Interlock Controls

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HOW DID WE GET HERE

- Main chamber gate failure at Markland L/D on 27 September 2009
- BOI determined gate failure was due to a malfunctioning solenoid valve which caused the filling valve to remain in the open position.
- Fragmentation order 05 (Minimum Interlock System Performance Requirements for LRD Lock Projects) to OPORD 2009-04 (Markland L/D, Ohio River – Downstream Miter Gate Failure, Board of Investigation Recommendations – Regional Implementation Plan)

New Interlock System Should Provide the Following Functions

- Gate to Valve Interlock – Prevents the filling valves from being opened if the lower miter gates are not closed and prevents the emptying valves from opening if the upper miter gates are not in the closed (mitered). This interlock will also stop the opening of the valves and will close the valves to the full closed position if the miter gates lose the mitered condition. There is currently a functioning gate to valve interlock at the high lift lock facilities which would need to be integrated into the new total interlock system.

New Interlock System Should Provide the Following Functions

- Valve to Valve Interlock – Prevents the filling or emptying valves from opening if either of the opposite valves is not in the full closed position. This interlock will also stop the opening of the valves and will close the valves to the full closed position if the opposite valves lose the full closed position. An audible alarm would sound if this condition occurred.
- Valve to Gate Interlock – Prevents the upper miter gates from being operated if the emptying valves are not in the full closed position and prevents the lower miter gates from being operated if the filling valves are not in the full closed position. An audible alarm would sound if this condition occurred.

Performance Guidlines

- The interlock system needs to be hardwired into the current lock operating relay controls.
- It will need to have keyed bypasses to provide the ability to operate the lock independent of the interlock system. Preference would be to have the ability to bypass each of the three interlocks independently of the others.
- It will need to have indicators at all operator stations identifying the status of the interlock system.
- An audible alarm needs to be located at each of the operator stations to signify an out of sequence event.
- Required sensors: miter gates mitered or not mitered; valve position indicators; gates in recess and pinned.
- When digital devices are used for position indication, redundant hard wired sensors with hard wired position indicators shall be provided in the lock operator area.