

CP4-ER-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 1 of 11
DOCUMENT CATEGORY: <input type="checkbox"/> Administrative <input checked="" type="checkbox"/> Technical		
LEVEL OF USE: <input type="checkbox"/> Information Level <input checked="" type="checkbox"/> Reference Level <input type="checkbox"/> Continuous Use		
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	
NUCLEAR SAFETY REVIEW DOCUMENTATION: N/A per CP3-NS-2001, Step 6.1.1, B.	APPROVED BY/DATE (Signature on file): Bruce Ford –Environmental Remediation Manager 4/15/2021	
REQUIRED REVIEW DATE (or expiration date for temporary change): 3/21/2027	EFFECTIVE DATE: 4/19/2021	

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	11/13/2017
FR2	General Revision.	All	4/15/2021
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-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 2 of 11
---------------------------------------	--	---------------------

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 4

 4.1 Precautions 4

 4.2 Limitations 4

5.0 PREREQUISITES 4

6.0 INSTRUCTIONS..... 5

 6.1 Preparation Activities 5

 6.2 Normal Startup..... 5

 6.3 Post-Startup and Normal Operations 6

 6.4 On-Line Bag Filter Change Out 7

7.0 ACCEPTANCE CRITERIA 8

8.0 POST PERFORMANCE WORK ACTIVITIES..... 8

9.0 RECORDS..... 8

 9.1 Records Generated..... 8

 9.2 Records Disposition 8

APPENDIX A – ACRONYMS/DEFINITIONS..... 9

APPENDIX B – VALVE ALIGNMENT FOR EW-234, EW-235, C-765, AND C-765-A
NORTHEAST PLUME CONTAINMENT NORMAL SYSTEM OPERATIONS..... 10

CP4-ER-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 3 of 11
---------------------------------------	---	---------------------

1.0 PURPOSE AND SCOPE

1.1 Purpose

To define the required equipment and action steps necessary to startup (from a completely shut down condition) and put into a normal system alignment the Extraction Well(s) (EW) EW-234 and/or EW-235 with C-765 and/or C-765-A Northeast Plume Containment System (NEPCS).

1.2 Scope

Perform activities associated with the startup and normal operation of the EW NEPCS and the TU.

2.0 REFERENCES

2.1 Use References

- CP3-OP-0207, *Use of Procedures*
- CP3-SM-1101, *Work Package Development*
- CP4-ER-0017, *Northwest/Northeast Plume Daily Operational Data Collection And Maintenance*

2.2 Source References

- CP2-ER-0067, *Health and Safety Plan for the Paducah Plumes Operations and C-613 Sediment Basin Paducah, Kentucky*
- DOE/OR/07 1535, *Operations and Maintenance Plan for the Northeast Plume Groundwater System Interim Remedial Action Plan at PGDP Paducah, Kentucky*
- JHA-10844, *Maintenance, Operations, and Testing for the Northwest and Northeast Plume and Water Treatment Operations*
- *Operation and Maintenance Manual for the Air Stripper Water Treatment System, PROACT Services Corporation*
- *Operation and Maintenance Manual for the Remediation System at the Northeast Plume, Paducah Gaseous Diffusion Plant, Paducah, Kentucky, Sharp Technologies, January 1997*

3.0 COMMITMENTS

None

CP4-ER-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 4 of 11
---------------------------------------	--	---------------------

4.0 PRECAUTIONS AND LIMITATIONS

4.1 Precautions

- 4.1.1 Normal operations include C-765 and C-765-A Treatment Unit (TU) facilities **and** EW-234 and EW-235 EW facilities only. All reference to EW-234 and EW-235 will be as “EW” unless required to be specifically identified by number. All references to C-765 and C-765-A will be as “TU” unless required to be specifically identified by number.
- 4.1.2 Personnel shall be aware of the hazards associated with exposure to Trichloroethylene (TCE) and review safety data sheet.
- 4.1.3 Industrial Hygiene (IH) shall be contacted prior to work activity for monitoring requirements.
- 4.1.4 IH will perform periodic surveillance sampling of TCE using a photo ionization detector as the bag filters are replaced.
- 4.1.5 Cut resistant or leather gloves shall be worn for handling items with sharp edges or corners.
- 4.1.6 **If** more than incidental body contact with TCE contaminated liquid or carbon is expected, **then** single layer Tychem 5000 Apron and sleeves or Silver Shield Apron and sleeves are required.
- 4.1.7 Chemical Gloves: Supreno EC Microflex Nitrile or Showa 730 gloves must be worn when handling the saturated bag filters.
- 4.1.8 A face shield is required when the potential for a splash hazard is present.

4.2 Limitations

- 4.2.1 A sustained instrument response for TCE at or above the action limit of 5 ppm (breathing zone) requires a work pause with removal of personnel from the area and notification to the IH Supervisor and FLM.
- 4.2.2 The breakthrough time of Supreno EC Microflex Nitrile gloves is 2 hours for TCE. Supreno EC Microflex Nitrile gloves are **NOT** to be used for more than 2 hours after contact with TCE contaminated liquid.
- 4.2.3 The breakthrough time of Showa 730 gloves is 4 hours for TCE. Showa 730 gloves are **NOT** to be used for more than 4 hours after contact with TCE contaminated liquid.

5.0 PREREQUISITES

- 5.1 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 CP2-OP-0207, *Use of Procedures*.
- 5.2 Shutdown the NEPCS and notify the Pump and Treat Project Manager.

CP4-ER-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 5 of 11
---------------------------------------	---	---------------------

- 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*.

6.0 INSTRUCTIONS

NOTES:

Steps are performed sequentially unless otherwise noted.

6.1 Preparation Activities

Facility Manager

- 6.1.1 Set the flow rate settings for EW as determined by the Pump and Treat Project Manager.
- 6.1.2 Set the air stripper blower intake damper settings for the TU air stripper blower as determined by Pump and Treat Project Manager.

6.2 Normal Startup

Technician

- 6.2.1 If valve alignments were changed during the system shutdown, **then** refer to Appendix B, *Valve Alignment for EW-234, EW-235, C-765, and C-765-A Northeast Plume Containment Normal System Operations* for proper valve alignments, before proceeding with Step 6.2.2.

NOTE:

It is recommended to have at least one person at the EW and the TU to coordinate for startup operations.

- 6.2.2 Verify that the well pump sump pump is in "Auto" position on the touch screen panel and that the E-Stop button is pulled out at the pump Variable Frequency Drive (VFD) panel at the EW.
- 6.2.3 Verify the TU air compressor is plugged in and receiving power.
- 6.2.4 Ensure that the TU air compressor switch is in the ON position.
- 6.2.5 Verify the TU air compressor has a pressure reading on PT-310 on the touch screen panel at TU. (Typically 60 psi).
- 6.2.6 Verify by visual observation that air stripper blower intake/silencer is unobstructed.

CP4-ER-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 6 of 11
---------------------------------------	---	---------------------

- 6.2.7** Verify the air stripper blower intake damper is set appropriately according to the Pump and Treat Project Manager direction obtained in step **6.1.1**.

NOTE:

The E-stop reset will **NOT** reset if an E-stop button on the TU system is still pressed. All E-stops will need to be reset prior to the E-stop reset button being pushed.

- 6.2.8** If necessary, **then** press the amber E-stop reset button at the TU control panel.

- 6.2.9** Verify **and** reset (cancel) active alarms at the TU touch screen panel.

NOTES:

Alarms will **NOT** reset if the alarm condition still exists.

All alarm conditions should be cleared prior to operation of the treatment trailer.

- 6.2.10** Set the TU Air Stripper Pump to “Auto” using the selector switch at the TU control panel.

- 6.2.11** Set the TU Air Stripper Blower to “Auto” using the selector switch at the TU control panel.

NOTE:

The EW control panel will show a green “run-permissive” light next to the EW pump selector switch once all alarms reset and systems have been activated to allow the system to operate. The system is operating normally when pumps EW234, EW235, and P340 are operational, and no alarms occur after five minutes.

- 6.2.12** Set the TU Air Stripper Pump to “Auto-Level” using the TU control panel.

- 6.2.13** Set the TU EW Pump to “Auto-Flow” using the TU control panel.

- 6.2.14** Adjust EW flow rates set point as directed by the Pump and Treat Project Manager.

- 6.2.15** Inspect TU piping and system for leaks following startup.

6.3 Post-Startup and Normal Operations

Technician

- 6.3.1** Check to ensure that the TU control panel displays EW as running and that the PT320 indicator begins to increase in pressure.

- 6.3.2** Monitor the system until the air Stripper effluent pump P-340 activates and stabilizes at approximately 10 inches adjusted water column for C-765 or 12 inches adjusted water column for C-765-A to ensure proper system operation (LIT 340).

- 6.3.3** Record all operational activities in accordance with CP4-ER-0017, *Northwest/Northeast Plume Daily Operational Data Collection and Maintenance*.

CP4-ER-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 7 of 11
---------------------------------------	---	---------------------

6.4 On-Line Bag Filter Change Out

Technician

NOTES:

The TU control panel will automatically switch from one set of bag filters to the other parallel set when the pressure drop across the bag filter set reaches 15 psig.

A clean bag filter pressure drop should be approximately 2 psig.

- 6.4.1** If the system is running, **then** verify at the TU control panel the bag filter skid that is being changed is off-line and the parallel bag filter skid is on-line, if it is online, then contact the Pump and Treat Project Manager.

NOTE:

Valve sets A1 and A2 apply to bag set 1A and 1B and valve sets B1 and B2 apply to bag set 2A and 2B.

- 6.4.2** Use the TU touch screen panel to close the automated valve set (Either AV330A1 & AV330A2 or AV330B1 & AV330B2) that is going to be change.
- 6.4.3** Close the influent ball valve (BA330A or BA330B) on the bag filter housing that is going to be changed.
- 6.4.4** Connect one end of a drain hose to the bag filter housing drain valve (1" cam-lock fitting) for the bag filter that is being changed and place the other end in a drain vessel.

CAUTION:

Be prepared for a high pressure discharge out of the drain hose during the next step.

- 6.4.5** Slowly open the 1" drain valve.
- 6.4.6** Connect an air hose to the air chuck located on the respective filter housing (ABV1, ABV2, ABV3, or ABV4).

NOTE:

Refer to the operating manual for the Ingersoll Rand air compressor inside the PROACT operations and maintenance manual Appendix B.

- 6.4.7** Using the air compressor, supply 5-10 PSI air pressure (PT-310) to the respective bag filter housing to be purged.
- 6.4.8** Open the associated ball valve located just past/adjacent to the air chuck **and** allow the compressed air to blow out the filter housing.

NOTE:

It may be necessary to cycle this ball valve open and closed a few times to allow sufficient pressure to repeatedly build and remove as much water as possible from the filter bag housing.

- 6.4.9** Close the air chuck ball valve on the filter housing **and** allow any residual air pressure in the filter housing to bleed off.

CP4-ER-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 8 of 11
---------------------------------------	---	---------------------

6.4.10 Verify that the respective pressure gauge (PI3 & PI4, PI5 & PI6, PI7 & PI8, **or** PI9 & PI10 on C-765; PI2 & PI3, PI4 & PI5, PI6 & PI7, **or** PI8 & PI9 on C-765-A) reads “0” PSI, **and** then disconnect air supply line.

6.4.11 Unclamp the retaining ring for the bag filter housing lid.

CAUTION:

Industrial Safety/Hygiene and RADCON should be contacted for monitoring requirements during system breaches described in Step **6.4.13**.

6.4.12 Open lid **and** remove used bag filter and place in an appropriate waste container.

6.4.13 Place new bag filter in bag filter housing.

6.4.14 Replace **and** fasten the lid using retaining ring.

6.4.15 Close 1” drain valve opened in Step **6.4.6**.

6.4.16 Remove the drain hose from 1” cam-lock fitting on filter bag housing.

6.4.17 Reopen the influent ball valve (BA330A or BA330B) on the bag filter housing.

6.4.18 Repeat Steps **6.4.1**through **6.4.18** for the other bag filter(s) in the set requiring filter bag changes.

6.4.19 Use the TU control panel to set the automated valve set that was closed (Either AV330A1 & AV330A2 or AV330B1 & AV330B2) back to auto.

6.4.20 Use the TU control panel to reset the “filter dirty” status on the bag filter skid.

6.4.21 Record all operational activities in accordance with CP4-ER-0017, *Northwest/Northeast Plume Daily Operational Data Collection and Maintenance*.

7.0 ACCEPTANCE CRITERIA

None

8.0 POST PERFORMANCE WORK ACTIVITIES

Notify the Pump and Treat Project Manager of the time of system has been restarted.

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-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 9 of 11
---------------------------------------	---	---------------------

Appendix A – Acronyms/Definitions

ACRONYMS

EW – Extraction Well

IH – Industrial Hygiene

NEPCS – Northeast Plume Containment System

TCE – Trichloroethylene

TU – Treatment Unit

VFD – Variable Frequency Drive

DEFINITIONS

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, an Operator or Maintenance Mechanic.

Appendix B – Valve Alignment for EW-234, EW-235, C-765, and C-765-A Northeast Plume Containment Normal System Operations

VALVE	LOCATION/VALVE NAME	C-765	C-765-A
		POSITION	
BA-230	Extraction Well Pressure Gauge Isolation Valve	OPEN	OPEN
BV-240	Extraction Well Vault Sump Pump Isolation Valve	OPEN	OPEN
BV-280	Extraction Well Pump Flow Control Butterfly Valve	OPEN – Set as directed	OPEN – Set as directed
SP-234	Extraction Well 234 Discharge Line Sample Port Block Valve	CLOSED	
N/A	Extraction Well 234 Discharge Line Sample Port Needle Valve	CLOSED	
SP-235	Extraction Well 235 Discharge Line Sample Port Block Valve		CLOSED
N/A	Extraction Well 235 Discharge Line Sample Port Needle Valve		CLOSED
GA-270	C-614 Equalization Tank Transfer Line Isolation Valve	CLOSED	
GA-275	Extraction Well 234 Transfer Line Isolation Valve	OPEN	
BV-290	Treatment Unit Influent Line Flow Control Butterfly Valve	OPEN – Set as directed	OPEN – Set as directed
BV-300	Treatment Unit Influent Line Flow Control Butterfly Valve	OPEN – Set as Directed.	OPEN – Set as Directed.
SP-1	Treatment Unit Influent Line Sample Port Valve	CLOSED	CLOSED
PIV-320	Treatment Unit Influent Pressure (PT-320) Isolation Valve		OPEN
BA-300A	C-765 Temporary Feed Isolation Valve	CLOSED	
BA-330A	Bag Filter #1A and #1B Influent Valve	OPEN	OPEN
BA-330B	Bag Filter #2A and #2B Influent Valve	OPEN	OPEN
AV-330A1	Bag Filter Automatic Flow Control Inlet Valve (#1 Side)	AUTOMATIC (PLC)	AUTOMATIC (PLC)
AV-330B1	Bag Filter Automatic Flow Control Inlet Valve (#2 Side)	AUTOMATIC (PLC)	AUTOMATIC (PLC)
AV-330A2	Bag Filter Automatic Flow Control Effluent Valve (#1 Side)	AUTOMATIC (PLC)	AUTOMATIC (PLC)
AV-330B2	Bag Filter Automatic Flow Control Effluent Valve (#2 Side)	AUTOMATIC (PLC)	AUTOMATIC (PLC)
BV-330	Bag Filter Bypass Flow Control Valve	CLOSED or Set as directed	CLOSED or Set as directed
ABV-1 ABV-2 ABV-3 ABV-4	Bag Filter #1A Vent Valve Bag Filter #1B Vent Valve Bag Filter #2A Vent Valve Bag Filter #2B Vent Valve	CLOSED	CLOSED

CP4-ER-0005 FRev. 2A	TITLE: Startup and Normal Operation of the Northeast Plume Containment System	Page 11 of 11
---------------------------------------	---	----------------------

Appendix B – Valve Alignment for Normal EW-234 and C-765 Northeast Plume Containment System Operations (Continued)

VALVE	LOCATION/VALVE NAME	C-765	C-765-A
		POSITION	
Bag 1A-D Bag 1B-D Bag 2A-D Bag 2B-D	Bag Filter #1A Drain Valve Bag Filter #1B Drain Valve Bag Filter #2A Drain Valve Bag Filter #2B Drain Valve	CLOSED	CLOSED
SP-2	Air Stripper Influent Line Sample Valve	CLOSED	CLOSED
PIV-330	Bag Filter Effluent Pressure (PT-330) Isolation Valve		OPEN
BV-340	Air Stripper Influent Flow Control Valve	OPEN – Set as directed	OPEN – Set as directed
BV-341	Air Stripper Effluent Flow Control Valve	OPEN – Set as directed.	OPEN – Set as directed.
BV-360	Air Stripper Pump (P-340) Discharge Control Valve		OPEN
ASP-BLV	Post-Air Stripper Return Exit Valve	OPEN	OPEN
P-340-BLV	Post-Air Stripper Return Entrance Valve	½ OPEN or Set As Directed	½ OPEN or Set As Directed
SP-3	Air Stripper Effluent Line Sample Valve	CLOSED	CLOSED
PIV-360	Treatment Unit Effluent Pressure (PT-360) Isolation Valve		OPEN
BV-370	Treatment Unit Effluent Flow Control Valve	OPEN	OPEN
BA-370A	C-765 Temporary Discharge Isolation Valve	CLOSED	
BV-400	CERCLA Outfall Control Valve	OPEN	OPEN
N/A	Air Stripper Blower Damper	½ CLOSED or Set As Directed	½ CLOSED or Set As Directed
N/A	Air Stripper Drain Valve	CLOSED	CLOSED
N/A	Air Stripper/Level Transmitter (LIT-340) Isolation Valve		OPEN

AUXILIARY TREATMENT UNIT SYSTEMS

VALVE	LOCATION/VALVE NAME	C-765	C-765-A
		POSITION	
BA-310	Containment Sump Drain (Outside of TU)	CLOSED	CLOSED
N/A	Containment Sump Secondary Drain (Outside of TU)	CLOSED	
N/A	Containment Sump Pump Suction Block Valve (Outside of TU)	OPEN	OPEN
BA-311	Containment Sump Pump Discharge Block Valve (Inside TU)	OPEN	OPEN
N/A	Compressed Air Supply Valve	OPEN	OPEN
PIV-310	Compressed Air Supply Pressure (PT-310) Isolation Valve	OPEN	
N/A	Compressed Air Bleed Valve	CLOSED	