

SECTION 01 92 00.13 – DRY OUTAGES

1.01 SUMMARY:

- A. **Basic Function:** Dry outages will be required for the periodic inspection, maintenance, and emergency repair of lock gates and trackway, culvert and conduit valves, lock chambers, culverts, water-saving basins and conduits, and other underwater structures or equipment.
- B. **Scope:** ^{A17}This Section contains the performance specifications for dewatering and filling requirements for each type of required dry outage.^{A17}
- C. **Related Sections:**
 - 01 10 00 General Project Requirements
 - 01 81 13 Filling and Emptying Systems
 - 01 81 19 Lock Gates
 - 01 81 23 Culvert and Conduit Valves
 - 01 86 13 Plant – Mechanical Systems and Equipment
 - 40 00 00 Process Systems Integration

1.02 DRY-OUTAGE REQUIREMENTS: ^{A17}In addition to the requirements specified in Section 01 10 00 (*General Project Requirements*) and other requirements that may be further specified in other Sections of the Employer's Requirements, the Works shall be designed and constructed to enable periodic or emergency dewatering/filling of the locks for inspection, maintenance, and repair of all underwater structures and equipment. Dewatering of all three chambers, Water-Saving Basins, gate Recesses, culverts, and conduits shall be possible as detailed in this Section. The Contractor shall provide all systems and equipment required to perform dry outages as described herein. Dewatering times specified below do not include the time required for equipment installation.

- A. **Dry Lock Chamber Outage:** The locks shall be designed and constructed to allow for a dry lock chamber outage.
 - 1. The lock-chamber design shall include a dewatering and filling system to obtain all dewatering conditions described below.
 - a. ^{A16}(Reserved)^{A16}
 - b. ^{A16}(Reserved)^{A16}
 - c. Complete dewatering of all three (upper, intermediate, and lower) chambers.
 - d. ^{A16}Complete dewatering of both the intermediate and lower chamber.^{A16}
 - e. Complete dewatering of the lower chamber.
 - 2. The lock-chamber design shall be such that the dry-chamber condition is achieved initially by discharging chamber water through the culverts by gravity.

The design shall include a dewatering and filling system to permit dewatering of all three chambers in ^{A11}48 hours^{A11} or less, beginning with sea level at the low-water springs condition. Leakage shall be taken into consideration in order to maintain the chambers in a dry condition after dewatering. The filling time shall be no longer than the dewatering time. The dewatering and filling system shall be as described in Section 01 81 19 (*Lock Gates*), Subparagraph 1.03 I. ^{A16}Refer to Section 01 93 00 (*Maintenance Services*) for the required number of portable dewatering pumps.

^{A16}3. **Transport, Installation, Hoisting Requirements, and Removal Procedures and Equipment:** The design shall indicate the recommended transport, installation, removal, and hoisting procedures and equipment required for the placing and removal of the closures. Hoisting requirements shall be clearly indicated and may use the Employer's Floating Crane Titan (See capacities in Section 01 81 19, Subparagraph 1.03 N).

4. **Storage and Maintenance Requirements:** The design shall indicate the recommended storage and maintenance requirements. ^{A16}

B. **Dry Lock-Gate Recess Outage:** ^{A17}Periodic inspection, maintenance, and emergency repair of a rolling gate shall be possible when the gate is in its corresponding Recess in the dry condition. ^{A17} Recess closures shall, when installed, hold back chamber water. ^{A17}The gate-Recess design shall include a dewatering and filling system to permit dewatering of the largest Recess in 24 hours or less. Leakage shall be taken into account in order to maintain the gate Recess in a dry after dewatering. ^{A17} The filling time shall be no longer than the dewatering time. The dewatering and filling system shall be as described in Section 01 81 19 (*Lock Gates*), Subparagraph 1.03 I. ^{A16} Refer to Section 01 93 00 (*Maintenance Services*) for the required number of portable dewatering pumps.

C. **Dry Culvert-Valve Pit Outage:** Periodic inspection, maintenance, and emergency repair in a culvert-valve pit (space between bulkheads) shall be possible when the pit is in the dry condition. Dewatering of the culvert-valve pit shall be possible without interrupting lock operations. Bulkheads shall, when installed, hold back upstream and downstream culvert water and allow dewatering of the valve pit. ^{A17}The culvert-valve pit design shall include a dewatering and filling system to permit dewatering the valve pit in 4 hours or less. ^{A17} Leakage shall be taken into consideration in order to maintain the valve pit in a dry condition after dewatering. The dewatering and filling system shall be as described in Section 01 81 23 (*Culvert and Conduit Valves*), Subparagraph 1.04 M.3. ^{A16} Refer to Section 01 93 00 (*Maintenance Services*) for the required number of portable dewatering pumps.

D. **Dry Culvert Outage:** ^{A10}Periodic inspection, maintenance and emergency repair in a culvert section (between the bulkheads for different valve pits) shall be possible when the culvert section is in the dry condition. Dewatering any culvert section including the corresponding secondary culverts shall be possible without interrupting lock operations. Culvert valve pit bulkheads shall, when installed, isolate the main culvert section from the rest of the culvert. Conduit valve pit bulkheads shall, when installed, hold back WSB water. A means of isolation shall, when installed at all required locations, hold back chamber water. The design of the culvert shall include a dewatering and filling system to

permit dewatering the culvert section between two adjacent ^{A11}lock heads in 24 hours ^{A11}or less. Leakage shall be taken into consideration to maintain the culvert section in a dry condition after dewatering. The filling time shall be no longer than the dewatering time. The dewatering and filling system shall be as described in Section 01 81 23 (*Culvert and Conduit Valves*). ^{A16} Refer to Section 01 93 00 (*Maintenance Services*) for the required number of portable dewatering pumps.

- E. **Dry Conduit-Valve Pit Outage:** Periodic inspection, maintenance, and emergency repair in a conduit-valve pit (space between bulkheads) shall be possible when the pit is in the dry condition. Dewatering of the conduit-valve pit shall be possible without interrupting lock operations. Bulkheads shall, when installed, hold back upstream and downstream conduit water and allow dewatering of the valve pit. ^{A17}The conduit-valve pit design shall include a dewatering and filling system to permit dewatering the valve pit in 4 hours or less. ^{A17} Leakage shall be taken into consideration to maintain the conduit-valve pit in a dry condition after dewatering. The filling time shall be no longer than the dewatering time. The dewatering and filling system shall be as described in Section 01 81 23 (*Culvert and Conduit Valves*), Subparagraph 1.04 M.3. ^{A16} Refer to Section 01 93 00 (*Maintenance Services*) for the required number of portable dewatering pumps.
- F. **Dry Water-Saving Basin (WSB) and Conduit Outage:** Periodic inspection, maintenance, and emergency repair in a WSB and conduit shall be possible when the WSB and conduit are in the dry condition. Dewatering of one or more WSBs and conduits shall be possible without interrupting lock operations. The design shall be such that the dewatering of a WSB and conduit is accomplished initially by discharging the WSB water through the conduits by gravity, with bulkheads then installed to isolate the conduit from the lock chamber in order to allow for the dewatering of the WSB and conduit. The design of the WSB and conduits shall include a dewatering and filling system to permit dewatering the WSB and conduits in 24 hours or less. The filling time shall be no longer than the dewatering time. Leakage shall be taken into consideration to maintain the WSB and conduit section in a dry condition taking after dewatering.

1.03 DESIGN CRITERIA/SYSTEM DESCRIPTION AND PERFORMANCE:

- A. **Dewatering and Filling Systems** Each dewatering and filling system shall include the intake piping, dewatering and filling pumps, outfall piping and discharge routes, and other features required for proper operation. The design and construction shall include all necessary features, such as pipe shafts, sumps, structural supports, pump and pump motor bases, motor starters, pump-motor protection, and controls. In general, suitably sized equipment shall be required to meet the dewatering time and smaller equipment shall be required to maintain the dry condition in case water leaks into the dry area. Dewatering and filling equipment installation shall be possible without interrupting lock operations. ^{A16}For equipment requirements, see Section 01 86 13 (*Plant – Mechanical Systems and Equipment*) and Section 01 93 00 (*Maintenance Services*). ^{A16} With the exception of dry-chamber dewatering, all dewatering processes shall be possible without interrupting lock operations. In all cases, discharged water shall not interfere with the lockage of vessels.
- B. **Means of Isolation:** ^{A10}The means of isolation shall allow a dry outage at any culvert section, including the main culvert section and the corresponding secondary culverts. The Employer's intent is to relocate the means of isolation to each desired location. The

means of isolation shall be as described in Section 01 81 23 (*Culvert and Conduit Valves*).^{A10}

- C. **Standardization:** Wherever practical, uniform sizes for dewatering and filling equipment shall be used to allow interchangeability and standardized procedures. The Employer's intent is to relocate the pumping equipment and the corresponding motor starter and controls to each desired location. The electrical feeder and pump-motor protection shall be available and fixed at each location. Equipment used at both locks shall be standardized for interchangeability of spares and to reduce maintenance training needs.
- D. **Accessibility:** ^{A17}The design shall take into account that pumps, pump motors, pump-motor starters, valves, piping, and other equipment requiring relocation shall be accessible and removable by crane through vertical shafts.^{A17} Enclosed and confined spaces shall be avoided.
- E. **Training:** During the installation and commissioning period, training shall be provided to 60 Employer operations and maintenance personnel. Demonstrations and training shall be in accordance with Section 01 79 00 (*Demonstration and Training*) and shall include the operation and maintenance procedures for each dewatering and refilling system.
- F. **Maintainability:** Adequate space for installation, operation, and maintenance shall be provided at each location where a dewatering and filling system for a dry outage is required.

1.04 SUBMITTALS:

- A. **General:** ^{A17}The Contractor shall make submittals as required in the relevant Sections of the Employer's Requirements, and the Accepted Baseline Programme.^{A17}
- B. **Dewatering and Filling Procedures:** The Contractor shall submit detailed procedures for dewatering and filling for each type of dry outage, including the necessary control settings and control logic, as required by Section 40 00 00 (*Process Systems Integration*).

1.05 QUALITY ASSURANCE AND VERIFICATION: ^{A17}Testing and commissioning shall be performed in accordance with Section 01 91 00 (*Tests on Completion and Tests after Completion*).^{A17}

END OF SECTION