ATTACHMENT G1

WIPP PANEL CLOSURE DESIGN DESCRIPTION AND SPECIFICATIONS

Adapted from the October 2016 Design Report – WIPP Panel Closure

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LIST OF ABBREVIATIONS/ACRONYMS

Permit	WIPP Hazardous Waste Facility Permit
ROM	run-of-mine
WIPP	Waste Isolation Pilot Plant
WPC	WIPP Panel Closure

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G1-1 Introduction

An important aspect of repository operations at the Waste Isolation Pilot Plant (**WIPP**) facility is the closure of waste disposal panels, also referred to as Hazardous Waste Disposal Units, under the Resource Conservation and Recovery Act. Each one of Panels 1 through 8, 11, and 12 consists of a panel air-intake drift, a panel air-exhaust drift, and seven rooms. Panels 9 and 10 consist of the main entries (North to South) and cross entries (East to West) to Panels 1-8. The closure of individual panels shall meet the closure requirements described in Attachment G and shall be built in accordance with the specifications in this attachment. This attachment describes the panel closure design and presents the applicable specifications and requirements for fabrication, installation, and maintenance of the WIPP Panel Closure (**WPC**).

The design discussed in this attachment is based on the Design Report, prepared by Golder Associates (Golder, 2016). Calculations demonstrating compliance with the volatile organic compounds emission standards are included with the Design Report. Calculations addressing the performance of the WPC under the geometries in the access drifts and main entries, including an assessment of the required length of the run-of-mine (**ROM**) salt component, are also included in the Design Report. The specifications for standard steel bulkheads and ROM salt are included as Attachment G1 Appendix G1-A *Technical Specifications* and Attachment G1 Appendix G1-B *Drawings*.

G1-2 WPC Description

The WPC consists of WPC-A and WPC-B. The WPC-A is the design for Panels 1 through 8, 11, and 12. They shall be closed using out-bye bulkheads in the panel intake and exhaust drifts. The WPC-A with ROM salt is also installed in Panel 9 in the main entries between S-2750 and S-2520 as the closures for Panels 3 through 6. The WPC-B is the closure design for Panel 10. It consists of a combination of in-bye and out-bye bulkheads and a length of ROM salt placed in the main entries north of S-1600. The WPC locations are depicted in Permit Attachment G1, Appendix G1-B.

G1-2a Permit Design Requirements

The applicable design requirements are provided in Permit Attachment G, Section G-1e(1). The WPC meets these design requirements as documented in the Design Report.

G1-2b Design Component Descriptions

The following subsections present a description of the WPC components. Individual specifications address shaft and underground access and materials handling, construction quality control, treatment of surfaces in the closure areas, and applicable design and construction standards.

The WPC-A consists of a standard steel bulkhead in the panel access drifts, near the intersection with the main entries or relocated to the main north-south drifts as determined by the geotechnical engineer. This bulkhead is referred to as the closure/out-bye bulkhead and it

will be maintained for as long as it is accessible. Additional ventilation barriers may remain in the panels as part of the operational controls prior to WPC installation. These ventilation barriers include steel bulkheads, brattice cloth and chain link, as well as concrete block walls in Panels 1, 2, and 5. These ventilation barriers are not part of the WPC design and will not impact the WPC-A bulkheads nor will they impede construction and maintenance of closure bulkheads. WPC-A with ROM salt has been emplaced in the main entries between Panels 9 and 10 (between S-2520 and S-2750).

The WPC-B design for the closure installed in the main entries north of Panel 10 (north of S-1600) consists of ROM salt between in-bye and out-bye bulkheads as shown in Permit Attachment G1, Appendix G1-B.

G1-2b(1) Steel Bulkhead

A bulkhead (shown in Permit Attachment G1, Appendix G1-B) serves to close panels by blocking ventilation to the intake and exhaust access drifts of the panel and preventing personnel access. This use of a bulkhead is a standard practice and the closure bulkhead shall be constructed as a typical WIPP facility bulkhead. The bulkhead will consist of a steel member frame covered with sheet metal. Telescoping tubular steel or functionally equivalent material shall be used to bolt the bulkhead to the floor and roof. Flexible flashing material such as a rubber conveyor belt (or other appropriate material) will be attached to the steel frame and the salt as a gasket, thereby providing an effective yet flexible blockage to ventilation air. The steel bulkheads will be maintained for as long as they are accessible to workers. In this regard, accessible bulkheads will be repaired, renovated, or replaced as required. Permit Attachment E, Table E-1 provides the schedule for inspecting panel closure bulkheads.

G1-2b(2) ROM Salt

Run-of-mine salt material from mining operations will be used in the main entries north of Panel 10. The salt will be emplaced to a specified design length based on geomechanical calculations described in detail in the Design Report.

G1-3 Constructability

The WPC-A and WPC-B can be constructed using available technologies for the construction of bulkheads. The use of bulkheads is a standard practice at the WIPP facility and the closure bulkheads will be constructed as typical WIPP facility bulkheads. Run-of-mine salt is available from mining operations in sufficient quantities. The construction methods and materials required for the ROM salt placement north of Panel 10 will use available technologies as discussed in the Design Report.

Conventional WIPP facility mining practices will be used for the WPC construction. Work packages will be prepared for the fabrication and installation of steel bulkheads and will list the materials used, the equipment used, special precautions, and limitations. Each work package will address location-specific prerequisites for installing the closure components, will contain the bulkhead specifications, as appropriate, and the location where the closure components are to be installed. Details on the conventional mining practices and work package preparation are discussed in the Design Report and, further construction details are given in the technical specifications included in Attachment G1, Appendix G1-A.

G1-4 Technical Specifications

The technical specifications are included in Attachment G1, Appendix G1-A, and are listed in Table G1-1.

G1-5 Drawings

The drawings are included in Attachment G1, Appendix G1-B and are listed in Table G1-2.

G1-6 References

Golder Associates Inc. (Golder), 2016, Design Report – WIPP Panel Closure report number 0632213 R1 Rev 1, Lakewood, Colorado, October 2016.

TABLES

Table G1-1
WIPP Panel Closure Technical Specifications

Division 1 – General Requirements	
Section 01010	**Summary of Work**
Section 01090	Reference Standards
Section 01400	Contractor Quality Control
Section 01600	Material and Equipment
Division 2 – Site Work	
Section 02010	Mobilization and Demobilization
Section 02222	Excavation
Division 3 – WPC Components	
Section 03100	Run-of-Mine Salt
Section 03200	Steel Bulkheads

Table G1-2
WIPP Panel Closure Drawings

Drawing Number	Title
262-001	WIPP Panel Closure (WPC) Title Sheet
262-002	WPC Locations
262-003	Typical Panel Layout and Mined Entry Cross-Sections
262-004	WPC Details – Bulkhead and ROM Salt Locations
262-005	WPC Details – Bulkhead Front-View and Attachment Detail