Spray Ring Testing
Spray Ring Testing, Training, and Witness Plan

After fabrication is complete, the performance of the Spray Ring shall be evaluated ensuring it functions as intended. The contractor shall facilitate, assemble, and perform all following tasks, with involvement from WRPS engineering. It is desirable that the test location be in close proximity to the fabrication location in case any modifications are required during testing. All testing shall be performed by qualified personnel and done safely. The contractor shall provide a testing environment that ensures the safety of all personnel, including test observers.

The following lists equipment that will be supplied as Government Furnished Equipment (GFE) and what will be expected to be provided by the contractor. Fabricator will be responsible for providing any additional hoses, fittings, etc... required to perform the following tasks.

GFE (Supplied by WRPS):
- NLB Integrated Pressure Washer System (IPWS) (40 GPM @ 3,000 psig) pressure washers
- Test pump riser flange with dowel pins. See detail below for configuration.
- Hoses to connect tested unit.

Contractor:
- Water source capable of delivering at least 30 gpm @ 60-100 psig (2” cam-lock coupling)
- Diesel fuel to run IPWS
- Any measurement equipment not explicitly stated as being GFE required to perform the following tests with calibrations as required to satisfy QA conditions
- Any additional utilities and equipment required to assemble and perform the tests outlined below. This may include but is not limited to: electricity, hoisting and rigging gear, crane (and operator), hoses, etc...
- Dunnage wood (4”x4”, 6”x6”, poles, etc.)

Engineering Tests
The engineering tests will be performed in the presence of a WRPS engineer. Their intent is to understand and validate acceptable performance of the Spray Ring and IPWS under conditions representative of what is expected in the field.

Test 1: IPWS Performance Verification Testing:
Before testing of the Spray Ring commences, the IPWS will first require operational testing in order to verify it is capable of achieving the manufacturer’s stated capacity and functionality. The system will need to be de-winterized prior to use. This includes adding diesel fuel and purging anti-freeze from the tank and water lines. After de-winterization, run the system and perform the following tests:

1. Max Pressure and Flow Rate Verification – Connect a flow meter, pressure gauge, and flow control device to each of the 3 outlets, in turn, and manipulate the flow control valve to achieve the maximum flow at 3,000 psi. Record the values displayed
on the IPWS instrumentation, contractor M&TE, and manufacturer’s stated values. Compare values and note any discrepancies. Test each of the 3 outlet channels individually.

2. Minimum Pressure Verification – With the M&TE still connected, reduce the pressure regulator to achieve the minimum possible pressure at full open flow. **Note:** Only adjust the pressure regulators. **DO NOT attempt to manipulate the pressure relief valve.** Record the values displayed on the IPWS instrumentation, contractor M&TE, and manufacturer’s stated values. Compare values and note any discrepancies. Test each of the 3 outlet channels individually.

**Test 2: Remote Spray Ring Mechanism Test:**

1. Place test pump riser flange on a flat surface. With the spray ring in the open position, lower the dowel pin guide (Item 19, SK-IMA11-SP) over the short dowel pin. Adjust support legs to level unit as needed.

2. Close/lower the spray ring, ensure spray ring halves close tightly together. Ensure spray ring halves rest flat on the riser when in the closed position. Ensure gasket/wiper material clears itself when closing, adjust as needed. Spray ring halves need to have 2” minimum clearance between the bottom gasket and the riser when translating. **Note** any issues.

**Acceptance Criteria:** Information only, address any performance issues that are observed.

**Test 3: Spray Ring Cleaning Performance**

Once Test 2 has been successfully completed, the Spray Ring will be tested to evaluate its ability to clean. Previous spray ring testing has utilized wooden dunnage to show clean efficiency.

Configure the GFE to provide high pressure water to the spray ring. This test will take place at or above grade.

**At Grade (2’-4’ off ground)**

1. Place test pump riser flange and install the Spray Ring; turn on high pressure water; insert wooden dunnage and slowly remove. Vary pressures to determine optimal cleaning and water usage (WRPS engineering direction). Conduct testing at 2000 psi, 2500 psi and 3000 psi. Each pressure will be repeated several times.

   **Record** system pressure and flow rate. **Note** cleaning performance.

2. Change out the nozzles in the spray ring with qty. 10 Hydraflex 4.5 (1002402-045) nozzles. Place test pump riser flange and install the Spray Ring; turn on high pressure water; insert wooden dunnage and slowly remove. Vary pressures to determine optimal cleaning and water usage (WRPS engineering direction). Conduct testing at 2000 psi, 2500 psi and 3000 psi. Each pressure will be repeated several times.

   **Record** system pressure and flow rate. **Note** cleaning performance.
Note that the nozzles may need modification as shown in SK-IMA11-SP (3.5), nozzles shall be provided by the fabricator.

*Acceptance Criteria: Information only, address any performance issues that are observed.*

**Management Witness**

Once the aforementioned tasks have been completed, WPRS Engineering or Craft will demonstrate operation of the Spray Ring. At given times during the fabrication contract, the IPWS and spray ring will be operated to show effectiveness of equipment. This will be for demonstration only. It is anticipated this witness will happen approximately 3 times. Plan on up to 20 people present for this activity.
Test Pump Riser Flange (GFE, reference only):

Riser flange dimensionally from CS per H-2-70549 Detail XVI. Dowel pins made of SS.