Section 3 – Operation & Maintenance Plan

Operation and Maintenance (O&M) Plan Guidelines

This document provides guidance in the preparation of O&M Plans required as part of an Air Quality Permit and/or Maricopa County Air Pollution Control Regulations. The goal is to establish acceptable operating parameters and limits, maintenance procedures and schedules, and documentation methods that will demonstrate the control device is being properly operated and maintained. Multiple control devices can be combined in a single O&M Plan providing they are identical in type, capacity, and use. Each device that is unique in type, capacity, or use must be contained in a separate plan.

General Information
This information provides identification and a quick understanding of the facility and equipment and the basis for the O&M Plan.

Operation Plan
Key operating parameters are quantifiable parameters (pressure drops, temperatures, flow rates, etc.) that, once properly defined, are considered indicators that a control device is functioning as designed. Operations log sheets should, at a minimum, contain the following information: date and time of readings; identification of the individual recording the data; operating parameters to be monitored including units of measure, allowable operating range (upper and/or lower limits, if applicable), and space for recording measurements; measurement frequency; and space for additional information such as corrective action taken or general comments. A log sheet must be completed for every day the process and control device are in operation. All values are to be recorded including those out of range at the time readings are taken. Sample operations log sheets are available from the Department for common types of control devices and it would be preferred that these forms be used, if possible. A copy of the actual log sheet(s) to be used at the facility are to be included in the O&M Plan.

If an automatic data recording system will be used, provide information on its measurement frequency and how the information will be recorded in addition to the above requirements. If recording charts are used, provide space on the charts to document the date, time, and initials of the individual checking system performance. If changing the location of the measurement device would affect its reading (for example, the location of the thermocouple on an afterburner), then the location of the device must be documented either in the text of the O&M plan or through a scaled drawing.

Maintenance Plan
Maintenance procedures (inspections, cleanings, lubrications, adjustments, replacements, instrumentation calibrations, etc.) are performed on a routine basis to ensure the equipment remains in peak operating condition. Maintenance checklists should, at a minimum, contain the following information: date; identification of the individual performing the maintenance check; procedures to be performed including frequency of occurrence; results of inspection (acceptable, nozzle plugged, belt cracked, etc.); corrective action taken (none, cleaned nozzle, replaced belt, etc.); and space for additional information such as observations or general comments. Sample maintenance checklists, containing general preventative maintenance that should be considered, are available from the Department for common types of control devices and it would be preferred that these forms be used, if possible. A COPY OF THE ACTUAL CHECKLIST(S) TO BE USED AT THE FACILITY ARE TO BE INCLUDED IN THE O&M PLAN.

Other Information
Additional information, such as process diagrams, control device schematics, etc. may be included only if it would be helpful in understanding the O&M Plan. Please do not provide a copy of the O&M Plan supplied by the equipment manufacturer (Provide only as an attachment).

All O&M Plan forms are available electronically by accessing www.maricopa.gov/aq/.

Changes to an existing O&M Plan should be made by submitting a complete, revised O&M Plan with a cover letter identifying all changes and the reason for such changes. This document is meant to serve as a general guideline in the preparation of O&M Plans. Since unique circumstances may exist, the Department reserves the right to request additional information to ensure compliance with air quality regulations.

3(a) Form GENERAL INFORMATION

Business Name: _____

Business Address: _____

_____

_____

Permit Number: _____

Date of Preparation/Revision: _____

General description of overall facility operations:

Brief description of process(es) ducted to control device including pollutants emitted:

Complete description of control device(s) covered by the plan including manufacturer, model, rated capacity, total number of identical units, equipment identification number, etc.:

3(b) Form OPERATION PLAN

List the operating parameters to be monitored including the units of measure (inches H2O, deg F, gpm, etc.), acceptable operating range (upper and/or lower limits), and frequency of recording measurements (daily, continuous, etc.)

PARAMETER	UNITS	LIMITS	FREQUENCY

List the method of recording measurements (manual, stripchart recorder, data acquisition system, etc.) and type of instrumentation (magnehelic, temperature sensor, flowmeter, etc.) with display range for each operating parameter:

PARAMETER	METHOD	INSTRUMENT	RANGE

Attach a copy of all operations log sheets, stripcharts, computer printouts, etc. utilized to document operating parameters of the control device.

Note: Instrumentation accuracy is expected to be comparable to industry standard for the specific type of instrumentation. Acceptable operating ranges may require modifications to reflect actual conditions during compliance testing. A log sheet must be completed for every day the process and control device are in operation. Records are required to be maintained for a minimum of five years.

3(c) Form MAINTENANCE PLAN

Maintenance procedures to be performed with the frequency of each procedure:

PROCEDURE	FREQUENCY

Attach a copy of all maintenance checklists, computer printouts, etc. utilized to document completion of maintenance procedures performed on the control device.

Notes: The spare parts inventory should be sufficient to handle all maintenance requirements and reasonably expected malfunction corrections. Records are required to be maintained for a minimum of five years.

Sample Operations Log Sheets & Preventative Maintenance Checklists

Attached are sample operations log sheets and preventative maintenance checklists for a variety of control devices and it would be preferred that these forms be used, if possible. Depending on the particular equipment and its application at your facility, some operating parameters and maintenance procedures may not be applicable or additional items may be necessary. If your specific control device is not one of those addressed in the attached forms, follow the O&M Plan Guidelines or contact the Department for assistance.

Operations Log Instructions

The operating parameters contained in the attached operations log sheets are representative of desirable operating parameters available for that equipment. Although it is highly recommended that as many of these parameters as possible be monitored and recorded, the minimum acceptable operating parameters for each control device are shown below:

Wet Scrubber: Scrubber pressure drop, recirculation rate, makeup water flowrate or blowdown rate, pH, and visible emissions.
Baghouse: Inlet temperature, baghouse pressure drop, and visible emissions.
Cyclone: Cyclone pressure drop and visible emissions.
Truck washer System pressure
Wheel Washer System pressure
Pressure control system designed to shut-off cement silo
Overflow warning system/device on cement, lime, and/or fly-ash storage silo
Dry mix concrete plant loading stations/truck maintenance instructions
Screening water system Spray Bar functioning, system pressure
Rock Crusher watering system: System pressure, Spray Bar Functioning (check for spray pattern and operation)
Rumble Grate cleaning and maintenance repair

Maintenance Checklist Instructions

The maintenance procedures and performance frequencies contained in the attached checklists are general procedures that should be considered for your equipment. Consult the equipment manufacturer for specific procedures and performance frequencies appropriate for your equipment.

It may be useful to create separate forms for each maintenance period (i.e. weekly, quarterly, etc.) or record multiple sets of weekly procedures, for instance, on one checklist.

WET SCRUBBER SYSTEM DAILY OPERATIONS LOG SHEET

Is this equipment applicable? Please check ☐YES or ☐NO)

PARAMETER	LIMITS	READINGS
Scrubber pressure drop (in H2O)		
Recirculation rate (gpm)		
Makeup water flowrate (gpm)		
Blowdown rate (gpm)		
pH		
Conductivity		
Supply water pressure (psig)		
Visible emissions (excluding water vapor)		

Date	
Time	
Technician	

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):

WET SCRUBBER SYSTEM PREVENTATIVE MAINTENANCE CHECKLIST

Is this equipment applicable? Please check ☐YES or ☐NO)

DATE:		TECHNICIAN:	

WEEKLY PROCEDURES:	RESULTS	ACTION TAKEN
Check pump & fan motor for unusual vibration, noise, or heat		
Inspect system for leaks		
Check system dampers for proper operation		
Check chemical metering pumps & probes for proper operation		

MONTHLY PROCEDURES:	RESULTS	ACTION TAKEN
Inspect spray nozzle distribution pattern		
Inspect/clean flow strainer		
Check fan housing drain		
Check condition of fan bearings, belts, & seals		
Inspect fan impeller & blades for solids buildup or erosion		

QUARTERLY PROCEDURES:	RESULTS	ACTION TAKEN
Inspect packing for breakage & settling		
Check piping for erosion or plugging		

SEMI-ANNUAL PROCEDURES:	RESULTS	ACTION TAKEN
Calibrate instrumentation		
Inspect sump, packing, & ductwork for solids buildup		
Inspect tower internals for corrosion or breakage		
Inspect ductwork, fan, & structural supports for deterioration/damage		

COMMENTS:

PRESSURE CONTROL SYSTEM designed to shut-off cement silo or OVERFLOW WARNING SYSTEM/DEVICE on cement, lime, and/or fly-ash storage silo

Is this equipment applicable? Please check ☐YES or ☐NO)

PARAMETER	LIMITS	READINGS
Visible emissions present at outlet		
Gage reading (Pressure)		
Gauge Reading (Overflow)		
Continuity Check (Pressure)		
Continuity Check (Overflow)		

Date	
Time	
Technician	

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):

MAINTENANCE CHECKLIST for _____

DATE: TECHNICIAN:

DAILY PROCEDURES:	RESULTS	ACTION TAKEN

WEEKLY PROCEDURES:	RESULTS	ACTION TAKEN

MONTHLY PROCEDURES:	RESULTS	ACTION TAKEN

QUARTERLY PROCEDURES:	RESULTS	ACTION TAKEN

SEMI-ANNUAL PROCEDURES:	RESULTS	ACTION TAKEN

COMMENTS:

TRUCK WASHER or WHEEL WASHER Maintenance Checklist

Is this equipment applicable? Please check ☐YES or ☐NO)

PARAMETER	LIMITS	READINGS
System pressure (40 PSI)		
Water pump operation		
Spray nozzles		
Date		
Time		
Technician		

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):

MAINTENANCE CHECKLIST FOR SCREEN WATERING SYSTEM

PARAMETER	LIMITS	READINGS
Spray Bar functioning,		
System pressure		
Spray Nozzles Condition and Pattern		

Date	
Time	
Technician	

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):

MAINTENANCE CHECKLIST for:

DATE: TECHNICIAN:

DAILY PROCEDURES:	RESULTS	ACTION TAKEN

WEEKLY PROCEDURES:	RESULTS	ACTION TAKEN

MONTHLY PROCEDURES:	RESULTS	ACTION TAKEN

QUARTERLY PROCEDURES:	RESULTS	ACTION TAKEN

SEMI-ANNUAL PROCEDURES:	RESULTS	ACTION TAKEN

COMMENTS:

MAINTENANCE CHECKLIST FOR ROCK CRUSHER WATERING SYSTEM:

PARAMETER	LIMITS	READINGS
SYSTEM PRESSURE		
SPRAY BAR FUNCTIONING (CHECK FOR SPRAY PATTERN AND OPERATION)		

Date

Time

Technician

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):

Baghouse Number

BAGHOUSE DAILY OPERATIONS LOG SHEET (Is this equipment applicable? Please check ☐YES or ☐NO)

(Must have plan for all baghouses)

PARAMETER	LIMITS	READINGS
Inlet temperature (°F)		
Outlet temperature (°F)		
Baghouse pressure drop (in H2O)		
Compressed air pressure (psi)		
Visible emissions present at outlet		

Date	
Time	
Technician	

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):

BAGHOUSE PREVENTATIVE MAINTENANCE CHECKLIST

(Equipment applicable? Please check ☐ YES or ☐ NO)

DATE:		TECHNICIAN:	

DAILY PROCEDURES:	RESULTS	ACTION TAKEN
Monitor cleaning system cycle		

WEEKLY PROCEDURES:	RESULTS	ACTION TAKEN
Check for proper system damper operation		
Check bag tension		
Check compressed air system		
Activate key shutdown or bypass controls		

MONTHLY PROCEDURES:	RESULTS	ACTION TAKEN
Spot-check bag condition & seating		
Inspect system for corrosion & material buildup		
Check all moving parts for vibration, wear, & alignment		

QUARTERLY PROCEDURES:	RESULTS	ACTION TAKEN
Thoroughly inspect bags		
Inspect door gaskets		
Check for dust buildup in ducts		
Check proper damper valve seating		

SEMI-ANNUAL PROCEDURES:	RESULTS	ACTION TAKEN
Calibrate instrumentation		
Check cleaning system for rebalance requirement		
Inspect baffles, hopper duct, etc. for wear		
Inspect general structural integrity of system		

COMMENTS:

CYCLONE DAILY OPERATIONS LOG SHEET

(Equipment applicable? Please check ☐ YES or ☐ NO)

PARAMETER	LIMITS	READINGS
Inlet temperature (°F)		
Cyclone pressure drop (in H2O)		
Gas velocity (ft/sec)		
Visible emissions present at outlet		

Date	
Time	
Technician	

COMMENTS (INCLUDING CORRECTIVE ACTION TAKEN):

CYCLONE PREVENTATIVE MAINTENANCE CHECKLIST

(Equipment applicable? Please check ☐ YES or ☐ NO)

DATE: TECHNICIAN:

MONTHLY PROCEDURES:	RESULTS	ACTION TAKEN
Inspect cyclone & ductwork for plugging		
Check for proper damper settings		
Check condition of cyclone walls & fan blades		
Inspect dust discharge mechanisms for leakage from dust discharge		

COMMENTS: