

VERIF. DATE: _____

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CP4-ER-0008 FRRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 1 of 26
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FUNCTIONAL AREA: Environmental Remediation SUBJECT MATTER AREA: Northwest and Northeast Plume Pump and Treat Operations	SUBJECT MATTER EXPERT: Shay Mitchell - Project Manager of Pump and Treat Operations	
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REVISION/CHANGE LOG			
Revision/Change Letter	Description of Changes	Pages Affected	Date of Revision/Change
FR0	Initial Bluesheeting	All	10/20/2017
FR1	Non-Intent Revision to Incorporate Bluesheeting Changes and Update to Current Form	All	11/15/2017
FR2	General Revision.	All	3/17/2021
FR2A	Periodic Review has been completed with no changes identified in procedure technical content. Nonintent changes have been incorporated per CP3-NS-2001. Date for review cycle has been reset.	All	3/21/2024

CP4-ER-0008 FRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 2 of 26
---------------------------------------	--	---------------------

TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE 3
1.1 Purpose..... 3
1.2 Scope..... 3
2.0 REFERENCES 3
2.1 Use References..... 3
2.2 Source References 3
3.0 COMMITMENTS..... 3
4.0 PRECAUTIONS AND LIMITATIONS 3
4.1 Precautions 3
4.2 Limitations 3
5.0 PREREQUISITES 4
6.0 INSTRUCTIONS..... 4
6.1 Preparation Activities 4
6.2 Startup and Normal Operations of C-612..... 4
6.3 Post Startup of C-612..... 5
7.0 ACCEPTANCE CRITERIA 6
8.0 POST PERFORMANCE WORK ACTIVITIES..... 6
9.0 RECORDS..... 6
9.1 Records Generated..... 6
9.2 Records Disposition 6
APPENDIX A – ACRONYMS/DEFINITIONS..... 7
APPENDIX B – NORTHWEST PLUME GROUNDWATER SYSTEM VALVE ALIGNMENT
CHECKLIST 8

CP4-ER-0008 FRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 3 of 26
---------------------------------------	--	---------------------

1.0 PURPOSE AND SCOPE

1.1 Purpose

The objective of this procedure is to define the required equipment and steps necessary to startup and place the Northwest Plume Groundwater System (NWPGS) in normal plant alignment following a long-term shutdown. This procedure is **NOT** to be used to perform a normal shutdown of the NWPGS. Refer to the Deactivation & Remediation (D&R) Contractor procedure CP4-ER-0014, *Normal Northwest Plume Groundwater Shutdown and Restart*, for startup after a normal shutdown.

1.2 Scope

This procedure applies to the basic activities associated with starting up and operating the NWPGS following a long-term shutdown. This procedure will be performed in response to any shutdown (planned or unplanned) occurring when the NWPGS is unattended for an extended period as determined by the Pump and Treat Project Manager.

2.0 REFERENCES

2.1 Use References

- CP2-ER-0067, *Health and Safety Plan for the Paducah Plumes Operations and C-613 Sediment Basin Paducah, Kentucky*
- CP3-OP-0207, *Use of Procedures*
- CP3-SM-1101, *Work Package Development*
- CP4-ER-0001, *Northwest Groundwater System Startup and Shutdown of the Air Compressors*
- CP4-ER-0014, *Normal Northwest Plume Groundwater Shutdown and Restart*
- CP4-ER-0017, *Northwest/Northeast Plume Daily Operational Data Collection and Maintenance*

2.2 Source References

- JHA-10844, *Maintenance, Operations, and Testing for the Northwest and Northeast Plume and Water Treatment Operations*
- DOE/OR/07 1253, *Operations and Maintenance Plan for the Northwest Plume Groundwater System Interim Remedial Action Plan at PGDP Paducah, Kentucky*

3.0 COMMITMENTS

None

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

Cut resistant or leather gloves shall be worn when handling items with sharp edges or corners.

4.2 Limitations

None

CP4-ER-0008 FRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 4 of 26
---------------------------------------	--	---------------------

5.0 PREREQUISITES

- 5.1 Notify the Pump and Treat Project Manager of the time of system shutdown.
- 5.2 Prior to performing the action steps identified in this procedure, the user shall have reviewed this document based upon its Level of Use according to CP3-OP-0207, *Use of Procedures*.
- 5.3 Prior to performing the action steps identified in this procedure, the performer shall have completed the required applicable training.
- 5.4 Prior to using this procedure as a work control document, follow the requirements as defined in CP3-SM-1101, *Work Package Development* for the activities being performed.

Technician

6.0 INSTRUCTIONS

6.1 Preparation Activities

NOTE:

Perform Action Steps sequentially unless otherwise noted.

- 6.1.1 Don personal protective clothing in accordance with CP2-ER-0067, *Health and Safety Plan for the Paducah Plume Operations and C-613 Sediment Basin Paducah, Kentucky*.

NOTE:

The Trichloroethylene (TCE) on-line analyzer (L-005) will be calibrated according to manufacturing instructions. The calibration of the TCE on-line analyzer is normally performed quarterly.

- 6.1.2 The treatment system will be configured in accordance with Normal Plant Alignment and Normal Plant Operations and the pumping rates will be set to the flow rates prior to shutdown unless otherwise directed by the Pump and Treat Project Manager.
- 6.1.3 Align the NWPGS valves as specified in the NWPGS valve alignment checklist (see Appendix B, *Northwest Plume Groundwater System Valve Alignment Checklist*).

6.2 Startup and Normal Operations of C-612

- 6.2.1 Move the following local control switches to the following positions:
 - A. Equalization pump (J-005) – ON
 - B. Submersible sump pump (J-016) – AUTO
 - C. Sand filter skid (G-001) – ON
 - D. Sand filter skid (G-002) - ON

CP4-ER-0008 FRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 5 of 26
---------------------------------------	--	---------------------

- 6.2.2 Move the following switches on the local air stripper control panel to the “AUTO” position:
 - A. Air stripper blower (HS-AJ001)
 - B. Air stripper pump (HS-J006)
 - C. Air stripper heater (HS-AC301)
- 6.2.3 Consult the Pump and Treat Project Manager for appropriate alignment for the Settling tank supernatant discharge control valve (UV-107) depending on the condition of the fluid in the settling tank (F-008).
- 6.2.4 Ensure UV-110 is **NOT** in bypass mode on the NWPGS control panel, K-100, for the Backwash/sluice tank influent control valve.
- 6.2.5 Ensure UV-050 is **NOT** in bypass mode on the NWPGS control panel, K-100, for the Effluent discharge control valve.
- 6.2.6 Ensure pump 3 is OFF on the NWPGS control panel, K-100, for the Backwash/sluice pump (HS-J008).
- 6.2.7 Fully open or verify open, the air stripper air inlet butterfly valve AHV-013.
- 6.2.8 Verify that the local power switch on the local control panel for each well pump to be started is in the “ON” position.
- 6.2.9 Start the air compressors in accordance with CP4-ER-0001, *Northwest Groundwater System, Startup and Shutdown of the Air Compressors*.
- 6.2.10 Start the designated extraction well pumps by pressing the corresponding “START” buttons on the “Well Control” Panel View screen at the K-100 control panel.
- 6.2.11 Start the equalization pump J-005 by pressing the “START” button (HS J005) on the K-100 control panel.
- 6.2.12 Open the on-line analyzer influent valve (HV-053).
- 6.2.13 Verify flow through the sample line by observing flow into the NWPGS sump **and** place the on-line analyzer (L-005) in the “Constant Monitoring” operation mode.
- 6.2.14 Verify proper flow from the Pump and Treat Project Manager **and** adjust the flow setting at each extraction well.

6.3 Post Startup of C-612

- 6.3.1 Notify the Pump and Treat Project Manager of and document the time the system has been restarted.
- 6.3.2 Record all operational activities according to CP4-ER-0017, *Northwest/Northeast Plume Daily Operational Data Collection and Maintenance*.

CP4-ER-0008 FRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 6 of 26
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7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

None

9.0 RECORDS

9.1 Records Generated

The following records may be generated by this procedure:

None

Forms are to be completed in accordance with CP3-OP-0024, *Forms Control*.

9.2 Records Disposition

The records are to be maintained in accordance with CP3-RD-0010, *Records Management Process*.

CP4-ER-0008 FRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 7 of 26
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Appendix A – Acronyms/Definitions

ACRONYMS

D&R – Deactivation & Remediation

NWPGS – Northwest Plume Groundwater System

TCE – Trichloroethylene

DEFINITIONS

Normal Plant Alignment – A normal plant alignment positions the sand filters on-line, followed by the air stripper, followed by the ion exchange columns.

Normal Plant Operation – Is defined as the following equipment and equipment skids in operation:

- Two extraction well pumps (J-010 and J-011)
- Equalization pump (J-005)
- Sand filter skid (H-001) and associated equipment
- Air stripper skid (H-003) and associated equipment
- Ion exchange column skids (H-005/H-006) and associated equipment
- Effluent on-line analyzer (L-005)
- Air compressor skid (J-012)

Sand Filters – Silica sand and anthracite filter media (formerly greensand and anthracite) used for the removal of suspended solids. Valve labels associated with the sand filters are still referenced as “greensand” for consistency with system identification tags.

Technician - The person performing the steps in this procedure. The person performing this work could have job functions including but **NOT** limited to the Frontline Supervisor, and Operator or Maintenance Mechanic.

CP4-ER-0008 FRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 8 of 26
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APPENDIX B – Northwest Plume Groundwater System Valve Alignment Checklist

WELL EW-228 (Out of Service)

WELL EW-229 (Out of Service)

WELL EW-230 (On Stand By)

VALVE	VALVE NAME	POSITION
HV-013	Well Pump J-003 Discharge Pressure Gauge Valve	CLOSED
HV-014	Well Pump J-003 Sample Supply Valve	CLOSED
HV-015	Well Pump J-003 Sample Valve	CLOSED
HV-016	Well Pump J-003 Discharge Valve	CLOSED
HV-148	Well Pump J-003 Drain Valve	CLOSED

WELL EW-231 (On Stand By)

VALVE	VALVE NAME	POSITION
HV-018	Well Pump J-004 Discharge Pressure Gauge Valve	CLOSED
HV-019	Well Pump J-004 Sample Supply Valve	CLOSED
HV-020	Well Pump J-004 Sample Valve	CLOSED
HV-021	Well Pump J-004 Discharge Valve	CLOSED
HV-149	Well Pump J-004 Drain Valve	CLOSED

WELL EW-232

VALVE	VALVE NAME	POSITION
HV-215	Well Pump J-010 Discharge Pressure Gauge Valve	OPEN
HV-216	Well Pump J-010 Sample Supply Valve	CLOSED
HV-217	Well Pump J-010 Sample Valve	CLOSED
HV-218	Well Pump J-010 Discharge Valve	OPEN
HV-219	Well Pump J-010 Drain Valve	CLOSED

WELL EW-233

VALVE	VALVE NAME	POSITION
HV-220	Well Pump J-011 Discharge Pressure Gauge Valve	OPEN
HV-221	Well Pump J-011 Sample Supply Valve	CLOSED
HV-222	Well Pump J-011 Sample Valve	CLOSED
HV-223	Well Pump J-011 Discharge Valve	OPEN
HV-224	Well Pump J-011 Drain Valve	CLOSED

APPENDIX B – Northwest Plume Groundwater System Valve Alignment Checklist (Continued)

AIR COMPRESSOR SKID

VALVE	VALVE NAME	POSITION
HV-031	Compressed Air Supply Valve	CLOSED
ACV-001	Air Compressor A1-A Discharge Valve	OPEN
ACV-002	Air Compressor A1-B Discharge Valve	OPEN
ACV-003	Air Filter A3 Bypass Valve	CLOSED
ACV-005	Air Filter A3-A Supply Valve	OPEN
ACV-006	Air Filter A3-A Discharge Valve	OPEN
ACV-007	Air Filter A3-B Supply Valve	OPEN
ACV-008	Air Filter A3-B Discharge Valve	OPEN
ACV-015	Air Filter Bypass Valve	CLOSED
ACV-016	Air Filter Supply Valve	OPEN
ACV-017	Air Filter Discharge Valve	OPEN
ACV-018	Air Filter Supply Valve	OPEN
ACV-019	Air Filter Discharge Valve	OPEN
ACV-025	Compressed Air Pressure Gauge Supply Valve	OPEN
ACV-026	Compressed Air Pressure Gauge Discharge Valve	OPEN
ACV-027	Compressed Air Pressure Gauge Supply Valve	OPEN
ACV-028	Compressed Air Pressure Gauge Discharge Valve	OPEN

SUMP PUMP

VALVE	VALVE NAME	POSITION
HV-158	Sump Pump Discharge Valve (to the Settling Tank)	CLOSED
HV-159	Sump Pump Discharge Valve (to a Mobile Tank Truck)	CLOSED
HV-172	Sump Pump Discharge Valve (to the Equalization Tank)	OPEN

APPENDIX B – Northwest Plume Groundwater System Valve Alignment Checklist (Continued)

PUMP HEADER VALVES (Located at the Equalization Tank)

VALVE	VALVE NAME	POSITION
HV-011	EW-232/EW-233 Discharge Header Valve	OPEN
HV-022	Ew-230/EW-231 Discharge Header Valve	OPEN
HV-023	Auto Sampler Supply Valve (South Wells)	CLOSED
HV-024	EW-230/EW-231 Discharge Header Sample Supply Valve	CLOSED
HV-025	EW-230/EW-231 Discharge Header Sample Valve	CLOSED
HV-026	Auto Sampler Supply Valve (North Wells)	CLOSED
HV-086	Iron Reactor Skid Influent Water Valve	CLOSED
HV-125	EW-232/EW-233 Header Sample Supply Valve	CLOSED
HV-128	EW-232/EW-233 Discharge Header Sample Valve	CLOSED

EQUALIZATION TANK & PUMP SYSTEM

VALVE	VALVE NAME	POSITION
HV-027	Equalization Tank pH Element Valve	OPEN
HV-028	Equalization Tank Drain Valve	CLOSED
HV-030	Equalization Pump Suction Valve	OPEN
HV-036	Equalization Pump Suction Line Drain Valve	CLOSED
HV-083	Equalization Pump Discharge Pressure Gauge Valve	OPEN
HV-081	Equalization Pump Discharge Sample Supply Valve	CLOSED
HV-082	Equalization Pump Discharge Sample Valve	CLOSED
HV-085	Equalization Pump Discharge Valve	OPEN
HV-145	Equalization Tank Level Control Valve Air Supply Valve	OPEN

APPENDIX B – Northwest Plume Groundwater System Valve Alignment Checklist (Continued)

SAND FILTERS (Online Mode)

VALVE	VALVE NAME	POSITION
HV-032	Sand Filter Skid Air Supply Valve	OPEN
HV-087	Sand Filter Skid Influent Valve	OPEN
HV-088	Sand Filter Skid Bypass Valve	CLOSED
HV-137	Sand Filter Skid Effluent Valve	OPEN
GHV-001	Sand Filter G-001 Influent Valve	OPEN
GHV-002	Sand Filter G-002 Influent Valve	OPEN
GHV-008	Sand Filter G-001 Vent Valve	CLOSED
GHV-009	Sand Filter G-002 Vent Valve	CLOSED
GHV-010	Sand Filter G-001 Drain Valve	CLOSED
GHV-011	Sand Filter G-002 Drain Valve	CLOSED
GHV-012	Sand Filter G-002 Upper Pressure Valve	OPEN
GHV-013	Sand Filter G-002 Lower Pressure Valve	OPEN
GHV-014	Sand Filter G-001 Upper Pressure Valve	OPEN
GHV-015	Sand Filter G-001 Lower Pressure Valve	OPEN
GHV-020	Sand Filter G-002 Effluent Valve	OPEN
GHV-021	Sand Filter G-001 Effluent Valve	OPEN
GHV-022	Sand Filter Skid Instrument Supply Valve	OPEN

SAND FILTERS (Bypass Mode)

VALVE	VALVE NAME	POSITION
HV-032	Sand Filter Skid Air Supply Valve	OPEN
HV-087	Sand Filter Skid Influent Valve	CLOSED
HV-088	Sand Filter Skid Bypass Valve	OPEN
HV-137	Sand Filter Skid Effluent Valve	CLOSED
GHV-001	Sand Filter G-001 Influent Valve	OPEN
GHV-002	Sand Filter G-002 Influent Valve	OPEN
GHV-008	Sand Filter G-001 Vent Valve	CLOSED

APPENDIX B – Northwest Plume Groundwater System Valve Alignment Checklist (Continued)

SAND FILTERS (Bypass Mode Continued)

VALVE	VALVE NAME	POSITION
GHV-009	Sand Filter G-002 Vent Valve	CLOSED
GHV-010	Sand Filter G-001 Drain Valve	CLOSED
GHV-011	Sand Filter G-002 Drain Valve	CLOSED
GHV-012	Sand Filter G-002 Upper Pressure Valve	OPEN
GHV-013	Sand Filter G-002 Lower Pressure Valve	OPEN
GHV-014	Sand Filter G-001 Upper Pressure Valve	OPEN
GHV-015	Sand Filter G-001 Lower Pressure Valve	OPEN
GHV-020	Sand Filter G-002 Effluent Valve	OPEN
GHV-021	Sand Filter G-001 Effluent Valve	OPEN
GHV-022	Sand Filter Skid Instrument Supply Valve	OPEN

AIR STRIPPER

VALVE	VALVE NAME	POSITION
HV-043	Air Stripper Skid Bypass Valve	CLOSED
HV-044	Air Stripper Skid Influent Valve	OPEN
HV-142	Air Stripper Effluent Control Valve Air Supply Valve	OPEN
AHV-001	Air Stripper Influent Water Valve	OPEN
AHV-002	Air Stripper Influent Sample Supply Valve	CLOSED
AHV-006	Air Stripper Sump Drain Valve	CLOSED
AHV-007	Air Stripper Pump Suction Valve	OPEN
AHV-008	Air Stripper Effluent Pressure Gauge Valve	OPEN
AHV-010	Air Stripper Pump Discharge Valve	OPEN
AHV-013	Air Stripper Air Inlet Butterfly Valve	OPEN
AHV-014	Air Stripper Effluent Sample Valve	CLOSED
AHV-015	Air Stripper Effluent Sample Valve	CLOSED
AHV-016	Air Stripper Control Valve Discharge Valve	OPEN

APPENDIX B – Northwest Plume Groundwater System Valve Alignment Checklist (Continued)

ION EXCHANGE VESSEL LEAD/LAG CONFIGURATIONS

VALVE ID	DESCRIPTION	VALVE POSITIONS (LEAD/LAG:LEAD/LAG)			
		A/B:C/D	A/B:D/C	B/A:C/D	B/A:D/C
PV-1	Vessels A/B Process Influent Block Valve	OPEN	OPEN	OPEN	OPEN
PV-2	Vessel A Primary Influent Block Valve	OPEN	OPEN	CLOSED	CLOSED
PV-3	Vessel B Primary Influent Block Valve	CLOSED	CLOSED	OPEN	OPEN
PV-4	Vessel A Primary Effluent Block Valve	OPEN	OPEN	OPEN	OPEN
PV-5	Vessel B Primary Effluent Block Valve	OPEN	OPEN	OPEN	OPEN
PV-6	Vessel A (Lag) Influent Block Valve	CLOSED	CLOSED	OPEN	OPEN
PV-7	Vessel B (Lag) Influent Block Valve	OPEN	OPEN	CLOSED	CLOSED
PV-8	Vessel A (Lead) Effluent Block Valve	OPEN	OPEN	CLOSED	CLOSED
PV-9	Vessel A (Lag) Effluent Block Valve	CLOSED	CLOSED	OPEN	OPEN
PV-10	Vessel B (Lag) Effluent Block Valve	OPEN	OPEN	CLOSED	CLOSED
PV-11	Vessel B (Lead) Effluent Block Valve	CLOSED	CLOSED	OPEN	OPEN
PV-12	Vessels C/D Process Influent Block Valve	OPEN	OPEN	OPEN	OPEN
PV-13	Vessel C Primary Influent Block Valve	OPEN	CLOSED	OPEN	CLOSED
PV-14	Vessel D Primary Influent Block Valve	CLOSED	OPEN	CLOSED	OPEN
PV-15	Vessel C Primary Effluent Block Valve	OPEN	OPEN	OPEN	OPEN
PV-16	Vessel D Primary Effluent Block Valve	OPEN	OPEN	OPEN	OPEN
PV-17	Vessel C (Lag) Influent Block Valve	CLOSED	OPEN	CLOSED	OPEN
PV-18	Vessel D (Lag) Influent Block Valve	OPEN	CLOSED	OPEN	CLOSED
PV-19	Vessel C (Lead) Effluent Block Valve	OPEN	CLOSED	OPEN	CLOSED
PV-20	Vessel C (Lag) Effluent Block Valve	CLOSED	OPEN	CLOSED	OPEN
PV-21	Vessel D (Lag) Effluent Block Valve	OPEN	CLOSED	OPEN	CLOSED
PV-22	Vessel D (Lead) Effluent Block Valve	CLOSED	OPEN	CLOSED	OPEN

APPENDIX B – Northwest Plume Groundwater System Valve Alignment Checklist (Continued)

ION EXCHANGE VESSEL LEAD/LAG CONFIGURATIONS (Continued)

VALVE ID	DESCRIPTION	VALVE POSITIONS (LEAD/LAG:LEAD/LAG)			
		A/B:C/D	A/B:D/C	B/A:C/D	B/A:D/C
PV-23	Ion Exchange System Effluent Block Valve	OPEN	OPEN	OPEN	OPEN
PV-24	Ion Exchange System Backwash Effluent Block Valve	CLOSED	CLOSED	CLOSED	CLOSED
PV-25	Vessels A/B Backwash Influent Block Valve	CLOSED	CLOSED	CLOSED	CLOSED
PV-26	Vessels C/D Backwash Influent Block Valve	CLOSED	CLOSED	CLOSED	CLOSED
PV-27	Main Air Supply Block Valve	OPEN	OPEN	OPEN	OPEN
PV-28	Auto Valve 1 (AV1) Air Supply Block Valve	CLOSED	CLOSED	CLOSED	CLOSED
PV-29	Auto Valve 2 (AV2) Air Supply Block Valve	CLOSED	CLOSED	CLOSED	CLOSED
PV-30	Auto Valve 3 (AV3) Air Supply Block Valve	CLOSED	CLOSED	CLOSED	CLOSED
PV-31	Auto Valve 4 (AV4) Air Supply Block Valve	CLOSED	CLOSED	CLOSED	CLOSED
PV-32	Main Air Supply Bleed Valve	CLOSED	CLOSED	CLOSED	CLOSED
PV-33	Main Air Supply Secondary Block Valve	OPEN	OPEN	OPEN	OPEN
HV-046	Ion Exchange Column System Bypass Valve	CLOSED	CLOSED	CLOSED	CLOSED
HV-051	Ion Exchange/Air Stripper Alternate Flow Valve	CLOSED	CLOSED	CLOSED	CLOSED
HV-055	Air Stripper Skid Effluent Valve	OPEN	OPEN	OPEN	OPEN
HV-074	Ion Exchange System Effluent Valve	OPEN	OPEN	OPEN	OPEN
HV-075	Ion Exchange System Influent Valve	OPEN	OPEN	OPEN	OPEN
	- Indicates Valve to be Open				
	- Indicates Valve to be Closed				

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

ION EXCHANGE SYSTEM ANCILLARY VALVE POSITIONS

VALVE ID	DESCRIPTION	VALVE POSITION
PIV-1	Ion Exchange System Influent Pressure Indicator (PI-1) Block Valve	OPEN
PIV-2	Vessel A Influent Pressure Indicator (PI-2) Block Valve	OPEN
PIV-3	Vessel A Effluent Pressure Indicator (PI-3) Block Valve	OPEN
PIV-4	Vessel B Influent Pressure Indicator (PI-4) Block Valve	OPEN
PIV-5	Vessel B Effluent Pressure Indicator (PI-5) Block Valve	OPEN
PIV-6	Vessel C Influent Pressure Indicator (PI-6) Block Valve	OPEN
PIV-7	Vessel C Effluent Pressure Indicator (PI-7) Block Valve	OPEN
PIV-8	Vessel D Influent Pressure Indicator (PI-8) Block Valve	OPEN
PIV-9	Vessel D Effluent Pressure Indicator (PI-9) Block Valve	OPEN
PIV-10	Ion Exchange System Effluent Pressure Indicator (PI-10) Block Valve	OPEN
PIV-11	Ion Exchange System Backwash Effluent Pressure Indicator (PI-11) Block Valve	OPEN
SP-1	Ion Exchange System Influent Sample Point (SP-1) Isolation Valve	CLOSED
SP-2	Vessel A Influent Sample Point (SP-2) Isolation Valve	CLOSED
SP-3	Vessel A Effluent Sample Point (SP-3) Isolation Valve	CLOSED
SP-4	Vessel B Influent Sample Point (SP-4) Isolation Valve	CLOSED
SP-5	Vessel B Effluent Sample Point (SP-5) Isolation Valve	CLOSED
SP-6	Vessel C Influent Sample Point (SP-6) Isolation Valve	CLOSED
SP-7	Vessel C Effluent Sample Point (SP-7) Isolation Valve	CLOSED

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

ION EXCHANGE SYSTEM ANCILLARY VALVE POSITIONS (Continued)

VALVE ID	DESCRIPTION	VALVE POSITION
SP-8	VesselD Influent Sample Point (SP-8) Isolation Valve	CLOSED
SP-9	VesselD Effluent Sample Point (SP-9) Isolation Valve	CLOSED
SP-10	Ion Exchange System Effluent Sample Point (SP-10) Isolation Valve	CLOSED
SP-11	Ion Exchange System Backwash Effluent Sample Point (SP-11) Isolation Valve	CLOSED
ABV-1	Vessel A Ambient Breather Valve	CLOSED
ABV-2	Vessel B Ambient Breather Valve	CLOSED
ABV-3	Vessel C Ambient Breather Valve	CLOSED
ABV-4	Vessel D Ambient Breather Valve	CLOSED
SLP-1	Vessel A Slurry Point Block Valve	CLOSED
SLP-2	Vessel B Slurry Point Block Valve	CLOSED
SLP-3	Vessel C Slurry Point Block Valve	CLOSED
SLP-4	Vessel D Slurry Point Block Valve	CLOSED
AAB-1	Vessel A Auto Air Bleed Isolation Valve	OPEN
AAB-2	Vessel B Auto Air Bleed Isolation Valve	OPEN
AAB-3	Vessel C Auto Air Bleed Isolation Valve	OPEN
AAB-4	Vessel D Auto Air Bleed Isolation Valve	OPEN
	- Indicates Valve to be Open	
	- Indicates Valve to be Closed	

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

ION EXCHANGE VESSEL BYPASS CONFIGURATIONS

VALVE ID	DESCRIPTION	Valve Position for Bypass (Identifies Vessel(s) to be Bypassed)								
		A	B	C	D	A&B	C&D	ALL		
PV-1	Vessels A/B Process Influent Block Valve	OPEN	OPEN				CLOSED		CLOSED	
PV-2	Vessel A Primary Influent Block Valve	CLOSED	OPEN				CLOSED		CLOSED	
PV-3	Vessel B Primary Influent Block Valve	OPEN	CLOSED				CLOSED		CLOSED	
PV-4	Vessel A Primary Effluent Block Valve	CLOSED	OPEN				CLOSED		CLOSED	
PV-5	Vessel B Primary Effluent Block Valve	OPEN	CLOSED				CLOSED		CLOSED	
PV-6	Vessel A (Lag) Influent Block Valve	CLOSED	CLOSED				CLOSED		CLOSED	
PV-7	Vessel B (Lag) Influent Block Valve	CLOSED	CLOSED				CLOSED		CLOSED	
PV-8	Vessel A (Lead) Effluent Block Valve	CLOSED	CLOSED				CLOSED		CLOSED	
PV-9	Vessel A (Lag) Effluent Block Valve	CLOSED	OPEN				CLOSED		CLOSED	
PV-10	Vessel B (Lag) Effluent Block Valve	OPEN	CLOSED				CLOSED		CLOSED	
PV-11	Vessel B (Lead) Effluent Block Valve	CLOSED	CLOSED				CLOSED		CLOSED	
PV-12	Vessels C/D Process Influent Block Valve			OPEN	OPEN				CLOSED	CLOSED
PV-13	Vessel C Primary Influent Block Valve			CLOSED	OPEN				CLOSED	CLOSED
PV-14	Vessel D Primary Influent Block Valve			OPEN	CLOSED				CLOSED	CLOSED
PV-15	Vessel C Primary Effluent Block Valve			CLOSED	OPEN				CLOSED	CLOSED
PV-16	Vessel D Primary Effluent Block Valve			OPEN	CLOSED				CLOSED	CLOSED
PV-17	Vessel C (Lag) Influent Block Valve			CLOSED	CLOSED				CLOSED	CLOSED
PV-18	Vessel D (Lag) Influent Block Valve			CLOSED	CLOSED				CLOSED	CLOSED

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

ION EXCHANGE VESSEL BYPASS CONFIGURATIONS (Continued)

VALVE ID	DESCRIPTION	Valve Position for Bypass (Identifies Vessel(s) to be Bypassed)						
		A	B	C	D	A&B	C&D	ALL
PV-19	Vessel C (Lead) Effluent Block Valve			CLOSED	CLOSED		CLOSED	CLOSED
PV-20	Vessel C (Lag) Effluent Block Valve			CLOSED	OPEN		CLOSED	CLOSED
PV-21	Vessel D (Lag) Effluent Block Valve			OPEN	CLOSED		CLOSED	CLOSED
PV-22	Vessel D (Lead) Effluent Block Valve			CLOSED	CLOSED		CLOSED	CLOSED
PV-23	Ion Exchange System Effluent Block Valve	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED
PV-24	Ion Exchange System Backwash Effluent Block Valve	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
PV-25	Vessels A/B Backwash Influent Block Valve	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
PV-26	Vessels C/D Backwash Influent Block Valve	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
HV-046	Ion Exchange Column System Bypass Valve	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	OPEN
HV-051	Ion Exchange/Air Stripper Alternate Flow Valve	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
HV-055	Air Stripper Skid Effluent Valve	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN
HV-074	Ion Exchange System Effluent Valve	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED
HV-075	Ion Exchange System Influent Valve	OPEN	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSED

	- Indicates Valve to Remain in Current Position
	- Indicates Valve to be Open
	- Indicates Valve to be Closed

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

ION EXCHANGE SYSTEM PARALLEL FLOW CONFIGURATIONS

VALVE ID	DESCRIPTION	Parallel Vessels		
		A&B	C&D	
PV-1	Vessels A/B Process Influent Block Valve	OPEN		
PV-2	Vessel A Primary Influent Block Valve	OPEN		
PV-3	Vessel B Primary Influent Block Valve	OPEN		
PV-4	Vessel A Primary Effluent Block Valve	OPEN		
PV-5	Vessel B Primary Effluent Block Valve	OPEN		
PV-6	Vessel A (Lag) Influent Block Valve	CLOSED		
PV-7	Vessel B (Lag) Influent Block Valve	CLOSED		
PV-8	Vessel A (Lead) Effluent Block Valve	CLOSED		
PV-9	Vessel A (Lag) Effluent Block Valve	OPEN		
PV-10	Vessel B (Lag) Effluent Block Valve	OPEN		
PV-11	Vessel B (Lead) Effluent Block Valve	CLOSED		
PV-12	Vessels C/D Process Influent Block Valve		OPEN	
PV-13	Vessel C Primary Influent Block Valve		OPEN	
PV-14	Vessel D Primary Influent Block Valve		OPEN	
PV-15	Vessel C Primary Effluent Block Valve		OPEN	
PV-16	Vessel D Primary Effluent Block Valve		OPEN	
PV-17	Vessel C (Lag) Influent Block Valve		CLOSED	
PV-20	Vessel C (Lag) Effluent Block Valve		OPEN	
PV-21	Vessel D (Lag) Effluent Block Valve		OPEN	
PV-22	Vessel D (Lead) Effluent Block Valve		CLOSED	
PV-23	Ion Exchange System Effluent Block Valve		OPEN	OPEN
PV-24	Ion Exchange System Backwash Effluent Block Valve		CLOSED	CLOSED
PV-25	Vessels A/B Backwash Influent Block Valve	CLOSED	CLOSED	

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

ION EXCHANGE SYSTEM PARALLEL FLOW CONFIGURATIONS (Continued)

VALVE ID	DESCRIPTION	Parallel Vessels	
		A&B	C&D
PV-26	Vessels C/D Backwash Influent Block Valve	CLOSED	CLOSED
PV-27	Main Air Supply Block Valve	OPEN	OPEN
PV-28	Auto Valve 1 (AV1) Air Supply Block Valve	CLOSED	CLOSED
PV-29	Auto Valve 2 (AV2) Air Supply Block Valve	CLOSED	CLOSED
PV-30	Auto Valve 3 (AV3) Air Supply Block Valve	CLOSED	CLOSED
PV-31	Auto Valve 4 (AV4) Air Supply Block Valve	CLOSED	CLOSED
PV-32	Main Air Supply Bleed Valve	CLOSED	CLOSED
PV-33	Main Air Supply Secondary Block Valve	OPEN	OPEN
HV-046	Ion Exchange Column System Bypass Valve	CLOSED	CLOSED
HV-051	Ion Exchange/Air Stripper Alternate Flow Valve	CLOSED	CLOSED
HV-055	Air Stripper Skid Effluent Valve	OPEN	OPEN
HV-074	Ion Exchange System Effluent Valve	OPEN	OPEN
HV-075	Ion Exchange System Influent Valve	OPEN	OPEN

	- Indicates Valve to Remain in Current Position
	- Indicates Valve to be Open
	- Indicates Valve to be Closed

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

CARBON COLUMNS AG-001 Lead and AG-002 Lag

VALVE	VALVE NAME	POSITION
CHV-001	Carbon Filter AG-001 Air Influent Valve	OPEN
CHV-002	Carbon Filter AG-001 Air Bypass Valve	CLOSED
CHV-003	Carbon Filter AG-001 Air Effluent Valve	OPEN
CHV-004	Carbon Filter Recirculation Valve	CLOSED
CHV-005	Carbon Filter AG-002 Air Effluent Valve	OPEN
CHV-006	Carbon Filter AG-002 Air Bypass Valve	CLOSED
CHV-007	Carbon Filter Exhaust Drain Valve	CLOSED
CHV-008	Carbon Filter AG-001 Sample Valve	CLOSED
CHV-009	Carbon Filter AG-002 Sample Valve	CLOSED
AG-010	Carbon Filter AG-002 Drain Valve	CLOSED
AG-011	Carbon Filter AG-001 Drain Valve	CLOSED

CARBON COLUMNS AG-002 Lead and AG-001 Lag

VALVE	VALVE NAME	POSITION
CHV-001	Carbon Filter AG-001 Air Influent Valve	CLOSED
CHV-002	Carbon Filter AG-001 Air Bypass Valve	OPEN
CHV-003	Carbon Filter AG-001 Air Effluent Valve	CLOSED
CHV-004	Carbon Filter Recirculation Valve	OPEN
CHV-005	Carbon Filter AG-002 Air Effluent Valve	CLOSED
CHV-006	Carbon Filter AG-002 Air Bypass Valve	OPEN
CHV-007	Carbon Filter Exhaust Drain Valve	CLOSED
CHV-008	Carbon Filter AG-001 Sample Valve	CLOSED
CHV-009	Carbon Filter AG-002 Sample Valve	CLOSED
AG-010	Carbon Filter AG-002 Drain Valve	CLOSED
AG-011	Carbon Filter AG-001 Drain Valve	CLOSED

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

CARBON COLUMNS BYPASSED

VALVE	VALVE NAME	POSITION
CHV-001	Carbon Filter AG-001 Air Influent Valve	CLOSED
CHV-002	Carbon Filter AG-001 Air Bypass Valve	OPEN
CHV-003	Carbon Filter AG-001 Air Effluent Valve	OPEN
CHV-004	Carbon Filter Recirculation Valve	CLOSED
CHV-005	Carbon Filter AG-002 Air Effluent Valve	CLOSED
CHV-006	Carbon Filter AG-002 Air Bypass Valve	OPEN
CHV-007	Carbon Filter Exhaust Drain Valve	CLOSED
CHV-008	Carbon Filter AG-001 Sample Valve	CLOSED
CHV-009	Carbon Filter AG-002 Sample Valve	CLOSED
AG-010	Carbon Filter AG-002 Drain Valve	CLOSED
AG-011	Carbon Filter AG-001 Drain Valve	CLOSED

CARBON COLUMNS PARALLEL

VALVE	VALVE NAME	POSITION
CHV-001	Carbon Filter AG-001 Air Influent Valve	OPEN
CHV-002	Carbon Filter AG-001 Air Bypass Valve	OPEN
CHV-003	Carbon Filter AG-001 Air Effluent Valve	CLOSED
CHV-004	Carbon Filter Recirculation Valve	CLOSED
CHV-005	Carbon Filter AG-002 Air Effluent Valve	½ OPEN
CHV-006	Carbon Filter AG-002 Air Bypass Valve	½ OPEN
CHV-007	Carbon Filter Exhaust Drain Valve	CLOSED
CHV-008	Carbon Filter AG-001 Sample Valve	CLOSED
CHV-009	Carbon Filter AG-002 Sample Valve	CLOSED
AG-010	Carbon Filter AG-002 Drain Valve	CLOSED
AG-011	Carbon Filter AG-001 Drain Valve	CLOSED

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

CARBON COLUMNS AG-002 Lead and AG-001 Bypassed

VALVE	VALVE NAME	POSITION
CHV-001	Carbon Filter AG-001 Air Influent Valve	CLOSED
CHV-002	Carbon Filter AG-001 Air Bypass Valve	OPEN
CHV-003	Carbon Filter AG-001 Air Effluent Valve	CLOSED
CHV-004	Carbon Filter Recirculation Valve	CLOSED
CHV-005	Carbon Filter AG-002 Air Effluent Valve	OPEN
CHV-006	Carbon Filter AG-002 Air Bypass Valve	CLOSED
CHV-007	Carbon Filter Exhaust Drain Valve	CLOSED
CHV-008	Carbon Filter AG-001 Sample Valve	CLOSED
CHV-009	Carbon Filter AG-002 Sample Valve	CLOSED
AG-010	Carbon Filter AG-002 Drain Valve	CLOSED
AG-011	Carbon Filter AG-001 Drain Valve	CLOSED

CARBON COLUMNS AG-002 Bypassed and AG-001 Lead

VALVE	VALVE NAME	POSITION
CHV-001	Carbon Filter AG-001 Air Influent Valve	OPEN
CHV-002	Carbon Filter AG-001 Air Bypass Valve	CLOSED
CHV-003	Carbon Filter AG-001 Air Effluent Valve	CLOSED
CHV-004	Carbon Filter Recirculation Valve	CLOSED
CHV-005	Carbon Filter AG-002 Air Effluent Valve	CLOSED
CHV-006	Carbon Filter AG-002 Air Bypass Valve	OPEN
CHV-007	Carbon Filter Exhaust Drain Valve	CLOSED
CHV-008	Carbon Filter AG-001 Sample Valve	CLOSED
CHV-009	Carbon Filter AG-002 Sample Valve	CLOSED
AG-010	Carbon Filter AG-002 Drain Valve	CLOSED
AG-011	Carbon Filter AG-001 Drain Valve	CLOSED

EFFLUENT DISCHARGE

VALVE	VALVE NAME	POSITION
HV-052	Plant Effluent Auto Sampler Inlet Valve	CLOSED
HV-053	On-Line Analyzer Influent Valve	¼ OPEN
HV-054	NWPGS Effluent Sample Valve No. 2	CLOSED
HV-143	NWPGS Effluent Discharge Control Valve Air Supply	OPEN
HV-171	NWPGS Effluent Sample Valve No. 1	CLOSED

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

BACKWASH SYSTEM

VALVE	VALVE NAME	POSITION
HV-056	Backwash/Sluice Tank Drain Valve	CLOSED
HV-057	Backwash/Sluice Pump Suction Valve	OPEN
HV-058	Backwash/Pump Discharge Pressure Gauge Valve	OPEN
HV-059	Backwash/Sluice Pump Recycle Valve	1/2 OPEN
HV-060	Backwash/Sluice Pump Discharge Valve	OPEN
HV-062	Iron Reactor Skid Backwash Influent Valve	CLOSED
HV-079	Ion Exchange Column Skid H-005 Influent Bypass Valve	CLOSED
HV-095	Effluent Backwash Water Header Valve	OPEN
HV-144	Backwash System Tank Influent Control Air Supply Valve	OPEN
HV-152	Sand Filter Skid Backwash Influent Valve	OPEN
HV-168	Backwash Water Sample Supply Valve	CLOSED
HV-169	Backwash Water Sample Valve	CLOSED

SETTLING TANK

VALVE	VALVE NAME	POSITION
HV-034	Settling Tank Supernatant Discharge Ctrl Air Supply Valve	OPEN
HV-099	Settling Tank Effluent Water Valve	OPEN
HV-123	Settling Tank Flush Valve	CLOSED
HV-174	Settling Tank Drain Valve	CLOSED

SLUDGE PUMP

VALVE	VALVE NAME	POSITION
HV-102	Sludge Pump Air Supply Valve	CLOSED
HV-105	Sludge Pump Air Pressure Control Valve	CLOSED
HV-124	Sludge Pump Discharge Valve	CLOSED
HV-127	Sludge Pump Air Pressure Control Valve	CLOSED
HV-155	Sludge Pump Discharge Pressure Gauge Valve	OPEN

APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

FILTER PRESS

VALVE	VALVE NAME	POSITION
HV-033	Filter Press Hydraulic Cylinder Air Supply Valve	CLOSED
HV-106	Filter Press Potable Water Valve	CLOSED
HV-108	Filter Press Compressed Air Supply Valve	CLOSED
HV-166	Filter Press Water Outlet Pipe Drain Valve	CLOSED
FPV-001	Filter Press Hydraulic Cylinder Pressure Control Valve	CLOSED
FPV-002	Filter Press Compressed Air Inlet Valve	CLOSED
FPV-003	Filter Press Left/Right Filtrate Discharge Isolation Valve	CLOSED
FPV-004	Filter Press Upper Left Filtrate Discharge Valve	CLOSED
FPV-005	Filter Press Upper Right Filtrate Discharge Valve	CLOSED
FPV-006	Filter Press Sludge Influent Valve	CLOSED
FPV-007	Filter Press Lower Right Filtrate Discharge Valve	CLOSED
FPV-008	Filter Press Lower Left Filtrate Discharge Valve	CLOSED
FPV-009	Filter Press Hydraulic Cylinder Control Valve	PORT A
PRV-G003	Filter Press Air Pressure Control Valve	CLOSED
HV-216	Filter Press Bypass Valve	CLOSED

TRUCK UNLOADING STATION

VALVE	VALVE NAME	POSITION
HV-098	Truck Unloading Pump Discharge Control Valve	CLOSED
HV-100	Truck Unloading Pump Suction Valve	CLOSED
HV-135	Truck Unloading Pump Pressure Gauge Valve	OPEN
HV-175	Truck Unloading Pump Discharge Sample Valve	CLOSED
HV-213	GPTS Influent Valve	CLOSED
HV-214	Truck Unloading Pump Effluent Valve	CLOSED
HV-212	GPTS Effluent Valve	CLOSED

CP4-ER-0008 FRev. 2A	TITLE: Startup and Normal Operations of the C-612 Northwest Plume Groundwater System Following Long Term Shutdown	Page 26 of 26
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APPENDIX B – NW Plume Groundwater System Valve Alignment Checklist (Continued)

RESIN DEWATERING SYSTEM

VALVE	VALVE NAME	POSITION
HV-039	Resin Dewatering Pump Discharge Pressure Gauge Valve	OPEN
HV-063	Resin Dewatering Tank Drain Valve	CLOSED
HV-064	Resin Dewatering Blower Suction Valve	CLOSED
HV-065	Resin Dewatering Pump Discharge Valve	CLOSED
HV-066	Resin Dewatering Pump Discharge Valve	CLOSED
HV-067	Resin Dewatering Pump Air Supply Valve	CLOSED
PRV-068	Resin Dewatering Pump Air Pressure Control Valve	CLOSED
HV-071	Resin Dewatering Pump Air Inlet Valve	CLOSED
HV-136	Resin Dewatering Pump Suction Drain Valve	CLOSED