# Facility Checklist for Identifying Environmental Issues During Lean

**= Visual, Auditory, Olfactory Checks** **? = Questions for Staff or Management**

***Note for Users**: These assessment points are intended to apply generally to many industrial plants and not to a specific industry. The list provides triggers for identifying potential environmental opportunities, but is not all- inclusive. Please contact **PPRC** for additional research for solutions to specific findings within this checklist, and/or more comprehensive or industry-specific checklist(s) and information, or referrals to technical or regulatory expertise on these topics.*

## Corporate Level – Questions

1. Do you have any corporate or regulatory environmental mandates or goals? Are you measuring progress?
2. Do you have a dedicated environmental (or environmental safety/health) staff person?
3. Do you have an Environmental Management System (EMS) or are you Certified to ISO14000? How is it working?
4. How much effort and resources are required to manage your environmental operations?
5. Are any environmental constraints limiting your growth?
6. Has your facility been subject to an environmental penalty that we might help address via lean & environment?
7. Will any new environmental regulations affect your facility in the near future?
8. Do you track greenhouse gas (GHG) emissions? Do you report GHG emissions (voluntary or mandatory) externally?

## Energy Use

| | ? |
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| □ Old lighting systems (T-12, yellow/blue/greenish hue lighting, incandescents)<br>□ Unnecessary lights/heat on, possible over-lit areas, reduced lighting possible with better placement?<br>□ Standard/low-efficiency pumps, motors, fans, heaters<br>□ Idle assets (motors, fans, pumps, machinery) waiting for production<br>□ Pumps and fans throttled to control flow rate<br>□ Older refrigeration/heating systems, space heating<br>□ Older kilns/ovens (including baffles, fans, etc.)<br>□ Multiple, unconnected compressed air systems<br>□ Listen/feel for compressed air leaks (connections)<br>□ Aging compressed air and supplied air systems, or throttle controls, poppet valves<br>□ Use of compressed air to dry, clean, etc.<br>□ Air compressor running when not needed<br>□ No evidence of heat recovery from coolant waters, ovens, large air compressors, or other heat-generating equipment<br>□ Use of heated water and/or onsite wastewater treatment<br>□ Un-insulated ovens, kilns, heater bands on pipes, etc. | ? Energy management system in place?<br>? Employee incentive system for energy innovations?<br>? What are the payback criteria for energy projects?<br>? When was last energy audit?<br>? Recent upgrades of motors, lighting, belts, drives, pumps for energy efficiency?<br>? Do you know efficiency ratings of any of above that have not been upgraded?<br>? Are any motors over-sized for their purpose? Operating at partial load?<br>? Air: centrifugal screw compressors that operate at more than full load capacity for >70% of the time? Are throttle controls, or poppet valves used (*May be improvement opportunity for variable speed drive (VSD), load/unload instead of throttle, on/off controls or poppet).*<br>? Is compressor cooling water discharged to sewer? Air discharged to atmosphere? (*Prospect for heat recovery?)*<br>? Regular maintenance schedule for above equipment?<br>? Have refrigeration system(s) been optimized?<br>? Are you aware of energy efficiency programs offered by your utility provider? |

## Fuel

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| □ Aging fleet (forklifts, cars, trucks, etc.)<br>□ Excessive vehicles/fleet<br>□ Inefficient fuel/ use practices, e.g., idling, sudden acceleration/braking<br>□ Vehicle or lift is oversized for use | 1. Any emissions retrofits completed on diesel vehicles?<br>2. Do you use any heavy diesel (compared to cleaner burning fuel such as liquid natural gas)?<br>3. Do you consolidate trips?<br>4. Regular maintenance for fleet/fuel-consuming equipment?<br>5. Do you offer an employee commute reduction program? |

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| Steam Systems | |
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| □ Un-insulated condensate storage tank or return lines<br>□ No condensate return loop<br>□ Throttling of boiler fans (*opportunity for VSD control on boiler induced draft or forced draft fans)*<br>□ No heat recovery<br>□ Manual performance monitoring of boiler blow-down and other operations (should be automated).<br>□ No steam recovery from drying kilns. | ? Is stack temperature higher than manufacture spec? Higher than these indicate inefficiency: 30 psig boiler - 375°F; 75 psig- 420°F; 100 psig-440°F; 125 psig-455°F<br>? Recent steam analysis/study?<br>? Are steam traps tested regularly?<br>? Is condensate return system open to atmosphere *(this may result in flashed steam)*?<br>? Is steam load matched to boiler output needs? |

| Water Use | |
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| ☞ | ? |
| □ High-water-use equipment: baths, rinse tanks, mists, washing hoses, aqueous cleaners, cooling tower, boiler(s), labs, autoclaves, vehicle wash, etc.<br>□ Water used in equipment clean-up, changeovers<br>□ Tanks without flow meters and conductivity controls for optimizing water or chemical use<br>□ Oversized or under-filled rack washers<br>□ Losses: leaks, drips, running water, potential evaporative losses<br>□ Parts dripping (dragout) outside wash or rinse tank<br>□ Irrigation during mid-day and/or lush green grass | ? What are your major water-consuming processes?<br>? Do you heat water for any uses?<br>? Have you looked at reducing? Conservation? Recovery for reuse?<br>? Have you converted to high-pressure/low flow vs. low-pressure high-flow for cleaning?<br>? Are building(s) constructed or renovated pre-1995 *(date of codification for lower water-use fixtures)*<br>? Recent water audits or water balance we can review?<br>? Do you have any once-through cooling loops? |

| Wastewater Generation | |
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| ☞ | ? |
| □ Onsite wastewater pretreatment or treatment system<br>□ Poor condition of discharge pipes<br>□ Poor housekeeping and containment for water treatment chemicals | ? Do you have a discharge permit? Trouble meeting limits for flow, pH, BOD, TSS, fats/oils, metals, other?<br>? Any recent violations? If yes, do you have any open corrective actions to address?<br>? If on-site pretreatment or treatment, how do you currently treat?<br>? Do you know the costs for wastewater management and treatment on site? |

| Emissions and Air Quality | |
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| □ Chemical odors inside (indicating VOCs, other)<br>□ Black or white (except steam) plumes from stacks<br>□ Plugged or dirty filters in paint booths or spray areas<br>□ Open containers of solvents not in direct use (storage, rinse tanks, parts cleaners)<br>□ Fugitive emissions from pipes<br>□ Inordinate amount of dust, overspray, etc. on floor or emitted from a process<br>□ Postings showing personal protective equipment required and employees not complying | ? Do you have an air permit or exemption? Type?<br>? Does your permit limit your current or future production capacity?<br>? Do you use any major air pollution control devices? Are they close to end of life or due for major maintenance? Do you know the costs of operating controls?<br>? Do staff complain about odors in the facilities?<br>? Do neighbors complain about your air emissions? |

## Facility Checklist for Identifying Environmental Issues During Lean

| Hazardous Materials and Chemicals: Inventory and Use | |
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| □ Messy storage, organization, and housekeeping<br>□ Rusted cabinet or storage containers *(indicates acidic or corrosive fumes)*<br>□ Labeling, including product expiration dates<br>□ Uncapped or open containers<br>□ Chlorinated solvents (MEC and TCE especially)<br>□ Flammable solvents (acetone, toluene, xylene)<br>□ Large inventory (with potential to standardize and reduce number of different items)<br>□ Odors or other indicators of inadequate ventilation<br>□ Use of aerosol sprays, especially if volatile (e.g., oil-based lubricant) or particulate (e.g., graphite)<br>□ Use of non-stick or perfluorinated compounds (e.g., non-stick coating), in products, equipment coatings, or supplies<br>□ Airborne dust arising from powder-type raw material storage /dispensing systems, or visible dust noted in air<br>□ Dispensing or raw material transfers that allow volatile releases, drips, or use of more material than needed<br>□ Evidence of staff complaints - odors, headaches, etc. that might be associated with chemical use | ? Do you dispose of much expired or unusable chemicals or materials?<br>? Are you or your employees concerned with the toxicity of any of the materials you frequently use?<br>? Do you have centralized chemical storage? Or vendor managed inventory?<br>? Are there specific materials or chemicals for which you are trying to find a substitute? |

| Hazardous Waste – Generation, Accumulation, and Storage | |
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| □ Signs of current or previous spills/leakage<br>□ Floor integrity (e.g., corroded or cracked concrete slabs that may allow leakage to groundwater)<br>□ Uncapped or open storage containers<br>□ Lack of secondary containment pads for hazardous waste drums<br>□ Combined waste streams that should be segregated | ? Do you feel you spend too much time dealing with hazardous waste?<br>? What is your generator status? Are you close to 'moving up'? *(~3-1/3 drums of hazardous waste per month may constitute large quantity status)*<br>? Do you submit a pollution prevention or other environmental plan to any regulatory body? If yes, any issues or challenges in your plan? |

| Stormwater | |
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| □ Potential 'items' or leakage that could spill, hosed, or washed down storm drains (including vehicle washes)<br>□ Visual signs of soil erosion/runoff<br>□ Extensive paved areas – no borders/swales, etc.<br>□ Exterior pools or streams of liquid (water, or other) on the ground, especially if close to a storm drain<br>□ Rust or stains under outdoor equipment or storage areas<br>□ Exterior waste or chemical storage with no secondary containment<br>□ Storage pads/areas with integrity issues (cracks, etc.) | ? Do you have and follow a stormwater management plan?<br>? Do you have a stormwater permit?<br>? Do you know where drains are and where they discharge to?<br>? Are drains inspected and maintained routinely?<br>? Do you have catch basins? |

*This checklist was prepared in collaboration with **Washington Department of Ecology**, **Impact Washington**, and **Ross & Associates Environmental Consulting, Ltd**.*