

Harrison Landfill

Run-on and Run-off Control System Plan

Monongahela Power Company
A FirstEnergy Company
Harrison Power Station
Shinnston, Harrison County, West Virginia


GAI Project Number: C150116.04

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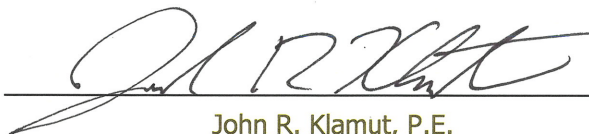
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Certification/Statement of Professional Opinion

The Run-on and Run-off Control System Plan (Plan) for the Harrison Power Station's Landfill was prepared by GAI Consultants, Inc. (GAI). The Plan was based on certain information that, other than for information GAI originally prepared, GAI has relied on but not independently verified. Therefore, this Certification/Statement of Professional Opinion is limited to the information available to GAI at the time the Plan was written. On the basis of and subject to the foregoing, it is my professional opinion as a Professional Engineer licensed in the State of West Virginia, that the Plan has been prepared in accordance with good and accepted engineering practices as exercised by other engineers practicing in the same discipline(s), under similar circumstances and at the time and in the same locale. It is my professional opinion that the Plan was prepared consistent with the requirements of the United States Environmental Protection Agency's "Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments," published in the Federal Register on April 17, 2015 with an effective date of October 19, 2015, § 257.81.

The use of the words "certification" and/or "certify" in this document shall be interpreted and construed as a Statement of Professional Opinion and is not and shall not be interpreted or construed as a guarantee, warranty or legal opinion.



John R. Klamut, P.E.
Engineering Manager



1.0 Introduction

The Harrison Power Station CCB Landfill (Landfill) is located approximately one mile north-northeast of the Harrison Power Station (Station), a coal-fired electric generating station located near the community of Shinnston in Harrison County, West Virginia (WV). The Landfill is a Class F Solid Waste Disposal Facility according to the WV Department of Environmental Protection (WVDEP).

Approximately 250 acres are currently permitted for landfill operations under WVDEP Permit No. WV0075795. Approximately 95 percent of the Coal Combustion Residuals (CCR) consist of fixated flue gas desulfurization material. Fly ash, bottom ash, and miscellaneous wastes compose the remaining five percent. The landfill is divided into three areas, referred to as the Lower Area, Upper Area, and Main Area.

The original Run-on and Run-off Control System Plan (Plan) was prepared by GAI in October 2016. This revision is based on drainage modifications made as part of landfill expansion for Phase 6A. Phase 6A consists of two sections of liner located within the existing footprint of the landfill in the Main Area. An approximately four-acre area was added to the western edge of the Main Area and an approximately two-acre area was added to the eastern edge of the Main Area.

A three-cell Sedimentation Pond (Pond) located near the toe of the Landfill is used as a settling pond for stormwater run-off and leachate flows. An 84-inch reinforced concrete pipe conveys run-on around the Pond from undisturbed areas, then discharges through a National Pollutant Discharge Elimination System Outlet into Robinson Run. The primary principal spillway of the Pond discharges to the West Fork River, while the overflow principal spillway and emergency spillway discharge to Robinson Run.

2.0 Plan Overview

This Plan, prepared in accordance with the requirements set forth in 40 CFR § 257.81 (including supporting engineering calculations, which are provided in the Permit Applications listed in Section 5.0), describes the following control systems for the Landfill, including a description of:

- ▶ Stormwater Run-on Control System;
 - Diversion Channel Design;
- ▶ Stormwater Run-off Control System;
 - Collection Channel Design; and
 - Sedimentation Pond Design.

The Landfill has a dual-channel perimeter system, which collects contact run-off in collection (interior) channels and diverts non-contact upslope stormwater run-on in diversion (exterior) channels. A riser pipe system has been installed in the CCR material to control contact water. This riser system directs water to the collection channels. Collection channels accept stormwater run-off from the Landfill and drain to the Pond. Diversion Channels are used to prevent run-on by collecting upslope stormwater and diverting flow around the Pond. Depending on the phase of landfill development, diversion channels are routed to collection channels and drain to the Pond.

All collection channels have been designed for the 25-year, 24-hour storm. Diversion channels, except for the temporary eastern and western construction diversion channels, have been designed for the 25-year, 24-hour storm. The permanent diversion channels, collection channels, and the Pond for the Landfill will meet the requirements set forth in 40 CFR § 257.81. Refer to Sections 3.0 and 4.0 and Figure 1 for details regarding the Run-on and Run-off Control Systems.

3.0 Stormwater Run-on Control System

Stormwater run-on to the Landfill is controlled by diversion features. The installed features are designed to divert up to the peak discharge from a 25-year, 24-hour storm, with the exception of the temporary eastern and western construction diversion channels. Control features consist of diversion channels and culverts.

3.1 Diversion Channel Design

The permanent perimeter diversion channels located along the outside of the Landfill are designed to direct flow of stormwater run-on from the 25-year, 24-hour storm event that would otherwise run-on to the Landfill. Temporary perimeter diversion channels installed for liner construction along the eastern perimeter of the Active Landfill Area were designed to prevent run-on to the active portion of the Landfill for the 25-year, 24-hour storm event. The re-directed flow can be routed to an 84-inch pipe that conveys the run-on around the Pond then discharges to Robinson Run, a tributary to the West Fork River. Depending on the phase of landfill development, diversion channels may be routed to collection channels and drain to the Pond.

Design calculations for the diversion channels can be found in the Permit Applications noted in Section 5.0 (References).

4.0 Stormwater Run-off Control System

Stormwater that encounters the CCR is collected prior to off-site discharge through a permitted outfall. Stormwater run-off collection systems are sized to accommodate the volume of water from a 25-year, 24-hour storm event through a series of channels, culverts, and the Pond.

4.1 Collection Channel Design

The design of the collection channels meets the applicable requirements of § 257.81 of the Federal CCR Rule. Design calculations for the collection channels can be found in the Permit Applications noted in Section 5.0.

The collection channels gather run-off contacting the Landfill in the inner channels of the dual-channel system that are located along the perimeter of the Landfill. Run-off is also collected from the active surface by a riser pipe system. The riser pipes and the collection channels drain to the Pond.

Run-off water is directed to the Pond where it undergoes primary sedimentation before being discharge to the West Fork River under a West Virginia-issued NPDES Permit. The Landfill was constructed with collection channels to route run-off stormwater from up to a 25-year, 24-hour storm event to the Pond.

4.2 Sedimentation Pond Design

The Pond is designed in a three-cell configuration (A, B, and C) to handle stormwater run-off from the Landfill's worst-case drainage scenario. The cells are separated by internal dikes to provide individual settling areas. The Primary principal spillway conveys flow to the West Fork River. The Overflow principal spillway and Emergency spillway discharge to Robinson Run. Pond calculations show that adequate freeboard is maintained between the top of the embankment and the maximum water surface elevation that occurs during a 25-year, 24-hour event. Design calculations for the Sedimentation Ponds can be found in the Permit Applications noted in Section 5.0 (References).

5.0 References

GAI Consultants Inc. 2002.

"Application for Lateral Expansion Permit No. WV0075795 Phase IV CCB Landfill," September 2002.

GAI Consultants Inc. 2011.

"Application for Lateral Expansion Permit NO. WV0075795 Phase 5 CCB Landfill Expansion,"
January 2011.

GAI Consultants Inc. 2016.

"Application for Renewal Permit No. WV0075795 Phase 6 Expansion," February 2016.

GAI Consultants Inc. 2017.

"Permit Modification, Application for Phase 6A Expansion," November 2017.

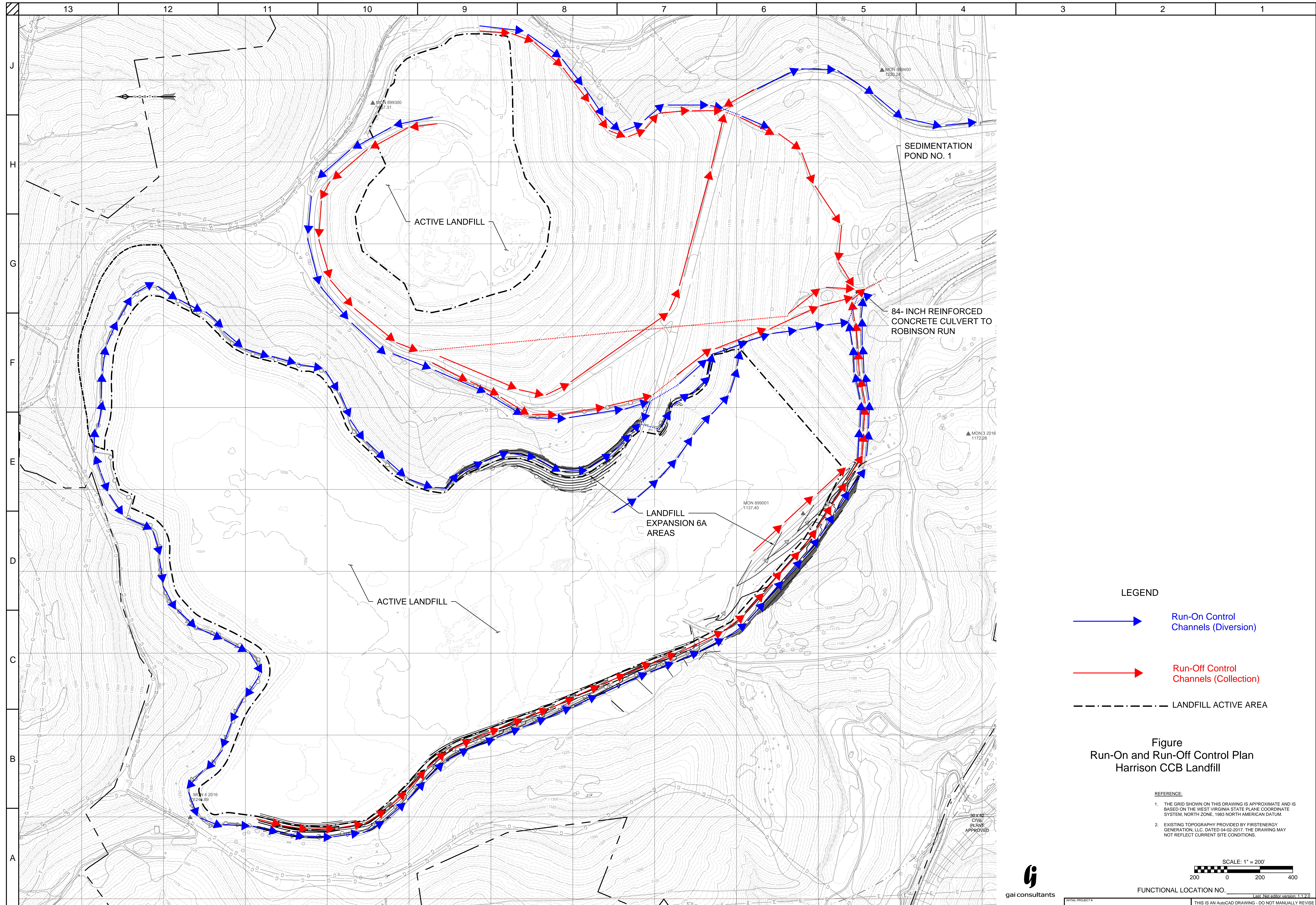
GAI Consultants Inc. 1994.

"APSC-Harrison Power Station LTV Expansion, Appendix D," May 1994.

United States Environmental Protection Agency.

40 CFR 257, *Criteria for Classification of Solid Waste Disposal Facilities and Practices.*

FIGURE



LEGEND




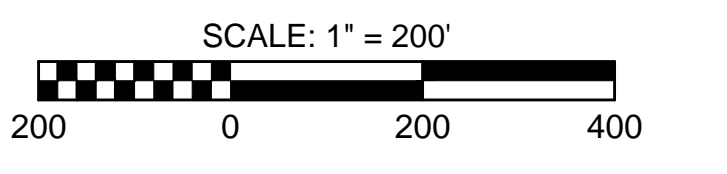
-  Run-On Control Channels (Diversion)
-  Run-Off Control Channels (Collection)
-  LANDFILL ACTIVE AREA

Figure
Run-On and Run-Off Control Plan
Harrison CCR Landfill

REFERENCE:

1. THE GRID SHOWN ON THIS DRAWING IS APPROXIMATE AND IS BASED ON THE WEST VIRGINIA STATE PLANE COORDINATE SYSTEM, NORTH ZONE, 1983 NORTH AMERICAN DATUM.
2. EXISTING TOPOGRAPHY PROVIDED BY FIRSTENERGY GENERATION, LLC, DATED 04-02-2017. THE DRAWING MAY NOT REFLECT CURRENT SITE CONDITIONS.



INITIAL PROJECT #		THIS IS AN AUTOCAD DRAWING - DO NOT MANUALLY REVISE	
ENGINEERING	DATE	HARRISON CCR LANDFILL	
DR WALLAMJ	05/17/2016	RUN-ON RUN-OFF CONTROL PLAN	
DRS ODONNDM	05/17/2016	FACILITY	HARRISON
APP COCKLKC	05/17/2016	UNIT	COMMON
SCALE		DWG. NO.	RUN-OFF WORKSHEET
		REV.	B

REVISION	DR	CHKD	APPD	DATE	REVISION	DR	CHKD	APPD	DATE	REVISION	DR	CHKD	APPD	DATE	REVISION	DR	CHKD	APPD	DATE	REVISION	DR	CHKD	APPD	DATE	REVISION	DR	CHKD	APPD	DATE										
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