POST CLOSURE CARE PERMIT RENEWAL APPLICATION
REVISION 2

BONNELL ALUMINUM, INC.

25 BONNELL STREET
NEWNAN, GEORGIA 30263

PREPARED FOR:

BONNELL ALUMINUM, INC.
25 BONNELL STREET
NEWNAN, GEORGIA 30263

MARCH 29, 2024 (ORIGINAL SUBMITTAL)
REVISION 1 – NOVEMBER 15, 2024
REVISION 2 – MAY 16, 2025

PREPARED BY:

WSP USA INC.
1075 BIG SHANTY ROAD NW, SUITE 100
KENNESAW, GEORGIA 30144

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SECTION 1 CERTIFICATIONS

BONNELL CERTIFICATION

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

______________________________	May 16, 2025
W. Brook Hamilton	Date

President
Bonnell Aluminum Inc.

QUALIFIED GROUNDWATER SCIENTIST CERTIFICATION

I certify that I am a qualified groundwater scientist who has received a baccalaureate or postgraduate degree in the natural sciences or engineering and have sufficient training and experience in groundwater hydrology and related fields as demonstrated by state registration and completion of accredited university courses that enable me to make sound professional judgments regarding groundwater monitoring and contaminant fate and transport. I further certify that this report was prepared by me or by a subordinate working under my direction.

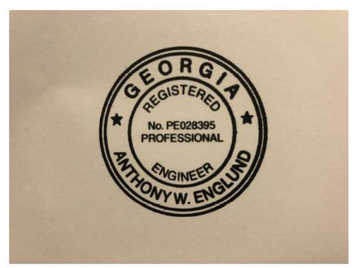
Anthony W. Englund

Digitally signed by Englund, Tony (USAE715237)
DN: cn=Englund, Tony (USAE715237), ou=Active, email=tony.englund@wsp.com
Reason: I have reviewed this document
Date: 2025.05.19 11:35:52 -04'00'

May 16, 2025

Anthony W. Englund, P.E.
Assistant Vice President, Project Management
WSP USA Inc.

Date



SECTION 2 INTRODUCTION

This permit application is for the third renewal of the Resource Conservation and Recovery Act (RCRA) Post Closure Care Permit HW-087(D). The Georgia Environmental Protection Division (EPD) issued the initial Post Closure Care Permit on September 28, 1992 (1992 PCC Permit) to The William L Bonnell Co., Inc., (Bon L) for the facility located at 25 Bonnell Street in Newnan, Coweta County, Georgia (the Site). The 1992 PCC Permit was issued for the closure and post-closure care of four Hazardous Waste Management Units (HWMUs): the Aluminum Hydroxide (AlOH) Land Treatment Unit, the Chromium Hydroxide (CrOH) Landfill, the CrOH Sand Drying Beds, and Surface Impoundment Unit.

In May 1997, Bon L submitted a Class 3 Permit Modification Request for the closure and post closure care of the Tank Farm Unit (TFU). EPD modified the 1992 PCC Permit in September 1997 to add the TFU as a HWMU.

In May 2003, an application was filed by Bon L Manufacturing Co. (the owner and operator company for the Newnan facility in 2003) to renew the 1992 PCC Permit. Subsequently, EPD renewed the 1992 PCC Permit on April 15, 2004 (2004 PCC Permit).

In 2009, Bon L submitted a Class 3 Permit Modification Request to remove a portion of the property (that was sold) located on the north side of the railroad adjacent to the plant from the 2004 PCC Permit. EPD modified the 2004 PCC Permit as requested (2009 PCC Permit).

In April 2012, EPD granted Bon L's request for a temporary authorization to conduct a pilot study of In-Situ Chemical Oxidation under the packing/loading area of the plant. In October 2012, Bon L submitted a Class 3 Permit Modification Request to extend the Temporary Authorization Request (TAR) for an additional 180 days. The TAR allowed Bon L to begin the In-Situ Chemical Oxidation process to remediate the groundwater under the packing/loading area of the facility.

In August 2013, Bon L submitted the third revision to the October 2012 Class 3 Permit Modification Request. This revision requested modifications to:

- streamline permit compliance by simplifying sampling, analytical protocol, and reporting requirements;
- expedite groundwater remediation on the property; and

- add an ongoing program of reagent injection to the existing pump-and-treat method of groundwater remediation to reduce or eliminate regions of VOC contamination.

EPD modified the 2009 PCC Permit in December 2013 (2013 PCC Permit).

In October 2013, an application was filed by Bon L Manufacturing Co. (formerly The William L. Bonnel Co., Inc.) to renew the 2004 PCC Permit. Following two revisions to the October 2013 permit application (the second revision submitted in August 2014), EPD renewed the 2004 PCC Permit on September 29, 2014 (2014 PCC Permit).

In May 2018, Bon L submitted a Class 3 Permit Modification Request to EPD. This revision requested the following modifications:

- Modify permit condition III.C.1 to incorporate the remedial goal options (RGOs) as groundwater protection standards (GWPS) contained in the EPD-approved March 11, 2016 (Revised June 30, 2016) Groundwater Risk Assessment.
- Revise the groundwater monitoring program based upon legacy source of impacts.
- Abandon RW1 and select maintenance only monitoring wells.
- Shut down the bioventing system in the TFU.
- Modify permit condition III.C.5 to incorporate the October 20, 2017 Request for Temporary Authorization and updated SWMU 49 Corrective Action Plan.

Following September 2018 and December 2018 revisions to the May 2018 application, EPD modified the 2014 PCC Permit as requested on April 19, 2019 (2019 PCC Permit). Unless otherwise noted, all references in this Renewal Application to the RCRA Post Closure Care Permit HW-087(D) are to the 2019 PCC Permit.

This document provides the requisite Part A and Part B applications for continued post-closure care of the HWMUs. The Part B information requirements listed in 40 CFR 270.28 for post-closure care of HWMUs are included in this application. The applicable sections referenced in 40 CFR 270.28 are 40 CFR 270.14(b) (1), (4), (5), (6), (11), (13), (14), (16), (18), and (19) and 40 CFR 270.14(c) and (d).

Bonnell Aluminum, Inc. (Bonnell) (formerly known as The William L Bonnell Co., Inc., and Bon L Manufacturing, Co.) is submitting this application to obtain a renewal of the Permit expiring on September 28, 2024, with some minor modifications. Bonnell is not requesting the use of any new hazardous waste treatment, storage, or disposal units. The requested changes summarized below are based on the Permit as modified in September 2018:

1. SWMU 49 Corrective Action Plan (Section 7.3.3.3 and Appendix 7-D): Revise the monitoring frequency for the Zone 2 effectiveness wells associated with the Zone 2 corrective action. The Zone 2 remedial approach was initiated in April 2018 and semi-annual sampling of the Zone 2 effectiveness wells (4 of the 9 Zone 2 effectiveness wells are sampled semi-annually while 5 of these 9 wells are sampled annually) has been conducted since that time. Six years of data has been collected from these Zone 2 wells providing evidence of positive impacts to groundwater in Zone 2. A change to annual sampling for these wells is reasonable.

2. Facility name change (Part A Application – page 1). This change is proposed to reflect Bonnell’s current legal name.

3. TFU Bioventing System (Section 7.3.2.3): Request permanent shut down and decommissioning of the TFU bioventing system.

4. Move to annual reporting from semi-annual reporting (Section 8.9 and Section 9.9).

Since the submittal of the October 2013 PCC Permit Renewal Application, Bonnell has obtained the following new information for the Site:

1. Additional injection wells have been installed as discussed in Section 7.1.1.1 as allowed by Bonnell’s UIC Permit (Permit Number R-548).

2. In-Situ Chemical Oxidation (ISCO) has continued in the packing/loading area. Preliminary results indicate ISCO is decreasing the PCE concentrations. The most recent ISCO injection was conducted in January 2020. ISCO is further discussed in Section 8.2.2.3.

3. In accordance with the 2019 PCC Permit, RW-1 was abandoned as discussed in Section 7.1.1.1.

SECTION 3 PART A APPLICATION

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
ENVIRONMENTAL PROTECTION DIVISION

Jeffrey W. Cown, Director

Land Protection Branch
2 Martin Luther King, Jr. Drive
Suite 1054, East Tower
Atlanta, Georgia 30334
404-657-8600

HAZARDOUS WASTE PERMIT PART A FORM

EPA ID Number G A D 0 0 3 2 7 3 2 2 4

1. Facility Name

Bonnell Aluminum, Inc.

2. Reason for Submittal

- ○ First-Time Applicant
- ○ Modification (Check one)
  - ☐ Class 1 not requiring approval
  - ☐ Class 1 requiring approval
  - ☐ Class 2
  - ☐ Class 3
- ● Renewal

3. Facility Existence Date (mm/dd/yyyy)

12/01/1955

4. Facility Status (Check all that apply)

- ☐ Operating TSD
- ☑ Post-Closure
- ☐ HSWA Corrective Action

5. Facility Location Address

Street Address 25 Bonnell Street			
City Newnan	**County** Coweta	**State** GA	**Zip Code** 30263
Latitude 32° 22' 49" N		**Longitude** 84° 49' 01" W	

Land Type: ● Private ○ Municipal ○ County ○ State ○ Federal ○ Other

6. Facility Mailing Address ☐ Same as Location Address

Street Address P.O. Box 428		
City Newnan	**State** GA	**Zip Code** 30264

7. Facility Permit Contact

Full Name Janette Courtney	**Title** Division Environmental, Health and Safety Director	
Phone 770-254-7665	**Fax** 678-854-7665	**Email** janette.courtney@bonnellaluminum.com

8. Facility Permit Contact Mailing Address ☐ Same as Location Address

Street Address 25 Bonnell Street		
City Newnan	**State** GA	**Zip Code** 30263

9. Legal Owner and Operator of the Facility

Does the Facility have multiple owners and/or operators? If yes, please use Attachment 1. ○ Yes ● No

A. Name of Facility's Legal Owner ☑ Same as Location Address

Full Name: Bonnell Aluminum, Inc.		Date Became Owner: 12/01/1955
Are there any previous owners of this Facility? If yes, please list in an attachment. ○ Yes ● No		
Owner Type: ● Private ○ Municipal ○ County ○ State ○ Federal ○ Other		
Street Address: 25 Bonnell Street		
City: Newnan		
State: GA	Country: Coweta	Zip Code: 30263
Phone: 770-253-2020	Fax:	Email: janette.courtney@bonnellaluminum.com

B. Name of Facility's Legal Operator ☐ Same as Facility's Legal Owner

Full Name: Bonnell Aluminum, Inc.		Date Became Operator: 12/01/1955
Are there any previous operators of this Facility? If yes, please list in an attachment. ○ Yes ● No		
Operator Type: ● Private ○ Municipal ○ County ○ State ○ Federal ○ Other		
Street Address: 25 Bonnell Street		
City: Newnan		
State: GA	Country: Coweta	Zip Code: 30263
Phone: 770-253-2020	Fax:	Email: janette.courtney@bonnellaluminum.com

10. North American Industry Classification System (NAICS) Code(s) for the Facility (at least 5-digit codes)

A. (Primary) 331318	C.
B.	D.

11. Nature of Business

Production and finishing of aluminum extrusions. Some extrusions are subjected to chemical conversion coating prior to painting. Others are anodized by dipping into caustic and sulfuric acid baths. Secondary smelting of scrap aluminum (casting).

12. Other Environmental Permits

A. Permit Type	B. Permit Number	C. Description
U	GAW000548	Underground Injection Control
S	GAR050000	Stormwater General Permit
S	335407700 1 0V040	Air Permit (Title V)
S	NU-002	Industrial Use Wastewater Discharge Permit

13. Process Information

Line No.		A. Process Code			B. Process Design Capacity (1) Amount	B. Process Design Capacity (2) Unit of Measure	C. Process Total Number of Units	D. Unit Name
0	1	D	8	0	26	A	2	Surface Impoundment Closure Area
0	2	D	8	0	1.4	A	1	Chromium Hydroxide Landfill
0	3	D	8	1	38.5	A	1	Aluminum Hydroxide Land Treatment Unit
0	4	D	8	0	1.1	A	1	Tank Farm Unit

14. Description of Hazardous Wastes

Line No.		A. EPA Hazardous Waste Code				B. Estimated Annual Qty of Waste	C. Unit of Measure	D. Processes (1) Process Codes	D. Processes (2) Process Description (if code is not entered in 14.D1)
0	1	D	0	0	1	0.90	T		Waste Solvent Rags
0	2	D	0	0	1	3.10	T		Waste Paint
0	3	D	0	0	1	0.24	T		Paint Water
0	4	D	0	0	1	43.91	T		Waste Line Flush

15. Clean Closed Hazardous Waste Management Units (Do not include current Post-Closure Units)

Unit Name	Dates of Operation			Date of Clean Closure Certification, if applicable	Date of Clean Closure Equivalency Demonstration, if applicable
		to			
		to			
		to			
		to			

16. Map

Attach to this application a topographical map, or other equivalent map, of the area extending to at least one mile beyond property boundaries. The map must show the outline of the entire facility, the location of each of its existing intake and discharge structures, each of its hazardous waste treatment, storage, or disposal facilities, and each well where it injects fluids under- ground. Include all springs, rivers, and other surface water bodies in this map area. Include drinking water wells listed in public records or otherwise known to the applicant within ¼ mile of the facility property boundary. USGS 7.5-minute series topographic or orthophotographic maps are available for all areas of the state.

17. Facility Drawing

All existing facilities must include a scale drawing of the facility showing the location of all past, present, and proposed treatment, storage, and disposal areas, including but not limited to solid waste management units and areas of concern.

18. Photographs

All existing facilities must include dated photographs (aerial or ground-level) that clearly delineate all existing structures; existing storage, treatment, and disposal areas; and sites of future storage, treatment, or disposal areas. Use the process codes listed in item 14 to indicate the location of all storage, treatment, and disposal areas.

19. List of Affected Governments

Full Name Coweta County Board of Commissioners	**Title** Commission Chairman, Mr. John Reidelbach	
Street Address 22 East Broad Street		
City Newnan	**State** GA	**Zip Code** 30263

Full Name City of Newnan	**Title** City Manager, Mr. Cleatus Phillips	
Street Address 25 LaGrange Street		
City Newnan	**State** GA	**Zip Code** 30263

Full Name Newnan Fire Department	**Title** Fire Chief, Chief Stephen Brown	
Street Address 23 Jefferson Street		
City Newnan	**State** GA	**Zip Code** 30263

Full Name Official Organ	**Title** Newnan Times Herald	
Street Address 16 Jefferson Street		
City Newnan	**State** GA	**Zip Code** 30263

Full Name	**Title**	
Street Address		
City	**State**	**Zip Code**

Full Name	**Title**	
Street Address		
City	**State**	**Zip Code**

20. Comments (include item number for each comment)

Item # 16 - Figure 3-1 and Figure 3-2
Item # 17 - Figure 3-3
Item # 18 - Figure 3-4

21. Certification I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment for knowing violations. **Note: For the RCRA Hazardous Waste Part A permit Application, all owners and operators must sign (see 40CFR 270.10(b) and 270.11)**.

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy) 03/19/2024
Printed Name (First, Middle Initial, Last) Brook Hamilton	Title President, Bonnell Aluminum, Inc.

Signature of legal owner, operator or authorized representative	Date (mm/dd/yyyy)
Printed Name (First, Middle Initial, Last)	Title

SECTION 4 SITE HISTORY

4.1 GENERAL FACILITY DESCRIPTION 270.14(B)(1)

Bonnell Aluminum, Inc. (Bonnell) owns and operates a facility in Newnan, Coweta County, Georgia, for the production of aluminum extrusions. This facility is commonly referred to as the Newnan plant. The political jurisdiction (270.14(b)(11)(i)) includes the city of Newnan in Coweta County, Georgia.

The facility's address is:

Bonnell Aluminum, Inc.
25 Bonnell Street
Coweta County
Newnan, Georgia 30263

The mailing address is:

Bonnell Aluminum, Inc.
P.O. Box 428
Newnan, Georgia 30263

The facility is located on an approximately 37-acre parcel in Coweta County that includes a 363,066-square-foot production building along with several canopies and auxiliary buildings, including maintenance, warehousing, and wastewater treatment. The facility also includes an aluminum hydroxide land treatment unit, a hazardous waste management area, and a chromium hydroxide landfill. An additional parcel has been leased to the AAA Cooper Truck Shop. Bonnell Aluminum owns a 13.44-acre parcel to the south, across West Washington Street, which is undeveloped. On-site buildings were constructed circa 1950 and upgraded circa 1970, when Bonnell Aluminum manufacturing operations began at the site.

Operations at the Newnan plant include the production and finishing of aluminum extrusions. Aluminum ingots and scrap aluminum are melted and cast into long aluminum logs, ranging in diameter from six to nine inches. These logs are cut into sections approximately 30 inches long called billets. Billets are heated and forced by hydraulic presses through steel dies to form the desired shapes.

The Newnan plant has the capability to finish aluminum extrusions in a number of ways. Some extrusions are anodized. This involves dipping the metal into chemical baths including sodium hydroxide, sulfuric acid, and other chemicals. These chemicals, along with an electrical current that is passed through the aluminum, cause the surface finish of the metal to change. Anodizing can produce a wide variety of finishes ranging from a shiny silver-like or gold-like finish to satin black.

Chemicals in the anodizing solutions are listed in Table 4-1, Chemicals in Bonnell Aluminum, Inc. Processes. Process waters generated from process tanks during operations of the anodizing line are treated on-Site in the facility’s process water treatment and recycling system.

Some aluminum extrusions are painted. A conversion coating must be applied to the aluminum for paint to adhere to the aluminum. If chromium is used for the conversion coating, the wastewater and wastewater treatment sludge generated from this conversion coating process is a listed hazardous waste (F019). In 2004, Bonnell discontinued using chromium and began using titanium. The titanium conversion coating system is a patented system with the trademark of E-CLPS. In a letter dated July 20, 2005, EPD agreed that the E-CLPS pre-treatment system that Bonnell uses does not produce the listed hazardous waste F019. The wastewater generated from the E-CLPS chemical conversion coating process wastewater is not a listed hazardous waste. Consequently, treating the wastewaters from this process does not produce a hazardous waste. Process waters discharged from the paint line are treated along with process waters from the anodizing line.

The process water treatment and recycling system includes physical-chemical precipitation, filters, ion exchange, carbon adsorption, and reverse osmosis (RO) (Figure 4-1, Reverse Osmosis Treatment System). Clean waters (permeate) discharged from the reverse osmosis units are reused by the plant as process waters. The brine waste stream is treated in an evaporator to reduce volume of water for disposal. The distillate from the evaporator is combined with the RO permeate to be recycled back to the plant (reuse water). The concentrated brine waste stream generated by the evaporator is disposed of off-Site as a non-hazardous waste. In the event that the facility cannot recycle all of the reuse water (permeate and distillate waters) into the processes, the reuse water can be discharged to the City of Newnan publicly owned treatment works in accordance with Industrial Use Wastewater Discharge Permit NU-002.

4.2 REGULATORY HISTORY

Bonnell petitioned the EPA for a delisting of its treatment of F019 wastewaters.

EPA granted a Temporary Delisting to Bonnell on November 14, 1986, for its "currently generated" F019 wastes. EPA specifically excluded the Surface Impoundment Unit from the delisting.

In October 1986, EPD was granted primacy for delisting of hazardous waste in Georgia. EPD contacted Bonnell and collected samples from the Surface Impoundment Unit. In 1989, Bonnell submitted a revision to its earlier delisting petition. However, analytical results from samples collected by both Bonnell and EPD indicated both PCE and chromium impacts in the groundwater. Bonnell subsequently withdrew its amendment to the delisting petition.
EPD and Bonnell signed a Consent Order in January 1991. The Consent Order required Bonnell to submit an application for the closure and post closure care of the CrOH Sand Drying Beds, the Surface Impoundment Unit (polishing and settling ponds), the CrOH Landfill, and the Aluminum Hydroxide Sand Drying Beds. Bonnell was also required to investigate the onsite groundwater conditions.

EPD issued the first PCC Permit on September 30, 1992. EPD modified the 1992 PCC Permit in September 1997 to add the TFU as a HWMU. EPD then renewed the PCC Permit on April 15, 2004. The Permit was again modified on August 21, 2009, to remove a portion of the property on the north side of the railroad adjacent to the plant that was subsequently sold.

In April 2012, EPD granted Bonnell a requested temporary authorization to conduct a pilot study of In-Situ Chemical Oxidation under the packing/loading area of the plant. In October 2012, Bonnell submitted a Class 3 Permit Modification Request to extend the Temporary Authorization Request (TAR) for an additional 180 days. The TAR allowed Bonnell to begin the In-Situ Chemical Oxidation process to remediate the groundwater under the packing/loading area of the facility.

In August 2013, Bonnell submitted the third revision to the October 2012 Class 3 Permit Modification Request. This revision requested modifications to:

- streamline permit compliance by simplifying sampling, analytical protocol, and reporting requirements;
- expedite groundwater remediation on the property; and
- add an ongoing program of reagent injection to the existing pump-and-treat method of groundwater remediation in order to reduce or eliminate regions of VOC impact.

Bonnell received the revised PCC Permit on December 27, 2013.

In June 2014 and August 2014, Bonnell submitted Revision 1 and Revision 2, respectively, of the October 16, 2013, PCC Permit Renewal Application. The revised PCC Permit was issued to Bonnell on September 29, 2014.

On March 11, 2016, Bonnell submitted a Groundwater Risk Assessment (Amec Foster Wheeler, 2016) which was later revised in accordance with EPD comments and resubmitted on June 30, 2016. The referenced document and the RGOs contained therein were approved by the EPD in a letter dated October 21, 2016.

On January 17, 2017, Bonnell submitted the RCRA/NPDES Compliance Strategy Report (Amec Foster Wheeler, 2017a) outlining the rationale for modifying the remedy at the site to improve corrective action effectiveness related to SWMU 49. EPD provided acceptance of the outlined strategy in a letter dated June 14, 2017.

On October 20, 2017, Bonnell submitted a Temporary Authorization request to EPD to begin implementation of the updated SWMU 49 CAP (Amec Foster Wheeler, 2017b). EPD approved the Temporary Authorization request in a letter dated November 29, 2017.

On September 14, 2018, Bonnell submitted a revision to the May 7, 2018, Class 3 Permit Modification Request. The modification request included incorporation of remedial goal options (RGOs) as groundwater protection standards (GWPS), allowance for the abandonment of RW1, allowance for the shutdown of the TFU bioventing system, modification of Permit condition III.C.5 to incorporate the 2017 Request for Temporary Authorization and the 2018 updated SWMU49 Corrective Action Plan, and the revision of the groundwater monitoring program based upon legacy source of impacts. The revised PCC Permit was issued to Bonnell on April 19, 2019, and is the current version of the PCC Permit.

4.3 REGULATED UNITS AND WASTE CHARACTERIZATION

4.3.1 Introduction

This section of the permit application presents the physical and chemical characteristics of the waste in each of the units that were closed as hazardous waste management units. Bonnell operated a wet paint line that used hexavalent chromium as the chemical conversion coating necessary to paint aluminum. That process generated F019 wastes (sludge) in the wastewater treatment system.

The land disposal restrictions (LDR) of 40 CFR 268 were not violated during the closure of the four regulated units discussed in Section 4.3.2. During closure, the waste in the units was not moved outside the lateral boundaries of the units. Closure of the surface impoundment unit did involve the use of equipment to dewater the sludge. The equipment was placed within the unit. The sludge was moved to and through the equipment and repositioned in the unit and was not moved outside the unit. Therefore, the LDR was not violated. See Section 4.4 for specifics of the closure plans.

Appendix 4-A and Appendix 4-B contain more detailed information concerning waste characterization.

4.3.2 Units and Wastes

In historical documents, varying names have been used to identify the four units discussed in this application. In this and future documents, the four units will be referred to as follows (including abbreviations):

- Aluminum Hydroxide Land Treatment Unit (AlOH LTU),
- Chromium Hydroxide Landfill (CrOH LF),
- Hazardous Waste Management Area (HWMA), and
- Tank Farm Unit (TFU).

These HWMUs are shown on Figure 4-2, Regulated Units. They are also shown on Figure 3-3, Topographic Map with HWMUs and SWMUs. The HWMA consists of what was formerly called the CrOH Sand Drying Beds and the Surface Impoundment Unit. The AlOH LTU, CrOH LF, and HWMA contain F019 listed waste. F001 (spent xylene) and F005 (spent toluene) listed wastes are contained within the TFU.

4.4 CLOSURE AND POST CLOSURE CARE

4.4.1 Closure / Post-Closure Plans

Closure and Post-Closure Care Plans for the CrOH LF, CrOH Sand Drying Beds, Surface Impoundment Unit, AlOH LTU, and TFU were presented in the 2003 Permit Application. As required by 270.14(b)(13), copies of each of these plans and closure certifications are presented in Appendix 4-C through 4-G of this Permit Application (provided on CD). Note that these are historical documents and any materials referenced in these plans refer to the 2003

Permit Application, not this document.

4.4.2 Financial Assurance

As specified in paragraph 391-3-11-.05 of the Rules of the Georgia Department of Natural Resources, Environmental Protection Division, and 40 CFR 270.14(b)(16) and (18), Bonnell has provided, through its parent company, Tredegar Corporation, a letter of Financial Assurance. This letter, dated April 5, 2022, and the Standby Letter of Credit are included in Appendix 4-H.

4.5 SOLID WASTE MANAGEMENT UNITS

4.5.1 SWMU Designation

This section provides information required by 40 CFR 270.14(d)(1), (2), and (3) on solid waste management units (SWMUs) at the Bonnell facility. Additionally, this section provides information on releases and sampling and analysis data regardless of whether or not the unit is designated as a SWMU. The SWMUs are shown on Figure 4-3, Solid Waste Management Units. The SWMUs are also shown on Figure 3-3, Topographic Map with HWMUs and SWMUs.

The following documents were used to designate a SWMU:

- SWMU Questionnaire submitted to EPD by William L. Bonnell Co., February 27, 1990;

- RCRA Facility Assessment Guidance, October 1986, USEPA, Office of Solid Waste;

- Interim Final RCRA Facility Investigation Guidance, May 1989, USEPA, Office of Solid Waste;

- Proposed Rule - Corrective Action for SWMUs at Hazardous Waste Management Facilities. Federal Register Vol. 55, No. 145, July 27, 1990; and

- RCRA Facility Assessment, William L Bonnell Co. Inc., September 30, 1991, by EPD.

4.5.2 Description of SWMUs

In accordance with 40 CFR 270.14(d)(1), the list of SWMUs, their descriptions, and waste materials that were (closed units) or still are (open units) managed at each SWMU are presented in Table 4-2, Solid Waste Management Units (SWMUs). SWMU #4 (the Surface Impoundment) is referenced in the RFA as two solid waste management units. However, the settling pond and polishing pond constitute only one SWMU, the Hazardous Waste Management Area (Surface Impoundment and CrOH Sand Drying Beds). SWMUs 1 through 55 were addressed in the 2013 Post Closure Care Permit Renewal Application.

4.5.3 Releases

Identification and information concerning historical releases (per 40 CFR 270.14(d)(2)) that are known to have occurred are presented in Table 4-3, Historical Releases. Releases that are known to have occurred since Bonnell submitted the 2014 PCC Permit Renewal Application are presented in Table 4-4, Summary of Releases from June 2014 to December 2023.

4.5.4 Sampling and Analysis Data

This section provides available sampling and analysis data per 40 CFR 270.14(d)(3) associated with SWMUs. Historical results are summarized in Appendix 4-I. Analytical reports for soil sampling that has been conducted since 2014 are included in Appendix 4-J for SWMU related sampling and Appendix 4-K for non-SWMU related sampling.

Non-SWMU related sampling since 2014 included the following.

1. In December 2022, soil samples were collected in the cast house area beneath the floor slab near the casting pit. Soil samples were analyzed for Total Petroleum Hydrocarbons Diesel Range Organics (TPH DRO) and polyaromatic hydrocarbons (PAHs). One sample of the 14 samples submitted to the laboratory indicated a TPH DRO concentration (687 mg/kg) above the reporting limit. This sample [SB8 (6’-8’)] was then analyzed for 1,4-dioxane and ethylene chloride. Both of these constituents were below the reporting limit (see Table 4-5).

4.5.5 SWMU Corrective Action Plan

Corrective action for the Solid Waste Management Units (excluding SWMUs 53, 54, and 55) was conducted in the mid 1990's. A SWMU Corrective Action Plan report was included as Volume 1B in the May 2003 Post Closure Care Permit Renewal Application and is included in Appendix 4-L. The SWMU Corrective Action Plan report summarizes the RCRA Facility Investigation and documents the actions taken with the SWMUs, as well as the data related to the actions. In addition, the May 2003 Feasibility Study and Corrective Action Plan for SWMU 49 is included in Appendix 4-M. A modification to the SWMU 49 CAP is described in Section 8.7 and included as Appendix 7-D.

Table 4-6, Solid Waste Management Units with Corrective Actions Completed, is a summary of completed corrective actions for each SWMU that required corrective action. Table 4-7, Solid Waste Management Units Requiring No Further Actions, lists SWMUs that required no further corrective action as of February 2024. Table 4-8, Solid Waste Management Units with On-Going Corrective Actions, lists SWMUs that have on-going corrective action as of February 2024.

SECTION 5 SITE HISTORY

5.1 TOPOGRAPHIC MAP

In accordance with 40 CFR 270.14(b)(19), a topographic map showing the Newnan plant and for an area extending 1000 feet around it is included as Figure 5-1, Topographic Map. Figure 5-1 is based on a USGS Digital Elevation Model from February 15, 2023. It also shows the flood and run-off control features.

Figure 5-2, Topographic Map with Sewers, shows the three types of sewers on Bonnell property (storm, sanitary and industrial).

In 2009, Bonnell sold a parcel of property located between Temple Avenue and the Central of Georgia Railroad. Figure 5-3, Site Plan Map, shows property boundaries and locations of active monitoring wells as of February 2024. These features are also shown on a topographic map on Figure 3-2.

Figure 5-4, Land Use Map, presents the current land use of the Bonnell property and nearby properties. Land uses are keyed to zoning restrictions.

Figure 5-5, Boundaries of Closed Hazardous Waste Management Units with Point of Compliance Wells, includes:

- property boundaries (for area depicted),
- fences and gates, and
- hazardous waste management units that are the subjects of this application and associated compliance point wells.

The relationship of groundwater flow direction, closed hazardous waste management units, and point of compliance monitoring wells are shown on figures in Section 6 and Section 7. Solid waste management units are discussed in Section 4.5. Additional information related to groundwater monitoring is shown in the topographic map on Figure 3-2 and other exhibits in Section 7 of this application.

Surveying associated with exhibits in this section and other portions of this application was conducted by surveyors licensed to practice in the State of Georgia.

A wind rose plot for the Bonnell facility is shown on Figure 5-6.

5.2 SEISMIC STANDARD

In accordance with 40 CFR 264.18(a) and 40 CFR 264 Appendix VI, this section is not applicable. The Site is an existing facility and is not within the jurisdiction to require this information. Included as Figure 5-7, Seismic Map of the United States, is a map of the seismic zones in the United States. As shown, the Site is located within a low risk zone for seismic activity.

5.3 FLOODPLAIN STANDARD

Minor portions of the property of the Newnan plant lie inside the 100-year floodplain. Figure 5-8, FEMA Floodplain Map, is the Federal Emergency Management Agency (FEMA) 100-year Floodplain Map. The most recent flood insurance rate map (Panel 139 of 430 for Coweta County) that is available on the FEMA website is dated February 6, 2013.

5.4 PROCEDURES TO PREVENT HAZARDS

5.4.1 Security

As required by 40 CFR 270.14 (b)(4) and 40 CFR 264.14, this section describes the security provisions for the Newnan Facility. A chain-link fence that is six feet high surrounds the closed units and all the facilities associated with manufacturing. Bonnell property south of West Washington Street and at the corner of West Washington Street and Henry Street are not enclosed with fencing. The fence has nine gates. All gates except the main gate are locked at all times. Security personnel attend the main gate 24 hours a day, seven days per week, and 52 weeks per year. The chain-link fence and manned entry serve as barriers to admission into the facility. All persons entering and leaving the plant are required to pass by the security office. Visitors are required to check in and out of the fenced area.

Bonnell maintains nine controlled entrances to the Newnan facility as follows:

1. a bulk chemical truck gate at the northeast corner of the property, which remains locked;

2. a truck entrance on the east side of the property north of the Security Office is attended at all times for access and does not open during

shift changes;

3. the employee/visitor door inside the Security Office, which remains locked and attended at all times for access and has a security camera;

4. a vehicle entrance on the east side of the plant and south of the Security Office is attended at all times for access;

5. a gate on Henry Street north of the Truck shop, which remains locked;

6. a gate on Henry Street for access to the Truck Shop, which remains locked allowing access by a keypad and has a security camera;

7. a gate on West Washington Street adjacent to the CrOH LF, which remains locked;

8. a gate on the west side of the property near the AlOH Land Treatment Unit, which remains locked; and

9. a gate straddling the railroad spur at the extreme northwest corner of the property, which remains locked.

As mentioned above, only the main plant gates in view of the security office are accessible using electronic gates remotely controlled by the security personnel. All other gates are padlocked at all times. Authorized persons desiring access to the property from any of the locked gates must sign out the key to that specific gate at the security office.

"No-Trespassing" signs are posted on the fence, at intervals ranging from 300 to 350 feet around the Bonnell facility. The signs are in English and are legible from 25 feet.

The chain-link fence, locked gates, and security guards control unauthorized entry to the Bonnell Facility. Based on the existing security system, no disturbance of the hazardous waste management units is likely. Post-closure care should not be adversely affected by breaches of Site security. Bonnell does not request a waiver of the requirements stated in Part 264.14(a)(1) and (2).

5.4.2 Inspection Schedule

Hazardous waste facilities are required by 40 CFR 270.14(b)(5) and 264.15(b) to be periodically inspected to ensure that no unplanned releases occur. Within the boundary of the main plant property, Bonnell has five closed hazardous waste management units. All of these units were closed in the time interval from 1992 to 1996. The units were closed by various means and capped to prevent infiltration of rainwater. The units also have groundwater monitoring associated with post closure care. Therefore, based on the closure program, the possibility of explosion is non-existent. The possibility of fire or unplanned release from the units is minimal.

Bonnell performs periodic inspections of the closed hazardous waste management units and associated equipment in accordance with the inspection and maintenance schedules presented in the Closure Plans (see Section 4.4). Inspectors look at the following:

- cover and surrounding area,
- seepage or surface discharges in surrounding areas,
- conditions of existing groundwater monitoring wells, and
- if adverse conditions are noticed, maintenance activities are initiated immediately.

Table 5-1 presents the schedule for the inspection of the items Bonnell is required to inspect on the Site.

5.4.3 Justification of Any Waiver

Pursuant to 40 CFR 270.14(b)(6), Bonnell is not requesting a waiver of the preparedness and prevention requirements under 40 CFR 264 Subpart C. However, the preparedness and prevention requirements are not presented in this document because this Part B application is not for an operational unit. These requirements do not apply to the post-closure care of closed units.

SECTION 6 GEOLOGY AND HYDROGEOLOGY

6.1 REGIONAL GEOLOGY

The Site lies within the Inner Piedmont section of the Southern Piedmont Physiographic Province of Georgia (McConnell and Abrams, 1984). The province is characterized by low rolling hills, narrow stream valleys, and a dendritic drainage pattern. The province is bounded on the northwest by the Northern Piedmont Province at the Brevard fault zone in northwestern Atlanta and on the southeast by the Atlantic Coastal Plain Province at the Fall Line in central Georgia.

The rocks of the Inner Piedmont consist primarily of gneiss and schists that have been metamorphosed to amphibolite or higher grade. The rocks of the Newnan area primarily belong to the Atlanta Group (McConnell and Abrams, 1984). The Atlanta Group contains several formations that consist of interlayered biotite-plagioclase gneiss, biotite-muscovite schist, granitic gneiss, amphibolite and quartzite with minor sillimanite schist, calc-silicate gneiss, and a banded iron formation.

The rocks have been folded into a large northeast-trending synformal structure with the axis of the fold trending from the Newnan area through the Tucker (Georgia) area. Atkins and Higgins (1980) identified this synform as the folded flank of a large nappe-like structure. They described a stratigraphic sequence with the rocks becoming younger and stratigraphically higher toward the axis of the synform. McConnell and Abrams (1984) believed the sequence was inverted based on the stratigraphic order of similar rocks north of the Brevard fault.

Atkins and Higgins (1980) identified five generations of folding in the Atlanta Group. These structures range from isoclinal, recumbent folds to gentle, upright folds. The large Newnan-Tucker synform was developed during the second generation of folding.

Concurrent with and following the major metamorphic and folding events, the rocks of the Atlanta Group were intruded by numerous granite and minor gabbro plutons. These include the Stone Mountain granite east of Atlanta.

Bedrock in the Piedmont Province is typically overlain by residual soils and partially weathered rock. These soils and partially weathered rock are the residual product of in-place physical and chemical weathering of the parent rock. The typical Piedmont subsurface soil profile consists of clayey and silty soils near the ground surface, where soil weathering is more advanced, underlain by sandy silts and silty sands that generally become harder or denser with depth. Much of the residual soil (often referred to as saprolite) retains the relic structure of the parent rock. The boundary between the soil and bedrock is not sharply defined. Partially weathered rock is a transition zone normally encountered between the residual soils and underlying rock. Weathering of the rock is facilitated by fractures and joints. The number and size of fractures usually diminish with increasing depth into rock. The presence of hard rock and partially weathered rock is quite irregular and erratic, even over short horizontal distances. Also, it is not uncommon to find lenses and boulders of hard rock and zones of partially weathered rock within the residual soil mantle, well above the general bedrock level.

6.2 REGIONAL HYDROGEOLOGY

Groundwater in the Piedmont Province is present in the residual soils a few feet to tens of feet below the land surface and within the underlying crystalline rock (Cressler et al., 1983). Groundwater usually occurs in pore spaces in the residual soils and in fractures and weathered zones within shallow rock. In deep, unweathered rock, the quantity of groundwater available depends on the number of fractures and the degree to which they are interconnected. Gneiss, schists, and amphibolites may have variable openings and yield small to moderate quantities of water. Zones of greater yield are often related to variations in lithology. Several wells in the region have yielded large quantities from fracture zones encountered beneath a thick layer of relatively dry, competent rock (Cressler, et al., 1983).

In the uppermost aquifer of this region, groundwater flow generally follows ground-surface topography but may be locally affected by bodies of surface water (creeks, lakes, rivers, and ponds), weathered zones, fractures, and joints. A diagram depicting the regional groundwater flow is included as Figure 6-1, Regional Flow Pattern. Groundwater flow in the deeper bedrock generally follows the regional flow pattern but locally follows fractures and joints in the rock. Groundwater recharge is from precipitation percolating downward through the residual soils, fractures in the rock, and exposed rock on ridges and highlands. Groundwater discharges locally into creeks, streams, lakes, and wells. Groundwater discharges regionally into rivers.

The Newnan area obtains drinking water from four surface water sources: White Oak Creek, Line Creek, Sandy Creek, and Brown Creek. The City of Newnan used four water supply wells for public drinking water until 1973. The wells are presently inactive. The wells range from 350 to 500 feet deep. The wells were installed into a bedrock (gneiss/schist) water-bearing unit and yielded 75 to 100 gallons per minute (gpm) each according to published information (Cressler, et al., 1983). According to Mr. Dennis McIntire, former Manager of Newnan Water and Light Authority (now Newnan Utilities), sustained pumping rates of only 20 to 30 gpm were achieved in these wells.

Groundwater from the fractured bedrock in the Newnan area is potentially used to supply drinking and irrigation water for some area businesses and residences. Some of the public schools, private residences, country clubs, churches, and private businesses in Newnan have water supply wells on record with the Georgia Geologic Survey (Cressler, et al., 1983). As of 1983, over 64 wells were on record. Four of these wells are recorded as inactive. It is not known how many of the other wells are currently active. The water supply wells on record within a one-mile radius of the Site are shown on Figure 6-2, Water Supply Well Location Map. Pertinent information (e.g., well depths, coordinates, date installed) about the wells shown on Figure 6-2 is provided in Table 6-1, Water Supply Wells Survey Information.

6.3 SITE GEOLOGY

The rock formations that underlie the Site, in descending order, are the Clarkston Formation, the Stonewall Formation, and the Wahoo Creek Formation of the Atlanta Group (McConnell and Abrams, 1984). The Clarkston Formation consists primarily of biotite-muscovite schist interlayered with hornblende-plagioclase amphibolite. The Stonewall Formation consists of interlayered fine-grained biotite gneiss, amphibolite, and biotite schist. The Wahoo Creek Formation contains medium-grained muscovite gneiss, amphibolite, mica schist, and calc-silicate gneiss. Based on the available literature, thicknesses of the formations are currently unknown and are probably quite variable in the vicinity of the Site.

Numerous soil borings, three exploratory rock core holes (1992), and numerous monitoring wells have been installed on or in the vicinity of the Site. Boring and construction data for the monitoring wells Bonnell is required to maintain are contained in Table 6-2, Well Construction and Survey Information. The table also includes construction data for recovery wells. The locations of these wells are shown on Figure 5-3, Site Plan Map. Appendix 6 contains well construction diagrams for the wells installed at the Site.

The borings drilled at the Site encountered fill soils, residual soil, and/or partially weathered rock from ground surface to depths ranging from about 10 to 75 feet below the ground surface. Near the ground surface, the residual soil typically consists of loose to firm, red-brown and tan, micaceous, silty fine to medium sands. The silty fine to medium sands extend from the ground surface to depths ranging from four to 15 feet below the ground surface. The red-brown sands encountered in the borings generally grade into a loose to very dense, brown, tan, and greenish-gray, micaceous, silty fine to coarse sand. These silty fine to coarse sands were encountered to depths of about 16 to 75 feet below the ground surface. The residual soils are underlain by partially weathered rock. The partially weathered rock is typically gray, tan, and white micaceous silty fine to medium sand with rock fragments. Partially weathered rock is defined as material having a Standard Penetration Test resistance great than 100 blows per foot. Rock underlies the partially weathered rock. For the purpose of this report, the contact between partially weathered rock and rock is defined as drill refusal.

Approximately 50 to 70 feet of rock was cored in each of three exploratory borings (C-1, C-2, and C-3) performed at the Site. C1 was cored to a depth of 74.60 feet. C2 was cored to a depth of 144.00 feet. C3 was cored to a depth of 125.00 feet. The three corings were closed.

The rock encountered in these borings consisted primarily of soft to hard, gray, black, and white garnet-quartz-plagioclase-biotite-muscovite gneiss. The rock generally had a well-defined foliation that dipped at a low to moderate angle from the horizontal. The rock was slightly to severely weathered and ranged from slightly to highly fractured. The fractures occurred primarily at low to moderate angles (from the horizontal) in the core.

Top of rock (drill refusal) elevations encountered in the Site borings are summarized in Table 6-3, Summary of Top of Bedrock Elevation Data. The top of rock surface at the Site generally follows the ground-surface topography in subdued relief and generally slopes toward the west and southwest. Apparent troughs in the top of rock surface are located near tributaries and valleys. A top of rock surface contour map based on drill refusal elevations is provided on Figure 6-3, Top of Bedrock Contour Map.

6.4 SITE HYDROGEOLOGY

Due to the hydraulic communication between the groundwater in the residual soils, partially weathered rock, and the weathered and fractured bedrock, the uppermost aquifer at the Site extends from the groundwater surface down to competent rock. Competent rock is defined as drill core yielding greater than 90 percent recovery and greater than 80 percent rock quality designation where severe weathering is not evident. The interrelationship of the various water-bearing units in the uppermost aquifer are shown on the hydrogeologic cross-sections. Figure 6-4, Hydrogeologic Cross Section Location Map, shows the location of three cross sections. Figure 6-5, Hydrogeologic Cross Sections A-A'-A", includes a cross section in the northeast to southwest direction. Figure 6-6, Hydrogeologic Cross Sections B-B' and C-C', includes a cross section in the northwest to southeast direction and a cross section in the west to east direction.

Groundwater occurs at the Site under unconfined (water table) conditions at depths ranging from about three to approximately 50 feet below the ground surface. The direction of groundwater flow at the Site is primarily toward the southwest. Figure 6-7, Potentiometric Surface Contour Map March 13-14, 2023, shows the estimated groundwater potentiometric surface elevation contours and inferred groundwater flow directions in the residual soils of the uppermost aquifer. Groundwater elevation data obtained from the Site monitoring wells in March 2023 is summarized in Table 6-4, Groundwater Elevation Data, March 13-14, 2023.

March 2023 hydraulic gradients were measured between well pairs MW73S/MW54S and MW53S/MWOS1S. The gradients were measured at 0.0242 feet per foot (ft/ft) and 0.0461 ft/ft, respectively. Both upward and downward vertical hydraulic gradients were observed in groundwater elevations measured in Site monitoring well clusters.

The estimated flow velocities at the Site were calculated using a modified Darcy's equation:

$V = Ki/ne$,

Where:

V = horizontal flow velocity,
K = hydraulic conductivity,
i = hydraulic gradient, and
ne = effective porosity.

From Table 6-5, Summary of Hydraulic Conductivity Data – Slug Test Method, the geometric mean of in-situ hydraulic conductivity tests (slug tests) for the residual soils (silty sands) at the Site is about 8.9×10^{-4} feet/minute. Using the range of measured hydraulic gradients and an estimated effective porosity for silty sands of about 0.25 (Fetter, 1988), the resulting groundwater flow velocities in the silty sands at the Site are estimated to range from about 45 to 86 feet/year. Bonnell conducted additional slug injection and removal testing as part of the 2006 pilot testing for in-situ chemical oxidation. Results were 1.5 to 3 feet per day, comparable to previous slug testing performed elsewhere on Site.

In-situ hydraulic conductivity tests (packer tests) were performed in the three rock boreholes to estimate the hydraulic conductivity of the rock. The pack tests were performed at six-foot intervals. Flow rates were determined by flow meters and pressures were determined by gauges.

From Table 6-6, Summary of Hydraulic Conductivity – Packer Test Method, hydraulic conductivity ranged from less than 2×10^{-7} to 1.6×10^{-3} feet/minute, with a geometric mean of about 8.83×10^{-6} feet/minute.

Average groundwater flow velocities are presented in the Semi-Annual Corrective Action Effectiveness and Groundwater Monitoring Reports. The flow velocity is calculated using Darcy's equation with the following inputs: average hydraulic conductivity on the Site of 3.77 feet per day and an effective porosity of 30 percent. The overall average hydraulic gradient for the Site during the March 2023 groundwater elevation measurements is 0.035 ft/ft. The resulting average groundwater flow velocity is approximately 161 feet per year.

6.5 TOPOGRAPHY

The topography across the Site (see Figure 5-1) slopes from the highest elevations on the northeast property boundary at the rail line and main road to the lower elevations on the southwest portion of the Site.

SECTION 7 GROUNDWATER AND SURFACE WATER EVALUATION

7.1 HISTORICAL GROUNDWATER MONITORING

7.1.1 Description of Monitoring Wells and Monitoring Programs

Hazardous constituents have been detected in groundwater in the uppermost aquifer underlying regulated units. However, the constituents detected are not always reasonably expected to be in or derived from waste contained in a regulated unit. Specifically:

- the source of metals is most likely associated with the AlOH LTU, CrOH LF, and HWMA (CrOH Sand Drying Beds and Surface Impoundment Unit), although lower concentrations of metals detected in groundwater can be associated with metals that occur naturally in the soil types found at the facility;

- the source of ethylbenzene, toluene, and xylenes is most likely associated with the TFU; and

- the historical and current delineations of the PCE plume demonstrate that the source of PCE, TCE, and PCE daughter products detected in point of compliance wells during Appendix IX sampling is most likely from SWMU 49.

Table 7-1, Abstract History of Groundwater Investigations, provides a brief history of the investigations (and associated reports) that have been conducted at the Site since 1990. Groundwater monitoring at the Site can be divided into four time periods. The first is the interim status monitoring that occurred from September 1989 until the RCRA Post-Closure Care Permit HW-087(D) was issued in September 1992 ("1992 PCC Permit"). Per 40 CFR 270.14(c)(1), a summary of the groundwater data collected from November 1990 through April 1992 is contained in Appendix 7-A. Details concerning the monitoring that occurred from 1989 through 1992 are presented in the 1992 PCC Permit Application.

The second time period is the groundwater monitoring conducted under the 1992 PCC Permit until the permit was reissued on April 15, 2004 ("2004 PCC Permit"). During this period an additional 13 monitoring wells (MW-48S, MW-49S, MW-50S, MW-51S, MW-52S, MW-53S, MW-54S, BR-1, BR-2, BR-3, BR-4, BR-5 and BR-6), 13 recovery wells, and 22 piezometers were installed. Table 7-1, Abstract History of Groundwater Investigations, contains more detailed information about activities that were conducted prior to the 2004

PCC Permit. The historical groundwater monitoring results (from 1990 through 2023) are presented in Appendix 7-A.

The third time period is groundwater monitoring that was conducted under the 2004 PCC Permit from April 2004 to May 2013.

The fourth time period is the period beginning in December 2013. This period is based on the 2014 PCC Permit and the 2019 modified PCC Permit. The activities conducted since the issuance of the 2014 PCC Permit are described further below.

Figure 7-1, Site Plan Map, shows the locations of the groundwater monitoring wells Bonnell is required to maintain as of the 2019 PCC Permit. Recovery wells and piezometers existing as of February 2024 are also shown on Figure 7-1, Site Plan Map. Per 40 CFR 270.14(c)(3), this figure also includes the HWMUs and the property boundary. Groundwater flow directions are shown on Figure 6-7, Potentiometric Surface Contour Map, March 13-14, 2023, which also includes the property boundary. Pertinent information (e.g., well depths, coordinates, date installed) about the wells is provided in Table 6-2, Well Construction and Survey Information.

7.1.1.1 Groundwater Monitoring During the 2014 PCC Permit Period

Since EPD issued the 2014 PCC Permit, 10 injection wells (IWs) and one monitoring well have been installed at the Site. These 10 injection wells were installed to expand the injection well network and to allow future ISCO injections to be more focused. The following six IWs were installed in January 2016:

IW43, IW44, IW45, IW46, IW47 and IW48.

Additionally, in January 2016, one monitoring well was installed to provide a well pair for MW83S:

MW83D

The following four IWs were installed in March 2017:

IW49, IW50, IW51 and IW52

Well construction diagrams are included in Appendix 6. Laboratory data reports are included in Appendix 7-B.

7.1.1.2 Groundwater Monitoring under the 2019 Post Closure Care Permit Modification

In September 2018, a revision to the May 2018 Class 3 Permit Modification Request (Modification Request), was submitted by Bonnell to the EPD. The September 2018 Permit modification is included in Appendix 7-C. This modification was approved and a new PCC Permit was issued in April 2019. The request included five modifications:

1. Modify Permit Condition III.C.1 to incorporate the Remedial Goal Options (RGOs) as Groundwater Protection Standards (GWPS) contained in the EPD-approved March 11, 2016 (Revised June 30, 2016) Groundwater Risk Assessment (Amec Foster Wheeler, 2016) into the Permit,

2. Revise the Groundwater Monitoring Program based upon legacy source of impacts,

3. Abandon RW1 and select Maintenance Only Monitoring Wells,

4. Shut down the Bioventing System in the TFU, and

5. Modify Permit Condition III.C.5 to incorporate the October 20, 2017 Request for Temporary Authorization and Updated SWMU 49 Corrective Action Plan (Amec Foster Wheeler, 2017) into the Permit.

Pertinent information is summarized below and has been incorporated into the Groundwater Monitoring Plan (Section 9). The 2018 Class 3 Permit Modification Request contains additional information concerning the basis for these modifications.

The 2019 PCC Permit specified that 81 wells be maintained. Table 7-2, Groundwater Monitoring Program Under 2019 PCC Permit, shows the constituents that are being analyzed at each well during the 2019 PCC Permit Period.

Table 7-3, 2019 Permit Tables I, II, III, and IV, presents the constituents to be monitored by unit. Table 7-4 presents the 2019 Permit monitoring well frequency and sampling constituents by well. Table 7-4 also includes the list of wells that are required only to be maintained without specified monitoring frequency or constituents. Bonnell proposes one change to the 2019 Permit Tables I, II, III, IV, and V (as shown in Table 7-3 and Table 7-4 of this permit application). For the upcoming 2025 Permit, Bonnell proposes to switch MW28D for MW28S in the groundwater monitoring program based on discussions with EPD. This change is reflected in Table 7-4, 2019 Permit Table V, Monitoring Well Sampling and Analysis, and is shown on Figure 9-1, Wells by Purpose and Frequency.

One recovery well (RW1) was abandoned since the 2014 Permit was issued. RW1 was abandoned in October 2019.

7.2 SAMPLING AND ANALYSIS PROCEDURES

Groundwater sampling is conducted in accordance with the 2019 PCC Permit.

Groundwater samples are collected on a semi-annual or annual basis as described in Table 7-4. Monitoring wells that are monitored for VOCs only are equipped with passive diffusion bag (PDB) samplers. Groundwater samples for VOCs are collected from the PDB without the need for purging the well. For monitoring wells that are monitored for metals and VOCs, the VOC samples are collected from the PDB prior to the collection of the metals samples which are collected using low-flow sampling techniques in accordance with the EPA Region IV Groundwater Sampling Procedure (LSASDPROC-301-R6). During the purging of the monitoring well, groundwater quality parameters including temperature, dissolved oxygen, conductivity, oxidation-reduction potential (ORP), turbidity and pH are also collected.

7.3 DESCRIPTION OF CONTAMINANTS AND CONTAMINANT PLUMES

From 1993 to 2013, Bonnell has sampled between 80 and 100 individual monitoring wells at least twice per year. From 2014 through 2023, approximately 58 individual monitoring wells are sampled during the spring monitoring event and approximately 43 individual monitoring wells are sampled during the fall monitoring event. During these time periods, three distinct categories of contaminants in groundwater have been observed from distinct sources: metals; toluene, ethylbenzene, and xylene; and PCE and PCE daughter products. However, the only significant groundwater contaminants consistently detected have been PCE and its degradation products as part of the PCE plume. A description of each contaminant category plume and its source(s) is included in this section.

7.3.1 Metals

7.3.1.1 Historical

Historical groundwater results are presented in Appendix 7-A. In 1993, a small chromium groundwater contamination plume centered around monitoring well MW2SR and a small chromium groundwater contamination plume centered around monitoring well MW4S extending to West Washington Street existed at the Site. As documented in the 2003 Permit Application, these two plumes have been remediated and have not existed since January 2000.

7.3.1.2 Current

The 2019 Permit requires analysis of chromium and nickel at four monitoring wells on an annual basis. In addition to the Permit-required analysis of chromium and nickel, Appendix IX sampling has been conducted annually since 2021. There have been no detections of chromium or nickel in the past three years (2021-2023). Appendix IX sampling has resulted in detections of three metals (arsenic, barium and zinc). Arsenic is being detected at MW52S while zinc is being detected at MW13S (background well). Barium has been detected in the Appendix IX wells (including the background well, MW13S) since 2021 (see Table 7-5, Recent Groundwater Metal Results), but is considered to be a naturally occurring background concentration due to its ubiquitous presence in the soils in the regions. Arsenic is monitored annually at MW52S where concentrations are below the GWPS of 50 µg/L. Zinc was detected in the background well only. As the detections and exceedances of metals in groundwater are minimal, there is no definable plume; thus, no figures are being presented for the metals results.

7.3.1.3 Corrective Action of Metals

As documented in the 2003 Permit Application, corrective action for the two chromium plumes was completed by remediation.

7.3.2 Toluene, Ethylbenzene, and Xylene Contamination

7.3.2.1 Historical

Non-chlorinated VOCs in the groundwater at the Site are associated with the TFU. Relatively small releases of petroleum constituents occurred over time. These releases have been contained and have been addressed through the use of the vadose zone bioremediation system and the groundwater collection and treatment system. The specific constituents include toluene, ethylbenzene, and xylenes (TEX), naphthalene, and 1,1-dichloroethane. TEX compounds have been detected since 1997. The first detections of naphthalene were in 1997, but it has not been detected since 2006. 1,1-DCA was first detected in 1999 in MW51S but has not been detected since 2006. The historical groundwater results are presented in Appendix 7-A. Since naphthalene and 1,1-DCA are no longer being detected in the TFU monitoring wells, monitoring of those constituents was not included in the 2019 Permit. The results from the last three years are summarized in Table 7-6, Recent Toluene, Ethylbenzene, and Total Xylenes Results.

7.3.2.2 Current

Toluene, ethylbenzene, and xylene concentrations from the March and September 2023 groundwater monitoring events are shown on Figure 7-2, Toluene, Ethylbenzene, and Xylenes Maximum Concentrations Detected in 2023. Low concentrations of toluene, ethylbenzene, or xylenes have been periodically detected in wells MW51S and MW52S, which are the compliance point wells for the TFU.

In September 2023, ethylbenzene, toluene and total xylenes were below detection limit (BDL) at both MW51S and MW52S. In March 2023, ethylbenzene was detected in MW51S at a concentration of 5.5 µg/L, only slightly above the GWPS of 2 µg/L. Toluene and total xylenes were BDL at MW51S. All TEX constituents were BDL at MW52S during the March 2023 monitoring event.

7.3.2.3 Effectiveness of Corrective Action

The 2003 Permit Renewal Application discussed the installation and operation of the bioremediation system to address soils located at the TFU. Except for brief power interruptions and minor maintenance, the bioventing system operated continuously from 1998 until it was formally shut down on May 10, 2019. The results of operation, as demonstrated by the soil sampling conducted in November 2015 and November 2019 and the continued groundwater monitoring at MW51S and MW52S, indicate the bioventing system has successfully decreased TEX soil concentrations in TFU soils below RSLs. These results indicate that the bioventing system has achieved its objective and further operations would not be beneficial. Bonnell requests approval to permanently shut down and decommission the bioventing system and to abandon the associated wells including the test wells, vent wells and shallow vapor points (see Figure 7-2B, Tank Farm Unit Wellfield Layout). The mechanical equipment associated with the bioventing system and the aboveground piping will be removed and disposed of properly. Subsurface piping will be closed in place by cutting and capping the piping at or just below ground surface. Monitoring wells MW51S and MW52S will remain in place for continued monitoring of the TFU area.

Time series graphs are presented in Figure 7-3A (Toluene vs. Time, MW51S & MW52S), Figure 7-3B (Ethylbenzene vs. Time, MW51S & MW52S) and Figure 7-3C (Total Xylenes vs. Time, MW51S & MW52S). These figures show the significant decrease in concentrations since the initiation of bioremediation activities in 1998. Current concentrations of TEX (September 2023) are below the approved perimeter GWPS demonstrating the success of the treatment system.

7.3.3 PCE Plume

7.3.3.1 Historical

The source of PCE, TCE, and associated daughter products detected in groundwater at Bonnell is from releases associated with the former degreasing operation (SWMU 49) that existed in the late 1950s. As of May 1992, the PCE plume (refer to Figure 7-4A, PCE Plume Map 1992) had migrated approximately 3,200 feet from the original release area. The PCE plume is contained by naturally occurring hydrologic boundaries.

The release of PCE occurred upgradient of the regulated units on Site. The later construction of the Polishing Pond modified the behavior of this release. The effect created a secondary plume, which existed in 1992 (refer to Figure 7-4A, PCE Plume Map 1992) near the southwest portion of the surface impoundment. Due to the presence of PCE in the F019 sludge in the surface impoundment and the hydraulic connection between the surface impoundment and the underlying groundwater, the smaller secondary plume was considered to be commingled with the F019 waste and released to the underlying shallow aquifer.

Prior to the construction of the Polishing Pond, the natural course of the creek in that area flowed through the area where the Polishing Pond was constructed. The Hillside Spring discharged to the creek prior to 1991.

When the Polishing Pond was built in approximately 1970, the course of the stream was redirected to flow on the east side of the Polishing Pond dike. The PCE contamination in the groundwater and creek was not known at the time the Polishing Pond was constructed. Therefore, the groundwater and sediments in the creek bed remained in place and in the bottom of the Polishing Pond. When sludge carried over from the Settling Pond settled to the bottom of the Polishing Pond in the contaminated areas, it is likely that PCE from the groundwater and contaminated sediment from the stream contaminated the Polishing Pond sludge.

In the early 1990's, it was determined that the diverted creek was a receiving stream. It is logical that the original creek was a receiving stream as well.

The secondary plume still existed in 1997, although the Polishing Pond was closed and the effect of the head associated with pond water no longer existed. Since 1997, the northern area of this secondary plume has become smaller and, at present, is undetectable. Figure 7-4B, PCE Plume Map 2003, depicts the understanding of the plume location in 2003. Figure 7-4C, PCE Plume Map 2013, depicts the understanding of the plume location in 2013. Historical groundwater results are summarized in Appendix 7-A. The data presented in Appendix 7-A includes the historical data from wells that were in place from 1992 to 2023. Some of the wells included have been closed.

Beginning in 2006, a concentrated area of PCE, and PCE daughter compounds in groundwater was discovered under the plant building. No soil contamination was discovered above the water table, indicating that the contamination is limited to groundwater. The high concentration of PCE in this portion of the PCE plume is a result of the constituent being transported by storm water to this area, which is still considered part of SWMU 49. The storm water drainpipe ended in this area until additions to the plant (i.e., the packing/loading area and paint line) were constructed over the pipe. At that time, the pipe was extended to its current end next to the low point collector. In the early 1990's, the pipe was abandoned, and a new storm water drainpipe was constructed using a different route.

The primary rock types observed in wells, in outcrop, and as scattered rock float in soils are schist and gneiss of various mineral compositions. Different rock types and their associated geometry occur in a complex pattern over the Site. The rocks or their weathered saprolitic remnants appear to occur in bands with dimensions ranging from a few inches to several hundred feet in width. With such variability, the exact distribution of rock types cannot be predicted accurately.

Several factors control subsurface aquifer characteristics and, hence, the ability of earth materials to store and convey groundwater. Three significant factors are:

- the depth of weathering,
- the parent rock type, and
- the amount of formation contacts or interlayering contacts.

Because of the variability of rock type and depth of weathering, the buried surface of the unweathered bedrock is undulating and uneven in appearance creating low-points or pockets where high dissolved concentrations of PCE may reside.

7.3.3.2 Current

The extent of the PCE plume as of March 2023 is shown on Figure 7-4D, PCE Plume Map March 2023. Recent groundwater results (2021-2023) for constituents associated with the PCE plume are summarized in Table 7-7, Recent PCE Plume Constituent Results.

The PCE plume originates under the manufacturing building in the area of SWMU 49 and extends downgradient to the southwest across West Washington Street, a distance of approximately 3,000 feet. The overall layout of the plume has remained fairly constant over time. The highest concentrations of PCE (19,300 µg/L at MW77S in September 2023) and PCE daughter compounds are detected beneath the packing/loading area of the plant. The vast majority of the PCE plume not located beneath the packing/loading area has PCE concentrations of less than 100 µg/L.

Shallow groundwater downgradient of the manufacturing area is monitored for PCE and select PCE daughter products at the Hillside Spring (HSS) monitoring point. The HSS monitoring point consists of a standpipe that extends into a subsurface, horizontal perforated pipe that collects shallow groundwater. During the September 2023 monitoring event, the PCE concentration at the Hillside Spring was 107 µg/L. TCE, cis-1,2-DCE and vinyl chloride were BDL. Prior to September 2023, the last time the Hillside Spring was sampled was March 8, 2019 due to access issues. The PCE concentration in March 2019 was 125 µg/L.

Concentrations downgradient of the building and through the CrOH LF area are typically between 5 to 50 µg/L. Beyond the CrOH LF, the concentrations rapidly decline to below the detection limits except for wells MWOS3D and MWOS6D where concentrations of PCE fluctuate. PCE concentrations at MWOS3D have decreased from approximately 25 µg/L to approximately 15 µg/L from May 2015 to September 2023. PCE concentrations at MWOS6D have varied from BDL to 5.9 µg/L from May 2015 to September 2023. Based on these data, PCE impacts south of West Washington Street are minimal.

The vertical extent of the contaminant plume is considered to be the top of the bedrock throughout most of the plume. In order to define the vertical extent of the VOC contamination, four bedrock wells were installed along the length of the two VOC plumes (MWBR1, MWBR2, MWBR3, and MWBR5) and one on the southwest side of Mineral Springs Branch (MWBR6). The analytical results of groundwater samples collected in the bedrock from these wells indicate VOC levels below detection limit at MWBR1, MWBR2, MWBR5, and MWBR6. From 2001 through 2018, PCE has been detected intermittently in MWBR3 at concentrations between 2.0 µg/L (December 2001 and May 2010) and 4.8 µg/L (February 2018). Since February 2018, PCE has been BDL at MWBR3.

PCE daughter compounds (e.g. TCE, cis-1,2-DCE, and vinyl chloride) have been detected within the PCE plume. Maximum TCE concentrations in groundwater in 2023 are shown on Figure 7-5, Trichloroethene Maximum Concentration Detected in 2023. The highest TCE concentrations are limited to the zone beneath the packing/loading area of the building. The highest TCE concentration exhibited in groundwater in 2023 was 455 µg/L at MW81S. Concentrations of TCE detected downgradient of the Hillside Spring are infrequent and do not appear to be connected. These detections are likely associated with PCE degradation. TCE was not detected in the bedrock wells (MWBR3 and MWBR6) during 2023. The footprint of the TCE plume is contained within the footprint of the PCE plume.

The maximum cis-1,2-DCE concentrations from 2023 are shown on Figure 7-6, Cis-1,2-Dichloroethene Maximum Concentration Detected in 2023. The highest concentration of cis-1,2-DCE detected during 2023 is 1,720 µg/L at MW77S. Concentrations of cis-1,2-DCE detected downgradient of the Hillside Spring are infrequent and do not appear to be connected. These detections are likely associated with the PCE plume. Cis-1,2-DCE was not detected in the bedrock wells during the 2023 sampling events.

Maximum vinyl chloride concentrations from 2023 are shown on Figure 7-7, Vinyl Chloride Maximum Concentration Detected in 2023. The highest concentration of vinyl chloride detected during 2023 is 343 µg/L at MW77S. The highest vinyl chloride concentrations are found in the area underlying the packing/loading portion of the building. Concentrations of vinyl chloride detected downgradient of the Hillside Spring are infrequent and no concentrations of vinyl chloride were detected downgradient of the Hillside Spring during the 2023 sampling events.

A figure is not shown for 1,1-DCE as the detections of this constituent are minimal compared to the other constituents. 1,1-DCE is most often detected in MW44S and MW44D (near the AlOH Unit). The majority of 1,1-DCE detections have been below the groundwater protection standard (GWPS) of 0.007 milligrams per liter (mg/L). There have been two detections of 1,1-DCE at MW81S that exceed the GWPS (0.0106 mg/L in September 2017 and 0.102 mg/L in November 2017).

7.3.3.3 Effectiveness of Corrective Action

The SWMU 49 CAP was prepared based on the strategy presented in the January 17, 2017 RCRA/NPDES Compliance Strategy Report which was approved by the EPD in their June 14, 2017 letter.

Elements of the SWMU 49 CAP include:

1. Discontinuing the extraction, treatment, and discharge of Site groundwater.
2. Continue ISCO of volatile organic compounds (VOCs) in the packing/loading area with sodium persulfate and/or sodium permanganate.
3. Enhanced In-Situ Bioremediation (ISBR) of VOCs in the downgradient plume area near West Washington Street.

In accordance with the approved TA, Bonnell discontinued the extraction, treatment, and discharge of Site groundwater on November 30, 2017. The groundwater recovery system was formally shut down and winterized on December 4, 2017. The SWMU 49 groundwater plume was monitored during system shutdown in accordance with the corrective action monitoring program included in the SMWU 49 CAP. Minor changes to the ISBR monitoring program have been made in an updated SWMU 49 CAP included in this Permit Application as Appendix 7-D.

There have been 15 recovery wells associated with the groundwater recovery system (RW1 – RW15). RW2 and RW12 have been abandoned in conjunction with previous Permit applications. On October 18, 2019, RW1 was abandoned leaving 12 recovery wells. As of this Permit Application, groundwater recovery infrastructure remains in place including the GWTS and the remaining 12 recovery wells (RW3 through RW11 and RW13 through RW15) until effectiveness of the modified remedy is demonstrated as outlined in the SWMU 49 CAP (Appendix 7-D).

The ISCO injection program continued through January 2020 with the eleventh chemical injection in the packing/loading area of the facility. In accordance with the approved TA and subsequent 2019 PCC Permit, sodium persulfate was used as the injection chemical in January 2018-2020. The need for additional ISCO injection events will continue to be evaluated. Potential ISCO injections may be completed using sodium persulfate or sodium permanganate in accordance with the current UIC Permit.

The ISBR program was initiated in March 2018 with the injection of biostimulating amendments in the downgradient portion of the SWMU 49 PCE plume to promote reductive dechlorination. A second ISBR injection was performed in September 2020. The effectiveness of the ISBR program and potential need for additional injection(s) continues to be evaluated using the analytical data collected through the groundwater monitoring program.

Moving forward, the SWMU 49 PCE plume will be addressed through the application of the ISCO and ISBR programs. The ISCO program is designed to address the area of highest remaining groundwater impacts and the ISBR program is designed to address the downgradient portion of the plume.

7.4 SURFACE WATER QUALITY

Although the focus of this section is groundwater, it is relevant to discuss surface water sampling that has occurred as the groundwater is hydrologically connected to surface water.

In March 2000, six surface water samples were collected from the stream running along the western side of the property, four of which were collected south of West Washington Street. All samples were BDL.

In August 2003, five surface water samples were collected: three from the stream leading away from the Hillside Spring and two from the small drainage ditch south of West Washington Street. PCE was detected in the drainage ditch near the plant but was BDL further downstream. PCE was detected at the detection limit in the ditch south of West Washington Street.

In May 2010, Bonnell collected surface water samples from the following locations:

- four along the length of the drainage ditch (SW01, SW02, SW03, and SW05) downstream of the Hillside Spring,

- five from the stream running along the western side of the property (one north of West Washington Street (SW06) and four south of West Washington Street (SW08, SW09, SW10, and SW11)), and

- one from the small drainage ditch south of West Washington Street (SW07).

The May 2010 sampling showed the presence of PCE at SW01, SW02, SW03, and SW07. Sampling results from SW08, SW09, SW10, and SW11 indicated no PCE was leaving the Site in surface water.

In November 2012, Bonnell collected seven surface water samples (SW06, SW08, SW09, SW10, SW11, SW12, and SW13) along Mineral Springs Branch for PCE and TCE analysis. Neither PCE nor TCE were detected.

In August 2013, Bonnell collected surface water samples from SW06, SW08, SW09, SW10, SW11, SW12, and SW13. These samples were analyzed for PCE and PCE daughter products. PCE was detected in one sample, SW08, at 2.3 µg/L. Analytical results of samples collected from SW09, SW10, and SW11, which are all downstream of SW08, were BDL for PCE, TCE, and PCE daughter products.
In December 2013, Bonnell collected surface water samples from SW06, SW08, SW09, SW10, SW11, SW12, and SW13. These samples were analyzed for PCE and PCE daughter products. PCE was detected in one sample, SW08, at 2.9 µg/L. Analytical results of samples collected from SW09, SW10, and SW11, which are all downstream of SW08, were BDL for PCE and PCE daughter products.

Bonnell currently collects surface water samples from these same seven sampling locations, SW06, SW08, SW09, SW10, SW11, SW12 and SW13, along with six more locations (SW Pond, SW01, SW03, SW05, SW14 and SW15) on a semi-annual basis. Surface water sample locations (including one additional proposed surface water sampling location, SW16) and maximum PCE concentrations for 2023 are shown on Figure 7-8, Maximum Tetrachloroethene Concentrations Detected in Surface Water in 2023. Recent surface water results are shown in Table 7-8, Recent Surface Water Results.

Surface water samples will continue to be collected for PCE and select PCE daughter products at the surface water sample locations on a semi-annual basis. Analytical results from these samples will be evaluated to monitor for potential changes as outlined in the SWMU 49 CAP (Appendix 7-D).

SECTION 8 GROUNDWATER CORRECTIVE ACTION PLAN

8.1 INTRODUCTION

This section describes proposed corrective action activities in accordance with Section III.C.5 of Bonnell's PCC Permit and outlines the steps required to meet the cleanup objectives for corrective action of groundwater stated in 40 CFR §264.100(a) using acceptable engineering methods. The section addresses the remediation of groundwater associated with the TFU and the remediation of the PCE plume associated with SWMU 49.

8.2 DESCRIPTION OF PLUMES

Site investigations conducted prior to July 2014 have shown two areas of volatile organic compound (VOC) groundwater contamination:

- ethylbenzene, toluene, xylenes, and naphthalene in TFU compliance point wells; and

- a PCE plume extending from the plant building in a southwesterly direction across West Washington Street, and the remnants of the smaller bifurcated PCE plume in the area between monitoring wells MW7D and the well pair MW44D and MW44S.

Groundwater monitoring has shown that hydrogeological barriers formed by the drainage basin for a tributary to Mineral Springs Branch confine the PCE plume.

Information regarding groundwater plumes and groundwater compliance monitoring are contained in Section 7.

8.3 HISTORICAL CORRECTIVE ACTION

8.3.1 Historical TEX and Naphthalene Plume Corrective Action

Bonnell installed an air injection, bioventing system in 1997 to remediate TEX and naphthalene detected in wells MW51S and MW52S. The bioventing system operated from 1997 to its formal shut down on May 10, 2019 (in accordance with the shutdown criteria contained in the July 1997 Solid Waste Management Units 7 and 46 Bioremediation System Pilot Test Report, Thomas W. Watson, 1997). The effectiveness of the bioventing system is evident in the groundwater sampling results for MW51S and MW52S. Since operation of the bioventing system began, constituent concentrations for TEX and naphthalene have decreased by several orders of magnitude. A flat line trend for TEX and naphthalene has been evident since approximately 2006 (as presented in Figures 7-3A through 7-3C) with constituent concentrations often below laboratory reporting limits. Constituent concentrations this low for a 17-year period and the soil sample results from November 2015 and November 2019 indicate that the original source material in soils has been remediated. Naphthalene is no longer monitored at the TFU wells, MW51S and MW52S, in accordance with the 2019 Permit.

8.3.2 Historical PCE Plume Corrective Action

8.3.2.1 Prior To 2013 Permit Modification

Between 1992 and 2017, PCE plume corrective action consisted of pumping groundwater to one of two treatment systems. One system pumped groundwater from RW1, the Hillside Spring, and the Low Point Collector through a clarifier, then through carbon adsorption. The groundwater recovered by RW3 through RW13 was pumped to a separate carbon adsorption system for treatment.

8.3.2.2 Post 2013 Permit Modification

The two separate treatment systems detailed in Section 8.3.3.1 above were combined into a single groundwater treatment system in February 2016. That single groundwater treatment system was then shut down on November 30, 2017, in accordance with the EPD approved Temporary Authorization (TA) which was later incorporated into the 2019 PCC Permit.

In the 1992 PCC Permit Application and the 2003 PCC Permit Renewal Applications, the original source of the PCE plume was SWMU 49. In both the 1992 and 2003 applications, the source of the small, bifurcated PCE plume downgradient of the Polishing Pond was considered to be from the Polishing Pond, which was a RCRA regulated unit. In the 2003 PCC Permit Renewal Application, source control techniques were discussed.

In 2006, Bonnell discovered high concentrations of PCE under the packing/loading area of the facility. However, as of February 2024, there is no evidence to indicate that dense non-aqueous phase material exists under the packing/loading area. Therefore, Bonnell does not believe there is a "source" in that area. The high concentrations are likely due to the storm water drainpipe, which formerly discharged upgradient to this area. When SWMU 49 was in operation, there was a pipe that connected the unit to the storm water drainpipe. PCE was discharged into the connecting pipe and was carried to the end of the pipe with storm water. While the PCE used during operations would have been concentrated, it entered the storm water drainpipe as a result of being washed into the drainpipe by "cleaning operations" in SWMU 49. This is based on interviews conducted in the early 1990's with plant personnel who were present during operations of SWMU 49. The PCE would have been diluted by the wash down waters. Based on this, Bonnell is concentrating on remediation in this area versus source control. In addition, with the 2013 Permit Modification, EPD is allowing Bonnell to proceed as if all PCE contamination, including the small, bifurcated PCE plume, originated from SWMU 49.

A review of PCE detections in the regulated unit POC wells was conducted to demonstrate that the PCE impacts seen in the regulated unit POC wells originate from the SWMU 49 PCE plume and not from the regulated units. This review included all PCE detections above the laboratory detection limit for the regulated unit POC wells since 2011. The most recent PCE plume is presented in Figure 7-4D, PCE Plume Map March 2023. Note that the majority of the SWMU 49 PCE plume originates below the building in the packing/loading area and moves downgradient towards the southwest. The September 2023 data indicates that, along the path of the plume, the plume travels through or adjacent to seven of the fourteen regulated unit point-of-compliance wells. These wells include MW51S, MW52S, MW2SR, MW50S, MW4SR, MW17D and MW19S. Since 2021, four of these seven regulated unit point-of-compliance wells (MW2SR, MW4SR, MW17D and MW50S) have exhibited PCE concentrations above the laboratory detection limit. Of the seven remaining regulated POC wells not located along or adjacent to the SWMU 49 PCE plume, only MW49S is sampled for PCE. There have been no PCE detections above the laboratory detection limit at MW49S since 2021.

MW4SR has had two detections of PCE above the laboratory detection limit ranging from 13.2 μg/L (March 2023) to 15.8 μg/L (September 2023). MW50S has had one detection of PCE above the laboratory detection limit (5.7 μg/L in April 2022).

The other two POC wells showing PCE detections, MW17D and MW2SR, have each had six detections of PCE above the laboratory detection limit. PCE detections at MW17D range from 3.0 μg/L (March 2023) to 6.4 μg/L (September 2023). The highest PCE detection at MW17D of 6.4 μg/L (September 2023) is slightly above the MCL of 5 μg/L for PCE. At MW2SR, the PCE detections range from 4.22 μg/L (September 2021) to 7.8 μg/L

(September 2023). Similar to MW17D, the highest PCE concentration at MW2SR is slightly above the MCL of 5 μg/L for PCE.

In summary, since 2021, there are four regulated POC wells that exhibit PCE concentrations above the laboratory detection limit (MW2SR, MW4SR, MW17D and MW50S). Of these four POC wells, only one (MW17D) has exhibited PCE impacts above the corresponding groundwater protection standard. At MW17D, PCE was detected at 6.0 μg/L and 6.4 μg/L during the September 2021 and September 2023 groundwater monitoring events, respectively. The groundwater protection standard for PCE at MW17D (a perimeter well) is 5 μg/L (see Figure 7-4D, PCE Plume Map, March 2023). With so few POC wells impacted and due to the location of the impacted POC wells, it is evident that the source of PCE impacts found in regulated unit POC wells is the SWMU 49 PCE plume and not the regulated units themselves.

8.4 FUTURE CORRECTIVE ACTION OBJECTIVES

Future corrective action is designed to meet the following goals:

1. to protect human health and the environment (because this area is served by a public water supply, groundwater in the vicinity of the Site is never expected to be used for domestic or commercial purposes),

2. to comply with standards for management of wastes and contaminated media, and

3. to achieve GWPS, or asymptotic levels in an economically feasible manner.

8.5 FUTURE TEX PLUME CORRECTIVE ACTION

Bonnell operated the bioventing system at the TFU from 1997 to May 10, 2019. In reviewing Figures 7-3A through 7-3C, Toluene vs Time, Ethylbenzene vs Time, and Total Xylenes vs Time, respectively, the vast majority of groundwater impacts at the TFU have been remediated. Near BDL conditions have been present in MW51S and MW52S for over 15 years. Based on the historical groundwater data and in accordance with the shutdown criteria contained in the July 1997 Solid Waste Management Units 7 and 46 Bioremediation System Pilot Test Report (Thomas W. Watson, July 1997), Bonnell shut down operation of the bioventing system on May 10, 2019. MW51S and MW52S continue to be monitored for TEX constituents along with

PCE and TCE. Minimal TEX concentrations are detected at MW51S and MW52S. These TEX detections are well below their respective MCLs. The July 1997 Solid Waste Management Units 7 and 46 Bioremediation System Pilot Test Report is included in Appendix 8-A.

Bonnell collected soil confirmation samples in November 2015 and soil verification samples in November 2019 in the area around MW51S and MW52S as described in the TFU shutdown criteria. The results of these soil confirmation samples were summarized and reported in the March 2016 Semi-Annual Corrective Action Effectiveness and Groundwater Monitoring Report (Amec Foster Wheeler, 2016) and the April 2020 Semi-Annual Corrective Action Effectiveness and Groundwater Monitoring Report (Wood, 2020). In general, the analytical results from both the 2015 and 2019 investigations indicate that the TEX soil impacts have been successfully remediated. Based upon the soil and groundwater sample results, Bonnell requests to permanently discontinue operation of the bioventing system and to properly remove and abandon all test wells, vent wells and shallow vapor points associated with the system. Bonnell will be responsible for additional re-evaluation efforts and/or corrective action if site data indicates that it is necessary in the future.

8.6 FUTURE PCE PLUME CORRECTIVE ACTION

8.6.1 Division of the PCE Plume Into Two Zones

The PCE plume varies in concentration, flow velocity, and covers a large area. For remediation purposes, the SWMU 49 PCE plume has been subdivided into two zones as shown in Figure 8-1, Sub Zones of the PCE Plume.

Zone 1 consists of a fairly concentrated plume of PCE, TCE, and PCE daughter compounds and is located beneath the packing/loading area of the building. As discussed in Section 8.2, the source of this zone originated from a release from SWMU 49 into the storm drain. This drainage system, now abandoned, remains under the packing/loading area of the building. It is not connected to the storm water system.

Zone 2 as shown in Figure 8-1, includes the portion of the plume that has migrated downgradient from the building. Zone 2 is a narrow, bifurcated, elongated plume of groundwater with PCE and PCE daughter products. Years of monitoring indicate that the size of the Zone 2 plume is decreasing. Additionally, PCE concentrations in most of the Zone 2 wells are also decreasing. Several PCE plume maps have been assembled in Appendix 8-B to illustrate the progression of the PCE plume.

8.6.2 Design Considerations

The corrective action program was developed based on the following conclusions resulting from assessing the groundwater at the Site:

1. The primary source of release of PCE was from the degreasing operations conducted between 1954 and 1958.

2. No public health risk to existing local groundwater users exists due to the direction of groundwater flow and the location of the Mineral Springs Branch, which serves as a natural plume boundary.

3. Through several years of monitoring onsite groundwater, it is evident that impacted groundwater has not migrated offsite; therefore, no water supply wells have been affected.

4. The underlying bedrock layer is a barrier to the downward migration of the PCE plume.

8.6.3 Scope of PCE Plume Corrective Action

The SWMU 49 PCE plume corrective action program required by Section III.C.5 of the PCC Permit previously consisted of groundwater recovery and treatment through carbon adsorption (Zone 1 and Zone 2), a spring containment system used to collect impacted groundwater at the Hillside Spring area (Zone 1) and ISCO injections (Zone 1). Groundwater was recovered via recovery wells located in Zone 1 and Zone 2. Figure 8-2, Recovery Well Locations, shows the location of the remaining 12 recovery wells. Treated groundwater was either used for process water in the plant or was discharged into the Mineral Springs Branch tributary through an existing NPDES permitted outfall.

An update to the SWMU 49 corrective action program was included in the October 20, 2017, Request for TA detailed in Section 7.3.3.3. The updated SWMU 49 corrective action program consists of the following:

1. Continue with the ISCO injection program conducted in the packing/loading area of the plant (Zone 1) including the use of sodium persulfate in addition to or in place of sodium permanganate.

2. Implemented in-situ bioremediation (ISBR) in the downgradient portion of the SWMU 49 PCE plume (Zone 2).

3. Shutdown of the groundwater recovery system with the potential for changes in the SWMU 49 PCE plume to be monitored with increased sampling of the ISCO monitoring wells, as well as downgradient perimeter monitoring wells. The recovery wells (12) and equipment have been maintained for use in the ISBR Program and other potential future uses.

8.6.4 Corrective Action In Zone 1

In April 2012, operating under an EPD Temporary Authorization (TA) in accordance with 40 CFR 270.42(e) and a pilot test UIC permit, Bonnell initiated a pilot test to observe the impact of sodium permanganate injected into Zone 1. Figure 8-3, Zone 1 PCE Analytical Results, shows the locations of the monitoring wells and injection wells (IW1 - IW14) that were used in the first injection pilot test.

During the first test, Bonnell injected approximately 110 gallons of a ten percent sodium permanganate solution into each of 14 injection wells, a total volume of about 1,500 gallons of reagent. In late June 2012, groundwater samples were collected from the monitoring wells shown on Figure 8-3, Zone 1 PCE Analytical Results. The June 2012 analyses showed a reduction of PCE. Specifically, wells MW75S, MW77S, MW78S, MW82S, MW85D, MW86D, and MW88D showed a reduction in PCE soon after the first injection. However, because the degree of reduction was within observed fluctuations of historical VOC levels, Bonnell considered the results inconclusive, and decided that a larger volume of reagent was needed.

In July 2012, Bonnell obtained permission from the UIC program to extend the pilot test under the UIC pilot test permit. In August 2012, a second injection of 7,000 gallons of sodium permanganate was conducted. Each of the 14 injection wells received approximately 500 gallons of a ten percent solution of sodium permanganate. Both the April and August 2012 injections were conducted under minimum injection pressure of approximately eight to ten pounds per square inch (psi).

The purple coloration of sodium permanganate is visible at concentrations as low as one milligram per liter. A visual inspection of groundwater from monitoring wells in the vicinity of the second pilot injections showed migration of reagent indicated by the characteristic purple color into monitoring wells MW75S, MW77D, MW77S, MW78S, MW81S, MW85D, and MW88D. To evaluate the effectiveness of the second injection, a monitoring well sampling event was conducted in December 2012. Results of the December 2012 sampling from this area are shown in Figure 8-3, Zone 1 PCE Analytical Results. PCE concentrations were generally similar to or higher than the June 2012 sampling results with the exception of MW88D, which had a significant decrease. Rebounding concentrations can occur following treatment by injection. An "NS" result indicates that the well was not sampled because of the presence of permanganate in the well.

Following the first two injections, visual inspections of groundwater in monitoring wells in Zone 1 showed the distribution of the reagent to be uneven, indicating areas where more injection/monitoring wells were needed. Before continuing injection inside the building, Bonnell considered the following options:

- additional injection and monitoring wells in areas where data is incomplete,
- the use of pressure injection to induce migration of reagent,
- the use of vacuum extraction to induce migration of reagent,
- hydraulic fracturing to improve aquifer permeability and reagent distribution, and
- the use of permanganate "candles", which are paraffin cylinders embedded with solid potassium permanganate. The permanganate cylinders are suspended in specific wells and allowed to disperse permanganate by the natural flow regime. Studies are available showing that this works in areas of low contaminant concentration.

In April 2013, Bonnell installed 24 additional injection wells, IW15 through IW42. These wells are located as shown on Figure 8-3, Zone 1 PCE Analytical Results. In August 2013, Bonnell performed a third injection of 100 gallons of ten percent permanganate into all 38 injection wells located in the packing/loading area. Results of that injection showed improved distribution of reagent, impacting areas not treated previously. These results are shown on Figure 8-3, Zone 1 PCE Analytical Results.

Bonnell installed another six injection wells (IW43 - IW48) in January 2016 and installed another four injection wells (IW49 - IW52) in March 2017. To date, Bonnell has conducted eleven (11) ISCO injections in the packing/loading area. The first eight injections were conducted using sodium permanganate. The next three injections (2018, 2019 and 2020) were conducted using sodium persulfate. Analytical data as of March 2023 is presented on Figure 7-4D, PCE Plume Map, March 2023.

As outlined in the approved TA and the June 2023 UIC Permit, Bonnell modified the ISCO injection protocol, by injecting sodium persulfate in place of the sodium permanganate that had been used previously. The June 2023 UIC Permit allows for the injection of sodium persulfate, sodium permanganate, sodium/potassium bicarbonate or sodium hydroxide. While the permanganate ion is more stable and will persist in the subsurface for a longer period of time, the persulfate ion has a higher oxidation potential and will therefore provide a more aggressive treatment as compared to permanganate. Details of the modification to the ISCO injection program are detailed in Appendix 7-D, SWMU 49 CAP.

8.6.5 Corrective Action In Zone 2

Zone 2 of the PCE plume is no longer being remediated with a groundwater recovery system. Although groundwater recovery methods have removed substantial quantities of PCE-impacted groundwater, these methods have not reduced the extent of the PCE plume. The Zone 2 portion of the SWMU 49 PCE Plume consists of low concentration impacts (generally less than 50 µg/L) over a fairly large area. Groundwater recovery methods are not typically efficient in these conditions.

To more efficiently address the groundwater impacts in Zone 2 and in accordance with the EPD approved TA, Bonnell has implemented an ISBR program. The program consists of the injection of carbon substrates, pH adjustment and the addition of nutrients to facilitate the natural biodegradation of the SWMU 49 PCE Plume contaminants. Two ISBR injections have been performed to date (April 2018 and September 2020). PCE concentrations in some of the POC wells located closest to the injection area have exhibited decreasing concentrations following the ISBR injections. In particular, the PCE concentration in MW4SR decreased from 38.5 µg/L in February 2018 (just prior to the April 2018 ISBR injection) to BDL during the March 2019 monitoring event. The PCE concentration at MW4SR increased to 5.3 µg/L during the September 2020 monitoring event (just prior to the September 2020 ISBR injection) and then decreased back to BDL in March 2021. PCE concentrations at MW4SR remained BDL until March 2023 when the PCE concentration increased to 13.2 µg/L. These data strongly indicate that the ISBR injections do produce subsurface conditions that are beneficial to natural degradation of chlorinated VOCs. Details of the ISBR program are included in Appendix 7-D, SWMU 49 CAP.

8.7 CORRECTIVE ACTION MONITORING PLAN

The monitoring activities discussed in Section 9 describe the proposed groundwater corrective action monitoring.

8.8 TERMINATION CRITERIA

Current corrective action for the PCE plume will continue until groundwater concentrations meet GWPS for three consecutive years.

As detailed in Section 8.5, Future TEX Plume Corrective Action, the bioventing system located at the TFU has been temporarily shut down. With this Permit Renewal Application, Bonnell is requesting approval to permanently discontinue operation of the bioventing system and to permanently remove existing bioventing infrastructure (vent wells and associated piping) based on recent soil and groundwater sampling results. With approval to permanently discontinue operation of the bioventing system, Bonnell would properly abandon the vent wells in accordance with the In-Place Well Abandonment Procedure included in Appendix 8-C.

8.9 CORRECTIVE ACTION REPORTING

Corrective action effectiveness will be reported in the Annual (as requested in Section 2) Groundwater Monitoring and Corrective Action Effectiveness Reports submitted to the GA EPD. Additional reports will be submitted to EPD as appropriate. These reports will enable Bonnell and EPD to assess the effectiveness of the corrective action program and to make adjustments as necessary.

8.10 SCHEDULE FOR IMPLEMENTATION

The use of in-situ chemical oxidation in Zone 1 will continue as warranted by ongoing monitoring and effectiveness evaluations. Additionally, the ISBR program, initiated in March 2018 as part of the SWMU 49 CAP, will continue in Zone 2 and will be evaluated with ongoing monitoring and effectiveness evaluations. An updated general corrective action schedule for SWMU 49 is included in Appendix 7-D, SWMU 49 CAP.

SECTION 9 GROUNDWATER MONITORING PROGRAM

9.1 INTRODUCTION

The purpose of this section is to describe the proposed groundwater monitoring program for the Site to meet the requirements of 270.14(c)(5), 270.14(c)(7), 270.14(c)(8), and 264.97. Groundwater monitoring at the Site is being conducted as compliance monitoring for three regulated units (AlOH LTU, CrOH LF, and the HWMA) and corrective action monitoring for the TFU and the SWMU 49 PCE plume. Groundwater quality sampling and analysis results at the POC wells demonstrate that hazardous constituents have been detected in groundwater. Therefore, a Detection Monitoring Program (270.14(c)(6)) is not required.

A description of the wastes previously handled at the facility, per 270.14(c)(7)(i), is provided in Section 4.3. A characterization of the impacted groundwater, per 270.14(c)(7)(ii) is presented in Section 7.2.

The monitoring program presented in this section is unchanged from the 2019 Permit.

9.2 MONITORING WELL NETWORK

Monitoring wells are classified into four categories in the 2019 Permit: background well (MW13S), regulated unit POC wells (14), SWMU 49 PCE plume monitoring wells, and Maintenance Only wells. Those same four designations are maintained in this Permit application. Some monitoring wells have a dual purpose though, such as being a regulated unit POC well and a SWMU 49 PCE plume monitoring well, as indicated in Table 7-4, 2019 Permit Table V, Monitoring Well Sampling and Analysis. Table 9-1, Well Construction and Survey Information, summarizes relevant monitoring well information concerning each of the wells being included in the monitoring program. The wells included in the monitoring program and their designations are shown on Figure 9-1, Wells by Purpose/Sampling Frequency.

9.2.1 Background Monitoring Well

Monitoring well MW13S is designated as the background well for each of the regulated units and the Site. MW13S is located hydraulically upgradient of the regulated units and the PCE plume. The depth and location of MW13S is sufficient to yield a sample that is representative of the background concentrations, relative to the regulated units, in the uppermost aquifer.

9.2.2 Point of Compliance Monitoring Wells

The POC wells are located such that the groundwater at the POC wells for each regulated unit is and will continue to be monitored in a manner that will enable detection and measurement of 8 potential constituents that could occur from the regulated units. POC wells for each regulated unit are as follows:

HWMA	MW2SR, MW48S, MW49S, MW50S
CrOH LF	MW4SR, MW17D, MW19S
AlOH LTU	MW42S, MW43S, MW44D, MW44S, MW45S
TFU	MW51S, MW52S

Eight of these 14 POC wells are also to be used as SWMU 49 PCE plume monitoring wells. These eight wells include: MW2SR, MW4SR, MW17D, MW19S, MW49S, MW50S, MW51S and MW52S. Although these are regulated unit POC wells, these wells also serve to provide delineation of the SWMU 49 PCE plume. Thus, these wells have the dual purpose as a POC well for a regulated unit and as a SWMU 49 PCE plume delineation well.

9.2.3 SWMU 49 PCE Plume Monitoring Wells

Table 9-2, Proposed 2024 Permit Table V, Monitoring Well Sampling and Analysis, lists wells associated with the groundwater monitoring program. As discussed in the previous section, there are eight monitoring wells with the dual purpose of being a POC well for a regulated unit and a SWMU 49 PCE plume definition well. As mentioned in Section 7.1.1.2, Bonnell proposes to switch MW28D for MW28S in the groundwater monitoring program as indicated in Table 9-2, Proposed 2024 Permit Table V, Monitoring Well Sampling and Analysis.

9.2.4 Maintenance Only Monitoring Wells

Forty-three site monitoring wells are not currently part of the Permit-required groundwater monitoring program but are required to be maintained by the 2019 PCC Permit. Bonnell proposes to continue with the current maintenance program for these 43 site monitoring wells.

9.3 SAMPLING AND ANALYSIS PLAN
9.3.1 Constituent List
9.3.1.1 Unit or Plume Specific Constituents

The constituents to be analyzed for in each well are shown in Table 7-3, 2019 Permit Tables I, II, III and IV. Bonnell is not requesting any changes in the 2019 Permit Tables I, II, III and IV for the 2024 Permit renewal. There is a separate constituent list for each category because each category of wells is associated with a different constituent group.

Table 9-2, Proposed 2024 Permit Table V, Monitoring Well Sampling and Analysis, lists which wells are to be sampled, which wells are to be maintained, the constituent groups to be analyzed in each well, and the frequency of sampling.

Table 9-3, Analytical Methods and Sampling Requirements, shows the analytical methods that Bonnell will use when analyzing the samples. Table 9-4 presents the GWPS for the wells included in the groundwater monitoring program. No changes to the 2019 PCC Permit GWPS are proposed.

9.3.1.2 Appendix IX

Pursuant to 40 CFR 264.100(d), Bonnell will analyze samples from POC wells for 40 CFR 264 Appendix IX constituents on a rotating basis as follows:

- two to three POC wells associated with the AlOH LTU once every four years,
- one to two POC wells associated with the CrOH LF once every four years,
- two POC wells associated with the HWMA once every four years, and
- one POC well associated with the TFU once every four years.

In addition, the background monitoring well (MW13S) will be sampled for Appendix IX constituents once every four years.

If an Appendix IX constituent that is not already included in the monitoring program is detected, Bonnell may resample and reanalyze for the constituent within one month from the receipt of the final analytical results. If the results of the second round of sampling do not confirm the initial results, no further action is required. If the results of the second round of sampling confirm the initial results, the constituent will be added to the compliance monitoring program. If confirmation sampling is not performed, that constituent will be added to the compliance monitoring program. In either case, Bonnell will submit a permit modification request to add the constituent to the compliance monitoring program.

If additional Appendix IX constituents must be added to the monitoring program as a result of the Appendix IX sampling and analysis, Bonnell will analyze samples from at least one of the POC wells for the AlOH LTU, at least one of the POC wells for the CrOH LF, at least one of the POC wells for the HWMA, at least one of the POC wells for the TFU, background well MW13S, and any additional wells specified by the Director, for all constituent(s) in Appendix IX at least once every year, to determine whether additional hazardous constituents are present in the uppermost aquifer and, if so, at what concentrations. Thereafter, Appendix IX sampling will be rotated among the POC wells for each unit so that one POC well for each unit is sampled every year. The background well (MW13S) will be sampled annually under this scenario.

Currently, Bonnell is monitoring Appendix IX constituents on an annual basis due to the detection of arsenic at MW51S and 1,1-DCA at MW44S during the March 2021 Appendix IX sampling. Bonnell, along with the background well MW13S, is sampling one POC well from each regulated unit for the Appendix IX constituents on an annual basis. Bonnell will maintain this sampling frequency until arsenic at MW51S and 1,1-DCA at MW44S are BDL for three consecutive years. These three-year timeframes can be met independently. Additionally, annual sampling is being conducted at MW51S (arsenic) and MW44S (1,1-DCA). Following the three years of BDL for arsenic and 1,1-DCA, the Appendix IX sampling program will revert to the schedule detailed above.

9.4 SAMPLING SCHEDULE

As described in the 2019 PCC Permit and shown in Table 9-2, Proposed 2024 Permit Table V, Monitoring Well Sampling and Analysis, the background well (MW13S) and POC wells for the CrOH LF, HWMA (with the exception of MW48S), and TFU will be sampled semi-annually. The POC wells for the AlOH LTU and MW48S, with the exception for metals analysis (chromium and nickel) at MW42S and MW45S, will be sampled for Appendix IX constituents only in accordance with the Appendix IX sampling schedule presented above. The wells associated with the PCE plume will be sampled either annually or semi-annually as shown in Table 9-2, Proposed 2024 Permit Table V, Monitoring Well Sampling and Analysis. Figure 9-1, Wells by Purpose/Sampling

Frequency, shows which wells will be sampled annually, semi-annually, or merely maintained. The rationale for this sampling schedule is described in Appendix 7-C (2018 Class 3 Permit Modification Request) and as updated in this permit application.

9.5 PROCEDURES

Bonnell will employ sampling and analysis procedures to provide a reliable indication of the quality of the groundwater pursuant to 40 CFR 264.97(d) and (e).

9.5.1 Water Level and Depth Measurement

Bonnell will measure the depth to groundwater each time a well is sampled. Total well depths will be measured annually in all wells Bonnell is required to maintain. Bonnell will conduct this work in accordance with the procedures in the current and future revisions of the USEPA Region IV Laboratory Services and Applied Science Division's (EPA LSASD) operating procedures found in its Field Branches Quality System and Technical Procedures (FBQSTP) or any document that supersedes it. The groundwater flow rate and direction in the uppermost aquifer will be evaluated annually.

9.5.2 Well Inspection and Maintenance

Each monitoring well listed in Table 9-2, Proposed 2024 Permit Table V, Monitoring Well Sampling and Analysis, will be visually inspected on a quarterly basis to identify possible damage. The condition of the well pad, well vault, well casing, well cap, and well lock will be noted. If any water is present in the well vault it will be immediately removed, and corrective action will be taken to prevent water from entering the well vault in the future. The well casing will be inspected to ensure the measuring point is always visible. Damaged well vaults and well pads will be repaired or replaced as needed and as quickly as possible.

The area surrounding the well pads will also be inspected for erosion, the presence of fire ant mounds, and holes from burrowing animals. Eroded areas will be repaired, and ants will be eradicated. Damaged well caps and well locks will be replaced as needed. An example of a monitoring well inspection form is presented in Figure 9-2, Monitoring Well Inspection Form. Bonnell may update this inspection log template as needed.

9.5.3 Purging and Sample Collection

Bonnell will use the groundwater purging and sampling procedures in the current and future revisions of the EPA LSASD operating procedures found in its FBQSTP.

Purged groundwater will be treated through Bonnell’s wastewater treatment system. Treated water from the wastewater treatment system is either reused in the plant or is discharged to the City of Newnan through its Publicly Owned Treatment Works Permit.

Field measurements required by the FBQSTP (e.g., pH, temperature, and specific conductance) will be taken during purging and sample collection. The information will be recorded on sampling forms. An example is shown on Figure 9-3, Groundwater Sampling Log. Bonnell may update this sampling form template as needed. These field measurements are not collected from those monitoring wells that are monitored for VOCs only (sampled from PDBs).

9.5.4 Sample Collection, Preservation, Shipment, and Tracking

Samples will be collected in the appropriate containers with the appropriate preservative in accordance with Table 9-3, Analytical Methods and Sampling Requirements. Immediately following collection, sample containers will be numbered, labeled, placed into individual bags, and placed into coolers containing ice for preservation.

Samples will be delivered to a certified laboratory accompanied by a chain of custody (COC) record. An example is shown on Figure 9-4, Chain of Custody Record. COCs are an accurate written record that will trace possession and handling of samples from collection through laboratory analysis and final recording of results. A COC will accompany sample bottles at all times.

9.6 CONCENTRATION LIMITS

Per 40 CFR 270.14(c)(7)(iv), 40 CFR 264.94(a) and 40 CFR 264.92, GWPS are to be set for each regulated unit. The proposed 2024 GWPS for each of the regulated units are shown in Table 9-4, Proposed 2024 Groundwater Protection Standards. The GWPS included in Table 9-4 are unchanged from the 2019 PCC Permit.

9.7 PROCEDURES FOR ESTABLISHING BACKGROUND

MW13S has and will continue to provide upgradient background groundwater quality for the Site. In accordance with 40 CFR 264.97(a)(1) and 40 CFR 264.97(g), the initial background values for parameters of concern were determined by taking the arithmetic mean of the individual indicator parameters analyzed during the interim status monitoring as shown in Table 9-5, Background Mean and Variance Data (MW13S).

9.8 ANALYSIS OF DATA / STATISTICAL PROCEDURES

When Bonnell demonstrates compliance with the GWPS, as defined under Condition III.C.1 of the 2019 PCC Permit or future revisions of the 2019 PCC Permit, Bonnell will use groundwater monitoring data obtained under Permit Condition III.C.3. The data used must indicate that constituents listed in Permit Table I, Table II, Table III and Table IV no longer exceed the GWPS at the point of compliance or any other monitoring point within or adjacent to the plume(s) of contamination. Bonnell will use a statistical procedure described in 40 CFR 264.97 (h) and (i) to make the comparisons.

9.9 REPORTING REQUIREMENTS

Bonnell will submit annual groundwater monitoring reports (as requested in Section 2) that summarize activities conducted as part of the groundwater monitoring program.

SECTION 10 REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc., 2016a, Groundwater Risk Assessment, Revised June 30, 2016

Amec Foster Wheeler Environment & Infrastructure, Inc., 2017a, RCRA/NPDES Compliance Strategy Report – Bonnell Aluminum – Newnan, Georgia. Amec Foster Wheeler, January 17, 2017.

Amec Foster Wheeler Environment & Infrastructure, Inc., 2017b, Request for Temporary Authorization, October 20, 2017.

Wood Environment and Infrastructure Solutions, Inc., 2020, Semi-Annual Corrective Action Effectiveness and Groundwater Monitoring Report, August 31, 2020.

RCRA Facility Assessment, William L Bonnell Co, September 30, 1991, EPD.

SWMU Questionnaire submitted to EPD by William L. Bonnell Co., February 27, 1990.

Thomas W. Watson, July 1997, Solid Waste Management Units 7 and 46 Bioremediation System Pilot Test Report.

Georgia Environmental Protection Division, Bon L Manufacturing Co. UIC Permit No. GAW000548, June 22, 2023.

Atkins, R.L. and Higgins, M.W. 1980. Superimposed folding and it's bearing on the geologic history of the Atlanta, Georgia area, in Frey, R.W., ed., Excursions in southeastern geology, v 1: Amer. Geol. Ist. P. 19-40.

Cressler, C.W., Thurmond, C.J., and Hester, W.G. 1983. Groundwater in the Greater Atlanta Region, Georgia. Georgia Geological Survey Information Circular 63.

Federal Register. 1990. Proposed Rule - Corrective Action for SWMUs at Hazardous Waste Management Facilities. Federal Register Vol. 55, No. 145, July 27.

Fetter, C.W. 1988. Applied Hydrogeology. 2nd Edition. Macmillan Publishing Company. New York. 592p.

McConnell, K. and Abrams, C. 1984. Geology of Greater Atlanta Region, Bulletin 96, Department of Natural Resources. GA Geologic Survey.

United States Environmental Protection Agency. 1986. RCRA Facility Assessment Guidance. Office of Solid Waste. October.

United States Environmental Protection Agency. 1989. Interim Final RCRA Facility Investigation Guidance. Office of Solid Waste. May.

United States Environmental Protection Agency. Field Branches Quality System and Technical Procedures. Region IV Laboratory Services and Applied Science Division. (https://www.epa.gov/quality/quality-system-and-technical-procedures-lsasd-field-branches)