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Standard Practice for Sustainable Laundry Best Management Practices[1]

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1. Scope

1.1 *Purpose*—The purpose of this practice is to identify and define sustainable laundry Best Management Practices (BMPs) that are used in commercial laundry facilities to reduce their impact on the environment.

1.2 It is recommended that users rely on professional judgment informed by both environmental expertise and specific knowledge of the intended use of this practice. This practice provides instruction on interpretation of the data obtained. Interpretation of the data results in a determination of whether a laundry implements enough BMPs to be certified as complying with the requirements of this practice.

1.3 The users of this practice include laundry professionals and inspectors who possess a broad understanding of environmental issues related to the operations and maintenance of laundry facilities.

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

1.5 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

E2107 Practice for Environmental Regulatory Compliance Audits

2.2 *NSF Standard:*[3]

NSF/ANSI 336 2011 Sustainability Assessment for Commercial Furnishings, Fabric

3. Terminology

3.1 *Definitions:*

3.1.1 *Best Management Practices, n*—structural, nonstructural, and managerial techniques found to be the most effective and practical means in achieving an objective (such as preventing or minimizing pollution) while making the optimum use of the firm's resources.

3.1.2 *biological oxygen demand, BOD, n*—indirect measurement of the amount of organic pollution (that can be oxidized biologically) in a sample of water.

3.1.3 *boiler, n*—closed vessel in which water or other fluid is heated; the heated or vaporized fluid exits the boiler for use in various processes or heating applications.

3.1.4 *detergent, n*—surfactant or a mixture of surfactants and other chemicals having "cleaning properties in dilute solutions."

3.1.4.1 *Discussion*—In common usage, "detergent" refers to a family of compounds that are similar to soap but are less affected by hard water.

3.1.5 *dissolved air flotation, DAF, n*—water treatment process that clarifies wastewaters (or other waters) by the removal of suspended matter such as oil or solids.

3.1.5.1 *Discussion*—The removal is achieved by dissolving air in the water or wastewater under pressure and then releasing the air at atmospheric pressure in a flotation tank or basin. The released air forms tiny bubbles that adhere to the suspended matter causing the suspended matter to float to the surface of the water where it may then be removed by a skimming device.

3.1.6 *material safety data sheet, MSDS, n*—a document that contains information on the potential hazards and how to work safely with a chemical product or compound.

3.1.6.1 *Discussion*—Required by OSHA for all ingredients of a product which have been determined to be health hazards and which comprise 1 % or greater of the composition of the product, or 0.1 % or greater if a carcinogen.

3.1.7 *stack economizer, n*—engineered device that captures the "lost or waste heat" from a boiler's hot stack gas.

3.1.7.1 *Discussion*—The heat can then be used in other areas of the facility.

3.1.8 *tunnel washer, n*—washer that consists of a long metal tube called a tunnel.

3.1.8.1 *Discussion*—The tunnel is made up of pockets. As

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from NSF International, P.O. Box 130140, 789 N. Dixboro Rd., Ann Arbor, MI 48113-0140, http://www.nsf.org.

the linen moves through the pockets, it is exposed to progressively cleaner water and fresher chemicals. Soiled linen continuously goes into one end of the tunnel while clean linen moves continuously out of the other.

3.1.9 *wastewater, n*—any water that has been adversely affected in quality by human processes or biological influence.

3.1.9.1 *Discussion*—It comprises liquid waste discharged by domestic residences, commercial properties, industry, or agriculture, or combinations thereof, and can encompass a wide range of potential contaminants and concentrations.

3.2 *Acronyms:*

3.2.1 *BMP*—best management practice

3.2.2 *BOD*—biological oxygen demand

3.2.3 *DAF*—dissolved air flotation

3.2.4 *EPA*—Environmental Protection Agency

3.2.5 *MSDS*—Material Safety Data Sheet

3.2.6 *NPE*—Nonylphenol ethoxylate

3.2.7 *OSHA*—Occupational Safety and Health Administration

3.2.8 *POTW*—publicly owned treatment works

3.2.9 *VOC*—volatile organic compounds

4. Best Management Practices

4.1 The implementation or use of the following:

4.1.1 *Water Reuse Technology*—A technology or equipment within a laundry facility that reuses, reclaims, or recycles water. The technology or equipment shall be visible, in use and designed for the purpose of reusing, reclaiming, or recycling water. Examples include: water reuse systems that capture and reuse final rinses drained from washers; water recycling or reclamation systems that capture and recycle treated wastewater; and special washers (for example, tunnel washers) that use the same water more than once for washing linen.

4.1.2 *Boiler Heat Recovery*—A technology or equipment within a laundry facility that recovers heat produced from the facility's water boiler system. The technology or equipment shall be visible, in use, and designed for the purpose of recovering heat from the boiler system. An example includes: stack economizers that capture the "lost or waste heat" from the boiler's hot stack gas.

4.1.3 *Direct-Fired Hot Water Heating System*—A water heating system that does not use a boiler to create steam but uses direct heat to create on-demand hot water.

4.1.4 *Wastewater Heat Recovery*—A technology or equipment within a laundry facility that recovers heat present in the facility's wastewater. The technology or equipment shall be visible, in use and designed for the purpose of recovering heat present in the wastewater. Examples include: "shell and tube" or "plate" heat exchangers that capture the "lost or waste heat" from the wastewater.

4.1.5 *Nonylphenol Ethoxylate (NPE)-Free Detergent*—NPEs are a type of surfactant that has been used in detergents for years by laundry facilities. EPA studies have shown that NPEs may be harmful to the environment. The primary detergent in use by the laundry shall be shown to be "NPE-free" through review of its OSHA Safety Data Sheet. Additionally, detergents should be OPE and DPE free. The NCTO/AATCC/AAFA VPEP form or equivalent should also be reviewed regarding the usage of APE's. Detergents should be APE Free as outlined in NSF/ANSI 336 2011 Section 6.4.6 Alkylphenol ethoxylates (APEs). Cleaning agents, detergents, scouring, dye process, yarn lubricants or finishing agents used in the production of fiber and fabric shall not contain intentionally added alkyl phenol ethoxylates (APEs), specifically nonylphenol ethoxylates or octylphenol ethoxylates at or above the inventory limit, including but not limited to the following: Ingredient Name CAS Number : 4-nonylphenoxyethanol 104-35-8, p-octylphenol diethoxylate 2315-61-9, p-octylphenol diethoxylate 2315-62-0, p-octylphenol diethoxylate 2315-64-2, 2-(4-1,1,3,3-tetra methylbutyl)phenoxy)ethanol 2315-67-5, p-tert-octylphenoxy polyethoxyethanol 9002-93-1, Dodecylphenol ethoxylates 9014-92-0, Nonylphenol polyethylene oxide 9016-45-9, Octylphenoxypoly (ethoxyethanol) 9036-19-5, Nonoxynol-9 26027-38-3, Nonylphenol monoethoxylate 27986-36-3, C9 Branched alkylphenol ethoxylate 68412-54-4, C8 Branched alkylphenol ethoxylate 68987-90-6.

4.1.6 *Energy Efficient Low-Temperature Detergents*—Detergents that are effective in eliminating pathogenic bacteria at low-wash temperatures (21°C instead of 60-71°C).

4.1.7 *Wastewater Pretreatment, Mechanical Solids Removal*—A technology or equipment within a laundry facility that pretreats more than 50 % of the total wastewater before being discharged to the sanitary sewer using mechanical solids removal. The technology or equipment shall be visible, in use, and designed for the purpose of filtering out suspended solids (for example, lint solids) from the wastewater and the associated oil and grease and biological oxygen demand (BOD) that is removed with the solids. Examples include: shaker screens or rotary drum screens.

NOTE 1—Although you may meet ASTM's standard for sustainability by ensuring more than 50 % of all wastewater is pretreated prior to discharge to the sanitary sewer, all companies are responsible for ensuring they meet all local, state, and federal regulations for wastewater pretreatment.

4.1.8 *Wastewater Pre-Treatment, Advanced Treatment Technologies*—A technology or equipment within a laundry facility that pretreats more than 50 % of the total wastewater before being discharged to the sanitary sewer using a mechanical or chemical means, or both, of advanced treatment. The technology or equipment shall be visible, in use, and designed for the purpose of removing emulsified oil and grease from the wastewater along with suspended solids, BOD, metals, and toxic organics. Examples include: dissolved air flotation (DAF) systems, and filtration systems (micro-, ultra-, nano-).

4.1.9 *Energy Efficient Lighting or Skylights, or Both*—Low-energy lighting or skylights, or both, within a laundry facility that clearly provide more than 50 % of the laundry's lighting. The lighting or skylights, or both, shall be visible and in use. The lighting shall be certified as compliant with the EPA's Energy Star program or other equivalent programs.

4.1.10 *Energy Audit*—An energy audit conducted by a third-party independent contractor to ascertain areas where a laundry facility may save energy by implementing recommendations made by the auditing organization. Audits shall be conducted at least once every three years.

4.1.11 *Alternative Energy*—Solar or geothermal technology that clearly provides a minimum of 10 % (individually or in combination) of the electrical energy used in the laundry.

4.1.12 *Recycling Programs*—Qualified waste recycling programs within a laundry facility. Examples include; hanger recycling, cardboard and paper recycling, bottles and cans recycling, electronic waste recycling, and waste oil recycling. The facility shall have at least three of the above recycling programs in place, and they shall be able to demonstrate that these programs are being utilized on a consistent basis.

4.1.13 *Fleet Vehicle Route Optimization*—The use of software or technologies to maximize the efficiency of routes driven by fleet vehicles to minimize fuel usage and exhaust emissions.

4.1.14 *Spill Prevention Plan or Slug Discharge Control Plan*—A written plan that is in place and describes procedures to prevent the spill or release of hazardous substances into the environment (spill prevention plan) or discharge of a nonroutine, episodic nature (slug discharge plan).

4.1.15 *Preventative Boiler or Direct-fired Hot Water Heating System Maintenance*—Maintenance of the boiler or direct-fired hot water heating systems as prescribed by the manufacturer or appropriate regulatory requirement to ensure maximum efficiency of the system. The facility shall provide documentation of the prescribed maintenance schedule from the manufacturer or appropriate regulatory requirement. Records shall also be kept of when preventative maintenance was conducted and the name, address, phone number, and contact person of the organization doing the preventative maintenance.

4.1.16 *Fleet Vehicles–Alternative Fuels*—Facilities must have at least 15 % of their fleet vehicles equipped to run on alternative fuels, for example, propane.

5. Inspection Checklist

5.1 Best Management Practices point allocation system and certification requirements. See Table 1 and Table 2.

6. Procedure

6.1 The user of this practice will utilize Table 1 to evaluate the implementation of the Best Management Practices described in Section 4. It will be at the discretion of the inspector to determine if the laundry facility has implemented each BMP.

6.2 BMPs shall be clearly demonstrated by the laundry facility through written documents and by visual evidence.

TABLE 1 Point Allocation System

	Implemented? (Circle)		Points
Tier 1 BMPs			
Boiler Heat Recovery or Direct-fired Hot Water Heater	**Y**	**N**	20
Wastewater Heat Recovery	**Y**	**N**	20
Wastewater Pretreatment, Mechanical Solids Removal	**Y**	**N**	20
Wastewater Pretreatment, Advanced Treatment Technologies	**Y**	**N**	20
Water Reuse Technology	**Y**	**N**	20
Tier 2 BMPs			
Alternative Energy, Solar or Geothermal	**Y**	**N**	10
Energy Audit (every three years)	**Y**	**N**	10
Energy Efficient Lighting or Skylights	**Y**	**N**	10
Fleet Vehicle Route Optimization	**Y**	**N**	10
Fleet Vehicles – Alternative Fuels (at least 15 %)	**Y**	**N**	10
Low Temperature Detergents	**Y**	**N**	10
Nonylphenol Ethoxylate (NPE) Free Detergent	**Y**	**N**	10
Preventative Maintenance (boiler or direct-fired hot water heater)	**Y**	**N**	10
Recycling Program	**Y**	**N**	10
Spill Prevention Plan or Slug Discharge Control Plan	**Y**	**N**	10

TABLE 2 BMP Points Required for Certification

Minimum Tier 1 BMP Points	Tier 1 or Tier 2 Points	TOTAL
60	40	100

6.3 For certification, laundry facilities shall receive a total score of 100 points based on the scoring system for BMPs established in Table 2.

6.4 Safety procedures for physical inspections of a laundry facility will follow the safety procedures outlined in Practice E2107.

6.5 The user is cautioned to review each question and the comments associated with each question. Unique characteristics of a Best Management Practice implemented may affect interpretation of the use.

6.6 Depending on the particular Best Management Practice implementation, additional questions may be necessary. The user of this practice may choose to ask additional questions regarding a BMP as applicable.

6.7 "N/A" may be indicated where questions request information that is not applicable or not available, or both.

7. Keywords

7.1 commercial laundry facility; sustainable laundry best management practice