inspection Log**.

5.2 Surface Temperature Scan

1. Use IR camera/thermometer to scan the entire surface of the pile.
2. Identify any areas hotter than natural background temperature.
3. Mark any zones exceeding 50°C (122°F).

Record readings in the **Wood Fiber Pile Inspection Log** under *Temperature Monitoring*.

5.3 Internal Temperature Monitoring (Weekly, or Daily if Elevated)

1. Insert temperature probe(s) 1–2 m into the pile at designated monitoring points.
2. Allow stabilization for 30–60 seconds.
3. Record internal temperatures.

Temperature Action Levels

Internal Temp	Condition	Required Action
< 10°C above ambient	Low	Continue routine monitoring
>10°C to 20°C above ambient	Moderate	Increase monitoring to daily
> 20°C to 30°C above ambient	High	Notify supervisor; gas-test area; plan pile breakup
> 30°C above ambient	Critical	Initiate emergency response; isolate area; break apart pile immediately
> 80°C above ambient	Extreme	Fire Department Response

5.4 Gas Monitoring (Weekly, or Daily if Elevated)

1. Insert gas sampling probe 1–2 m into the pile.
2. Allow meter to stabilize.
3. Record O_2, CO, CO_2, VOC levels.

Gas Action Levels

Gas Reading	Interpretation	Required Action
CO < 50 ppm	Normal	Routine monitoring
CO 50–200 ppm	Early oxidation	Increase monitoring frequency
CO 200–500 ppm	Likely hotspot forming	Supervisor notified; prepare for intervention
> 500 ppm	High probability of smoldering fire	Emergency action required

5. RESPONSE ACTIONS

5.1 Elevated Temperatures or Gas Levels

If temperature **> 20°C above ambient or CO > 200 ppm:**

1. Notify Shift Supervisor immediately.
2. Restrict access to the area.
3. Conduct secondary scan to confirm hotspot.
4. Begin preparations for mechanical intervention.

5.2 If temperature is above **>30°C above ambient or CO > 300 ppm**

1. Use loader/excavator to **break apart the pile**, starting from the outer edges.
2. Spread material into thin layers (< 2 ft / 0.6 m).
3. Allow natural cooling and ventilation.
4. Apply water only if flames or visible ignition are present.
5. Re-test temperature and gases after spreading.

5.3 Critical Condition (> 80°C or CO > 500 ppm)

1. Initiate emergency response protocol.
2. Contact fire department per facility policy.
3. Evacuate nonessential personnel.
4. Mechanically separate burning or smoldering material.
5. Apply water or foam under guidance of fire services.

6. DOCUMENTATION

The following logs must be maintained:

- Wood Fiber Pile Inspection Log

7. SAFETY PRECAUTIONS

- Do not walk on piles showing signs of settlement or internal voids.
- Never probe alone; maintain radio contact.
- Wear respiratory protection when off-gassing levels exceed permissible limits.
- Do not saturate piles unnecessarily—steam pressure can cause eruptions.
- Equipment operators must maintain safe distances from unstable pile walls.