Operation, Maintenance, and Replacement Plan Requirements

Contents

Introduction

Projects funded by the FACTS grant (Funding AMD Chemistry for Treatment Systems) must have an operation, maintenance, and replacement (OM&R) plan. This document explains the FACTS program's minimum requirements for such a plan.

An OM&R plan includes a narrative report—described in the remainder of this document—and at least one schematic of the treatment system to accompany the report's descriptions. Multiple diagrams are recommended (but not required), each one presenting a subset of the concepts to be depicted, in order to simplify the drawings and to enhance legibility. At least one schematic should be an aerial-view diagram of decent precision (preferred scale: between 1 inch : 50 feet and 1 inch : 100 feet). The schematic(s) must include a legend and must clearly depict the following:

- Access roads;
- Each major component, labeled (see "Treatment System: System components");
- Normal flow of water through system;
- Flow of water during flushing operations (if applicable);
- Valves or control structures used in regular OM&R activities;
- Sampling points, labeled (see "Operational Check-ups");
- Flow-measurement points, labeled;
- Emergency spillways.

An example diagram can be found at *http://www.wpcamr.org/facts/groups/omr-plan/*

In writing the OM&R plan narratives, assume the reader has basic knowledge of abandoned mine drainage (AMD) chemistry and typical passive treatment methods. The plan need not follow the outline structure of the remainder of this requirements document, as long as all the required information is present.

Site Background

1. Mine discharge

Identify the mine discharge and summarize its history, if known. Describe the discharge's chemistry and flow rate. Does the flow fluctuate or has the chemistry changed over time? This information can be either a narrative an attachment of available data.

2. Receiving stream

Identify the discharge's receiving stream. Disclose any other known sources of AMD or polluted water that flow into the receiving stream within one mile upstream or downstream of the treatment system's effluent. Does the stream have a documented TMDL?

Before the treatment system was installed, what was the stream's quality or health? If available, upstream and downstream data from before the treatment system was installed should be documented with the precise locations of these in-stream sampling points.

Treatment System

Give basic background information about the treatment system's installation and capital funding. Is there a source of funding for operation, maintenance, or replacement of the system?

If known, give the system's longitudinal and latitudinal coordinates, the location within the system where the coordinates were measured, and whether they were determined by GPS. Explain best way to get to the system. If access to the system is restricted, who has a key or who can grant permission? Identify any hazards of which a visitor should be aware, including weather-related ones.

1. System components

List all major system components. For each component:

- Assign the component a *unique* name or identifier, which will be used to label it on a diagram of the system. For example, a good name for an anoxic limestone drain might be **ALD**; if the system has more than one of a single component type, you

might name them **SAPS1** and **SAPS2**. If there is an existing scheme to identify the components, it should be used.
- Give a brief description of the component's role in the treatment of AMD.
- If applicable, give an extended explanation of any component that has unusual specifications, any unobvious considerations that went into a component's placement, or any component not normally found in an AMD passive treatment system.

2. System Synopsis

Identify any emergency spillways and the maximum flow the system will accept before spilling over. Identify every known location where water or AMD enters or leaves the system, including flow data if possible (see also "Operational Check-ups: Flow measurements").

Give a narrative description of the process by which the system's components, working together, remove pollutants. Also predict the system's performance in treating AMD by indicating expected changes in pollutant concentrations and/or loadings.

Operational Check-ups

All sampling points from which water will be sent to a chemical laboratory as part of the FACTS grant must be clearly labeled *on-site* using a method resistant to weathering and fading. Ideally, *all* sampling and flow-measurement points should be labeled in this way.

Specify whether any sampling or flow-measurements need to be planned around flushing or component discharges, as not to skew results.

If prior sampling or flow-measurement data exist, include a brief summary in the OM&R plan, or attach available data. Make a note of any existing scheme to identify the sampling points (e.g. DEP's SIS) or try to continue to use those labels.

1. Flow measurements

Flow rates should be monitored in all passive treatment systems wherever water enters or leaves the system. These data can be useful in estimating metal loadings. Where possible, flow rates should also be monitored before and after treatment components that might become clogged or lose permeability, as this can identify problems.

Identify every flow-measurement point in the system, the frequency of such readings, and the technique used to measure flow (e.g. weir, bucket & stopwatch, estimate). If a weir is

used, include the table or chart that converts water levels into flow measurements in the OM&R plan.

2. Water samples

Identify every location where field tests should be performed and where water samples should be collected for laboratory analysis. For each point, include the parameters to be measured and the frequency. Wherever possible, describe field tests that may serve as substitutes for laboratory tests.

Maintenance Activities

Passive treatment systems require regularly-scheduled maintenance, as well as unforeseen activities. For every task the system requires, such as those described below, identify how often it should be performed and give instructions, if necessary. For complex tasks such as system flushing, you may wish to include diagrams and identify or valves and control structures on a schematic of the system. Most OM&R plans call for completion of reports accompanying regular inspections.

Regular maintenance includes system flushing, clearing debris, and other activities necessary to control litter, vegetation, and erosion. Such activities should be included during a complete inspection of the system at least annually, though some likely need to be addressed more frequently.

Some conditions such as heavy rains, the presence of animals, drought, or small acts of vandalism require special maintenance. Identify such conditions and the non-routine activities required to keep the system operating well.

Finally, address the eventual need for large-scale maintenance and replacement of system components. Vandalism, metal clogging, decreased permeability, and sludge accumulation, for example, all require extensive action, which can be costly. Where possible, predict the years that such activities, including limestone addition or agitation, compost replacement, or sludge excavation, will be necessary. Also estimate their associated costs and whether any arrangement exists to fund these.