# Anna S Mine Complex Treatment System Operation and Maintenance Plan

## Developed for the Babb Creek Watershed Association

## By Hedin Environmental

## June 30, 2004

**Table of Contents**



**Attachments**

Inspection and Monitoring Form
Flushing Form
O&M Site Map

## I. Partners and Responsibilities

This project was funded by the Pennsylvania Department of Environmental Protection's (DEP) Growing Greener Program, the U.S. Office of Surface Mining (OSM), and the Babb Creek Watershed Association (BCWA). The system was designed by Hedin Environmental (HE) of Pittsburgh and Hess & Fisher of Clearfield.

BCWA is responsible for all regular inspections and O&M of the treatment system. In the event of a serious problem at the treatment system, DEP and HE should be notified immediately.

## II. System Overview

This is one of the largest passive treatment systems ever constructed. It collects and treats mine water from three deep mine discharges using eight vertical flow ponds (VFPs), four constructed wetlands, and two flush ponds. The purpose of this section is to describe system components and how they are related. Because the flow paths are completely separate, this section discusses the Anna S system and Hunter's Drift (HD) system separately. Items in **Red Bold** are shown on the attached O&M Map

### *A. Anna S System*

The Anna S system collects two discharges from the Anna S mine complex: Anna S1 and Anna S2. The S1 collection system extends from the deep mine entry into the **Anna S1 Mine Collection Box**. The purpose of this structure is to screen out debris, limit the total amount of water to the treatment systems, and allow the excess water to discharge to the stream. The outlet from the Mine Collection Box is transferred to the treatment system area. At regular intervals, the pipeline is equipped with cleanouts in the unlikely event of clogging.

When the S1 pipeline reaches the treatment system area, the flow enters the **Anna S1 Drift Distribution Box**. The purpose of this structure is to split the mine water into four equal flows for treatment by the four VFPs. Four pipes lead from the Distribution Box to the VFPs.

The Anna S2 discharge is collected in a perforated pipe buried in aggregate and leads to the **Anna S2 Mine Collection Box**. The purpose of this structure is to screen out debris, limit the total amount of water to the treatment systems, and allow the excess water to discharge to the stream. The outlet from the Mine Collection Box is transferred to the treatment system area. At regular intervals, the pipeline is equipped with cleanouts in the unlikely event of clogging.

When the S2 pipeline reaches the treatment system area, the flow is controlled by two valves, labeled **A2-1** and **A2-3**. These valves, when open, allow water to flow to VFP1 and VFP3, respectively.

The VFPs for the Anna S flows are **VFP1**, **VFP2**, **VFP3** and **VFP4**. VFP1 and VFP3 have two inlets (one from Anna S1 and one from Anna S2). VFP2 and VFP4 only receive water from

Anna S1. In each VFP, water flows down through the compost and limestone and into a series of underdrain pipes. The pipes in each VFP connect to a single pipe that discharges from the pond through flow control boxes, called **Box 1**, **Box 2**, **Box 3** and **Box 4**, respectively. These boxes carry the treated water into the channel. Panels can be removed from the boxes periodically if head losses are causing the water level in the VFP to rise. The effluents from VFP1 and VFP2 enter the channel together at its beginning.

The channel outlets to the beginning of **Wetland 4**. The final treated water is discharged to the stream channel.

Each of the Anna S VFPs is equipped with three flushing valves, numbered using the VFP number followed by A, B, and C. These valves all flush to **Flush Pond A**. The water from Flush Pond A is retained by **Box A**.

### *B. Hunter's Drift System*

The Hunter's Drift (HD) system collects the HD deep mine discharge and conveys it to the treatment system area via a 3,000 ft pipeline. The collection system extends from the deep mine entry into the **Hunter's Drift Mine Collection Box**. The purpose of this structure is to screen out debris, limit the total amount of water to the treatment systems, and allow the excess water to discharge to the stream. The outlet from the Mine Collection Box is transferred to the treatment system area. At regular intervals, the pipeline is equipped with cleanouts in the unlikely event of clogging.

When the pipeline reaches the treatment system area, the flow enters the **Hunter's Drift Distribution Box**. The purpose of this structure is to split the mine water into four equal flows for treatment by the four VFPs. Four pipes lead from the Distribution Box to the VFPs.

The VFPs for this flow are **VFP5**, **VFP6**, **VFP7** and **VFP8**. Pipes inlet into each VFP in the northernmost corner. In each VFP, the water flows down through the compost and limestone and into a series of underdrain pipes. The pipes in each VFP flow into a single pipe that discharges through flow control boxes, called **Box 5**, **Box 6**, **Box 7** and **Box 8**, respectively. These boxes carry the treated water in a common pipeline. Panels can be removed from the boxes periodically if head losses are causing the water level in the VFP to rise.

**Pipe 5-8** outlets to the beginning of **Wetland 1**, then flows to **Wetland 2** and **Wetland 3**. The final treated water from Wetland 3 is discharged to the stream channel.

Each of the HD VFPs is equipped with four flushing valves, numbered using the VFP number followed by A, B, C, and D. These valves all flush to **Flush Pond B**. The water from Flush Pond B is retained by **Box B**.

## III. System Monitoring

In conjunction with regular system inspections, monitoring of the flow and chemistry of mine water should also be performed. The following locations should be monitored for flow and/or chemistry.

| Site Name | Parameters | Notes |
|---|---|---|
| Anna 1 Mine Box | Flow rate of overflow | Should be zero most of the time |
| Anna 2 Mine Box | Flow rate of overflow | Should be zero most of the time |
| HD Mine Box | Flow rate of overflow | Should be zero most of the time |
| VFP1 Inlet Anna S1 | Flow rate and chemistry | Chemistry for raw Anna S1 |
| VFP1 Inlet Anna S2 | Flow rate and chemistry | Chemistry for raw Anna S2 |
| VFP2 Inlet | Flow rate | |
| VFP3 Inlet Anna 1 | Flow rate | |
| VFP3 Inlet Anna 2 | Flow rate | |
| VFP4 Inlet | Flow rate | |
| VFP5 Inlet | Flow rate and chemistry | Chemistry for raw HD quality |
| VFP6 Inlet | Flow rate | |
| VFP7 Inlet | Flow rate | |
| VFP8 Inlet | Flow rate | |
| VFP1 and 2 Outlet | Chemistry | Taken at beginning of channel |
| VFP3 Outlet | Chemistry | Taken at pipe to channel |
| VFP4 Outlet | Chemistry | Taken at pipe to channel |
| VFP 5-8 Outlet | Chemistry | Taken at inflow to Wetland 1 |
| Wetland 3 Outlet | Chemistry | Taken in outlet channel |
| Wetland 4 Outlet | Chemistry | Taken in outlet channel |

The outlets of each VFP can be measured separately if a performance decline is expected. This can be done in the outlet Flow Control Box (FCB) for each VFP.

## IV. Regular Inspections

Regular inspections are necessary in order to assess the performance of the treatment system and to identify any potential problems as soon as possible. The system should be inspected monthly and after severe rainfall events.

The attached Regular Inspection Form should be filled out for each inspection of the site.

### *A. Equipment*

The following equipment will be required for each inspection:

- Keys for all boxes (mine boxes, distribution boxes, and level control boxes)
- Wrenches to open mine boxes and distribution boxes

- A calculator (for calculating head losses and flow rates)
- A stopwatch
- A large bucket marked in gallons
- A ruler or stick marked in tenths of feet
- A clipboard and inspection form
- A copy of the O&M Map
- These instructions

Based on situations encountered during inspections, the following equipment may be required:

- Valve keys
- Flow control box panel lifters (stored in flow control boxes)
- Shovel/garden rake (for clearing debris)

Additional equipment and supplies, such as bottles, acid, pH meter, and alkalinity kit are required for field chemistry sampling and sample collection.

### *B. Inspection Checklist*

The following table shows the items that should be checked during every inspection. Measurements, samples, and particular items to note are listed in the last column. This table is the second page of the regular inspection form, with the "What to Check" column listed as "Notes." This is where measurements, samples, and observations should be listed.

| ✓ | **Item/Area** | **What to Check** |
|---|---|---|
| | Anna S1 Mine Collection Box | Check to ensure that the inlet, overflow outlet, and outlet to the treatment system are clear. Remove any debris or growth from within the box. Measure and record any overflow that is occurring (inspection for page 1). |
| | Anna S2 Mine Collection Box | Check to ensure that the inlet, overflow outlet, and outlet to the treatment system are clear. Remove any debris or growth from within the box. Measure and record any overflow that is occurring (inspection for page 1). |
| | Anna S1 Distribution Box | Check to ensure that the inlet and the outlets to the treatment system are clear. Remove any debris or growth from within the box. |
| | VFP1 | Measure and record the influent flow rates and the depths of water (inspection form page 1). Note if any boards are added or removed in the flow control box. Note any berm subsidence, leaks, or leaking valves. |
| | VFP2 | |
| | VFP3 | |
| | VFP4 | |
| | Wetland 4 | Check inlet and outlet channels for debris. Examine vegetation and berms for pest damage. The exit of this wetland is a sample location. |
| | Flush Pond A | Berms should be checked for subsidence and leakage. |
| | HD Mine Collection Box | Check to ensure that the inlet, overflow outlet, and outlet to |

| | | |
|---|---|---|
| | | the treatment system are clear. Remove any debris or growth from within the box. Measure and record any overflow that is occurring (inspection for page 1). |
| | HD Distribution Box | Check to ensure that the inlet and the outlets to the treatment system are clear. Remove any debris or growth from within the box. |
| | VFP5 | Measure and record the influent flow rates and the depths of water (inspection form page 1). Note if any boards are added or removed in the flow control box. Note any berm subsidence, leaks, or leaking valves. |
| | VFP6 | |
| | VFP7 | |
| | VFP8 | |
| | Flush Pond B | Berms should be checked for subsidence and leakage. |
| | Wetland 1 | Check inlet and outlet channels for debris. Examine vegetation and berms for pest damage. |
| | Wetland 2 | Check inlet and outlet channels for debris. Examine vegetation and berms for pest damage. |
| | Wetland 3 | Check inlet and outlet channels for debris. Examine vegetation and berms for pest damage. The exit of this wetland is a sample location. |
| | Site Access Roads | The general condition of the access roads and road culverts should be noted. |
| | Vegetation | On-site vegetation (excluding wetland vegetation) should be examined for success. Bare patches and damage should be noted. |
| | Vandalism | Note any evidence of vandalism, including cut locks, tracks in the wetlands, garbage, etc. |
| | Other | Anything else unusual about the site should be noted. |

## V. Regular Maintenance Items

The regular inspections are designed to help identify problems before they develop or as soon as possible. Close attention to the following items will allow problems to be corrected before they damage the treatment system or cause a decrease in treatment performance. Flushing the VFPs will be the most intensive maintenance item and is described in detail in the following section.

### *A. Mine Collection Boxes*

The mine collection boxes (Anna S1, Anna S2, and HD) each contain a debris screen that may accumulate debris or growth over time. This screen should be checked and cleaned if necessary. The overflow pipe and the outflow pipe to the treatment system should also be checked and cleared of any growth or debris. The boxes should be opened and inspected annually. If debris is found in the boxes, more frequent inspections should be considered.

### *B. Flow Distribution Boxes*

The flow distribution boxes (Anna S1 and HD) should be periodically opened and checked for debris. While it is unlikely that debris would reach these boxes from the mine collection boxes, algae growth may occur. If so, the pipes leading to the VFPs should be cleared. The distribution boxes should be inspected annually.

### *C. VFP and Wetland Channels*

Channels leading from the VFP exits, between the wetlands, and the wetland exit channels may become plugged with debris such as sticks, leaves, and other vegetation. Any debris clogging these channels should be removed. Then channels should be walked and inspected at least semi-annually.

### *D. Pest Damage*

Pests such as muskrats and beavers have been known to cause damage to passive treatment systems by digging through berms, destroying wetland vegetation, blocking pipes and channels, and draining ponds and wetlands. If muskrat or beaver activity is noted, continuous trapping is recommended. Game commission regulations on trapping should be followed unless special permission is gained to trap outside of the regular seasons. This kind of special permission has been gained for passive treatment systems in other areas. Observations for evidence of pest activity should be made during every inspection.

## VI. VFP Flushing

The purpose of the treatment system is to remove acidity and metals, primarily iron and aluminum. These metals can cause clogging and system failure if they accumulate in the compost and/or limestone. Therefore, a system of pipes has been built into the system and will be used to dislodge and remove these particles.

The VFPs are equipped with valves that flush only a portion of the cell. The Anna S VFPs (VFPs 1 – 4) each have three flushing zones (and thus, three valves). These valves have been labeled with the number of the VFP and the letters A, B, and C. The HD VFPs (VFPs 5 – 8) each have four flushing zones (and thus, four valves). These valves have been labeled with the number of the VFP and the letters A, B, C, and D. Thus, 28 valves control all flushing activities.

**Before beginning any flushing event, the flush ponds should be drawn down as much as possible (if they contain any water).** This is done by removing boards from Box A and Box B on the Flush Ponds A and B respectively. Boards should be removed one at a time so that water is slowly released to the stream.

### *A. Flush Scheduling*

Each valve should be flushed 3 – 4 times a year or more frequently if the head losses increase rapidly (See Inspection Form, Table 2). Only one valve per header pipe should be flushed at a time. The following table shows the valves that share a common header pipe.

| Valves with Common Headers | Flush Pond |
|---|---|
| 1A, 1B, 1C, 2A, 2B, 2C | A |
| 3A, 3B, 3C | A |
| 4A, 4B, 4C | A |
| 5A, 5B, 5C, 5D, 6A, 6B, 6C, 6D | B |
| 7A, 7B, 7C, 7D | B |
| 8A, 8B, 8C, 8D | B |

One approach to flushing the valves is to set up a rotating monthly schedule of which valves to flush each month. A sample of this type of schedule is shown below. In this schedule, each valve is flushed three times a year.

| | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| VFP1 | A | B | C | | A | B | C | | A | B | C | |
| VFP2 | | B | C | A | | B | C | A | | B | C | A |
| VFP3 | A | B | C | | A | B | C | | A | B | C | |
| VFP4 | | B | C | A | | B | C | A | | B | C | A |
| VFP5 | A | B | C | D | A | B | C | D | A | B | C | D |
| VFP6 | A | B | C | D | A | B | C | D | A | B | C | D |
| VFP7 | A | B | C | D | A | B | C | D | A | B | C | D |
| VFP8 | A | B | C | D | A | B | C | D | A | B | C | D |

The advantage of this type of schedule is that fewer valves are flushed at a time, meaning that the flush ponds will not fill as quickly and the flushing event does not take as long as a full system flushing event. Monthly flushing could be performed during monthly inspections.

The disadvantage of this type of schedule is that monthly access to the site is required. It also requires flushing valves that share a common header, meaning the flush on Valve 1B must be completed before Valve 2B can be opened. This will make the flushing event somewhat longer.

If this type of schedule is followed, it is estimated that the inspection and flushing activities will take 1 full day. However, it will also be necessary to visit the site prior to flushing in order to empty the flush pond.

An alternative to this schedule would be to perform flushing on all the valves over a several day period, three times a year. The advantage of this schedule is that flushing events could be timed to avoid the heaviest winter snows (March, July, and November).

For this flushing scenario, the valves would be opened and flushed in sequence until the flush ponds are full. The flushing would then end for the day. On the next day, water that has cleared could be released from the flush ponds and more valves could be flushed. This would continue until all the valves had been flushed.

One of the possible flushing patterns is:

- Flush 1A, 4A, 5A, 7A
- Flush 1B, 4B, 5B, 7B
- Flush 1C, 4C, 5C, 7C
- Flush 2A, 5D, 7D
- Flush 2B, 6A, 8A
- Flush 2C, 3A, 6B, 8B
- Flush 3B, 6C, 8C
- Flush 3C, 6D, 8D

A sequence such as this one ensures that only one valve per common header is being flushed at a time. In addition, it avoids flushing more than two ponds to the same flush pond at one time.

### *B. Performing a Flushing Event*

Each flushing event will likely be a unique experience. It is important to record the activities of the flushing event while flushing is taking place. The Flushing Form should be completely filled out for each flushing event. If a single event takes place over several days, the flushing form can continue to be used over the entire event.

The following table is part of the Flushing Form. It has been filled out here as an example. This example assumes that the February flushing event is being performed using the monthly flushing schedule.

| **Date/Time** | **Action** |
|---|---|
| 2/5/05, 10:00 AM | Started to drain down Flush A and Flush B. Added boards to all VFP flow control boxes. |
| 2/5/05, 3:00 PM | Removed more boards from Box A and Box B. Checked water levels in VFPs. |
| 2/6/05, 7:45 AM | Arrived on site. Replaced all boards in Box A and Box B. |
| 8:10 AM | Opened Valve 1B. Water very black and smelly at first. |
| 8:20 AM | Opened Valve 3B. Water orange/white with chunks. |
| 8:30 AM | Opened Valve 4B. Strong odor to water but no color. |
| 8:40 AM | Water has begun to clear. Will close valves as they clear. |
| 8:45 AM | Closed Valve 1B. Opened Valve 2B. Water dark with some odor. |
| 8:55 AM | Closed Valve 3B. |
| 9:00 AM | Closed Valve 4B. |
| 9:10 AM | Closed Valve 2B. Water running clear. |
| 9:15 AM | Opened Valve 5B. Brownish water has no odor. |

| | |
|---|---|
| 9:25 AM | Opened Valve 7B. Water is grey with slight odor. |
| 9:35 AM | Opened Valve 8B. Orange/brown water. No odor. |
| 9:45 AM | Closed Valve 5B. Opened Valve 6B. Water clear with slight odor. |
| 9:55 AM | Closed Valve 7B. |
| 10:05 AM | Closed Valve 8B. |
| 10:10 AM | Closed Valve 6B. Water still running slightly cloudy. |
| 10:30 AM | Returned all VFP flow control boxes to normal operating levels. |
| 2/8/05, 9:00 AM | Checked water levels in all VFPs. Added one board to Box1 (VFP1) and Box 6 (VPF6). Pond A and Pond B clearing, removed one board from each box. |

### *C. Flushing Tips*

- Fill out the Inspection and Monitoring Form before each flushing event.
- Each valve should be flushed for a period of 20 – 60 minutes.
- Observe and record the color and odor of the flush water.
- The water level in the VFP should never fall below the top of the compost.
- The flush pond should be drawn down as much as possible before beginning any flushing event.
- Be sure to replace the boards in the flush pond box prior to flushing.
- Only clear water should be released from the flush pond. If cloudy or colored water is leaving the flush pond, stop flushing and allow the water in the pond to settle.
- The flow control boxes on the VFPs can be used to back the water up before flushing. This will result in a more powerful flushing action.

## VII. Diagnosing Potential Problems and Their Solutions

While the systems have been designed to operate as smoothly and maintenance-free as possible, some problems may develop. The following table has been compiled in order to assist the BCWA in recognizing, diagnosing, and remedying potential problems.

| Symptom | Possible Cause | Possible Solution |
|---|---|---|
| One or more VFPs is not receiving water | If all VFPs are affected, the mine collection box is not receiving water (all VFPs), the mine collection box outlet is plugged (all VFPs), or the pipeline is plugged between the mine box and the distribution box. If one or more are affected, the distribution box outlets are plugged or the pipeline is plugged after the distribution box. | Beginning at the mine water collection box, check the flow path to determine the location of the problem. Remove any debris encountered. If the pipe is plugged, remove debris via the pipe cleanouts (equipment necessary). |
| The Anna S VFPs are not receiving equal amounts of flow or one VFP is not receiving any flow | The distribution box needs adjusted, distribution box outlets are partially plugged, pipelines are partially plugged. | |
| The HD VFPs are not receiving equal amounts of flow or one VFP is not receiving any flow | The distribution box needs adjusted, distribution box outlets are partially plugged, pipelines are partially plugged. | |
| The water is too high in a VFP and/or water is leaving the spillway of the VFP. | Not enough hydraulic head available. | Attempt to flush the VFP. If this does not improve the condition, remove one or boards from the VFP flow control box and monitor the water level over several weeks. If this does not improve the condition, contact DEP and Hedin Environmental. |
| All the boards have been removed from the VFP flow control box but the water level in the VFP is still too high | Compost, limestone or plumbing is clogged. | Attempt to flush the VFP. If this does not improve the condition, contact DEP and Hedin Environmental |

## VIII. Long-Term O, M &R Tasks

All short-term and regular operation and maintenance tasks have been discussed above. However, there are also long-term issues that will arise eventually.

### *A. Compost Replacement*

Based on the performance of other systems, it is reasonable to expect at least 5 years of performance from the compost. The compost was amended with both wood chips and limestone in an effort to extend its life by adding buffering capability and secondary porosity. Indications that the compost may be failing include the retention of iron within the compost, bright orange flush water from the limestone, and decreased porosity (increased water levels) in the system.

Before the compost is replaced, it should be stirred up with an excavator. In some VFPs, a hard iron crust forms on the surface of the compost, interfering with flow into the underlying compost and limestone. In these cases, breaking up the crusty condition usually returns the system's permeability.

### *B. Limestone Replacement*

Based on current performance of the systems and assuming that all alkalinity is being produced by limestone dissolution, approximately 600 tons of limestone will be dissolved each year. This is less than 2% of the 38,300 tons of limestone that are in the vertical flow ponds (which includes 3,300 tons of limestone chips in the compost mixture). The amount of limestone in the systems should be sufficient to provide over 20 years of treatment before the excess amount of alkalinity produced begins to decrease. Based on the performance and life cycles of many other VFPs, compost fouling and/or porosity issues will likely be the limiting factor in the overall lifespan of the systems, with limestone dissolution being a minor concern.

If replacement of limestone appears necessary, an investigation of the condition of the limestone in the failed VFP should be conducted. The flow can be turned off at the distribution box and the system can be drainage at the water level control box. Excavation may reveal that only one-half of the limestone aggregate is fouled. If this is the case, a repair plan that includes partial replacement of limestone may be feasible.

### *C. Flush Pond Cleaning*

The purpose of the flush ponds is to collect solids removed from the VFPs during flushing. The more effective the flushing is at removing solids from the VFPs, the faster the flush ponds will fill. As the ponds fill with solids, they will not be able to retain as much water during flushing. The solids will have to be removed and buried on site, possibly in the Hunter's Drift borrow area between VFP8 and Wetland 1. It is estimated that this will be required every 10 – 15 years.

When the performance of the flush ponds begins to decline, the ponds should be drained of all free water on top of the solids and allowed to dry as much as possible. Drying the solids will allow them to be removed using a backhoe or excavator. The solids should be placed in a pit and covered with at least 1 foot of soil. Permissions from the DEP, county conservation district, and property owner will likely be required.

# Inspection and Monitoring Form, Page 1 of 2

**Date:_____** **Inspector(s):_____**
**Reason for Inspection:** □ Regular Inspection □ Flooding Event □ Other

Fill out the following table, except where shaded. Flow rate is in gallons per minute. Sample information should include field information and sample bottle numbers. Include any addition information in the "Notes" Section.

**Table 1**

| Site Name | Flow Rate (gpm) | Sample Information | NOTES |
|---|---|---|---|
| Anna 1 Mine Box | | | |
| Anna 2 Mine Box | | | |
| HD Mine Box | | | |
| VFP1 Inlet Anna S1 | | | |
| VFP1 Inlet Anna S2 | | | |
| VFP2 Inlet | | | |
| VFP3 Inlet Anna 1 | | | |
| VFP3 Inlet Anna 2 | | | |
| VFP4 Inlet | | | |
| VFP5 Inlet | | | |
| VFP6 Inlet | | | |
| VFP7 Inlet | | | |
| VFP8 Inlet | | | |
| VFP1 and 2 Outlet | | | |
| VFP3 Outlet | | | |
| VFP4 Outlet | | | |
| VFP 5-8 Outlet | | | |
| Wetland 3 Outlet | | | |
| Wetland 4 Outlet | | | |

**Table 2 (Measure all distances in feet)**

| | A | B | C = A - B | D | E | F = D - E | G = F - C |
|---|---|---|---|---|---|---|---|
| **VFP** | **Box Elev.** | **Dist. To Water in Box** | **Exit Elev.** | **Stake Top Elev.** | **Dist. To Water in VFP** | **Water Elev.** | **Head Loss** |
| **1** | 1676.98 | | | 1674.98 | | | |
| **2** | 1679.32 | | | 1677.32 | | | |
| **3** | 1677.01 | | | 1675.01 | | | |
| **4** | 1676.69 | | | 1674.69 | | | |
| **5** | 1639.61 | | | 1637.61 | | | |
| **6** | 1637.60 | | | 1635.60 | | | |
| **7** | 1637.98 | | | 1635.98 | | | |
| **8** | 1635.86 | | | 1633.86 | | | |

# Inspection and Monitoring Form, Page 2 of 2

**Table 3**

| ✓ | Item/Area | What to Check |
|---|---|---|
| | Anna S1 Mine Collection Box | |
| | Anna S2 Mine Collection Box | |
| | Anna S1 Distribution Box | |
| | VFP1 | |
| | VFP2 | |
| | VFP3 | |
| | VFP4 | |
| | Wetland 4 | |
| | Flush Pond A | |
| | HD Mine Collection Box | |
| | HD Distribution Box | |
| | VFP5 | |
| | VFP6 | |
| | VFP7 | |
| | VFP8 | |
| | Flush Pond B | |
| | Wetland 1 | |
| | Wetland 2 | |
| | Wetland 3 | |
| | Site Access Roads | |
| | Vegetation | |
| | Vandalism | |
| | Other | |

# Flushing Form, Page 1 of 2

Begin Date:_____ End Date: _____
Personnel:_____
Reason for Flushing : □ Regular Schedule □ Decreased Flow through VFP

This Flushing Event is for:

| | | | | | |
|---|---|---|---|---|---|
| □ VFP1 | Valve(s) | □ A | □ B | □ C | |
| □ VFP2 | Valve(s) | □ A | □ B | □ C | |
| □ VFP3 | Valve(s) | □ A | □ B | □ C | |
| □ VFP4 | Valve(s) | □ A | □ B | □ C | |
| □ VFP5 | Valve(s) | □ A | □ B | □ C | □ D |
| □ VFP6 | Valve(s) | □ A | □ B | □ C | □ D |
| □ VFP7 | Valve(s) | □ A | □ B | □ C | □ D |
| □ VFP8 | Valve(s) | □ A | □ B | □ C | □ D |

**Before beginning the flush cycle, measure and record all information requested in Table 1 and Table 2 of the Inspection and Monitoring Form**

**Table 1**

| **Date/Time** | **Action** |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

# Flushing Form, Page 2 of 2

| Date/Time | Action |
|---|---|
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**NOTES:**