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FEB 2 1 2023

Ms. Lisa F. Garcia
Regional Administrator
U.S. Environmental Protection Agency, Region 2
290 Broadway, 26th Floor
New York, NY 10007-1866

Dear Administrator Garcia:

On behalf of the Governor of the State of New York, I am submitting for approval by the U.S. Environmental Protection Agency (EPA) a Source-Specific State Implementation Plan Revision (SSSR) for Knowlton Technologies, LLC in Watertown, New York. This SSSR replaces and withdraws the SSSR for the tanks that was submitted by the New York State Department of Environmental Conservation (NYSDEC) on September 16, 2008.

Title 6 of the New York Codes, Rules, and Regulations (NYCRR) contains several regulations that define Reasonably Available Control Technology (RACT) for certain categories of stationary sources. The Air Title V Facility Permit for Knowlton Technologies, LLC that was issued on December 27, 2022, includes conditions that establish VOC RACT for the tanks that do not meet the presumptive RACT limits.

A public notice specifying that process specific RACT determinations would be submitted to EPA as a SSSR was published in the Environmental Notice Bulletin (ENB) and the Watertown Daily Times on July 13, 2022. A public comment period occurred from July 13, 2022, through August 12, 2022. No comments were received.

The following documents, including those that were used by the DEC to evaluate and approve RACT emission limits, are enclosed with this proposed SSSR:

1. Source-Specific State Implementation Plan Revision, Reasonably Available Control Technology, Knowlton Technologies, LLC, Permit ID: 6-2218-00017/00009.
2. Public Notice as published in the *Environmental Notice Bulletin* on July 13, 2022.
3. Proof of Publication of Knowlton Technologies, LLC's Title V Permit Renewal Application in the Watertown Daily Times on July 13, 2022.

If you have any questions or concerns, please contact Amanda Bonville, Assistant Engineer, Division of Air Resources, Bureau of Air Quality Planning, SIP Planning Section at (518) 402-8396.

Sincerely,

Christopher LaLone
Director
Division of Air Resources

Enclosures

c: R. Ruvo, EPA Region 2
R. Bielawa

Department of Environmental Conservation

Source Specific State Implementation Plan Revision

KNOWLTON TECHNOLOGIES, LLC
PERMIT ID: 6-2218-00017/00009

DECEMBER 2022

DIVISION OF AIR RESOURCES
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Table Contents

Acronyms and Abbreviations

CAA	Federal Clean Air Act
DAR	DEC Division of Air Resources
DEC	New York State Department of Environmental Conservation
EPA	United State Environmental Protection Agency
NAAQS	National Ambient Air Quality Standards
NO_x	Oxides of Nitrogen
NYCRR	New York Codes, Rules, and Regulations
RACT	Reasonably Available Control Technology
SIP	State Implementation Plan
SSSR	Source Specific SIP Revision
VOCs	Volatile Organic Compounds

Introduction

The United States Environmental Protection Agency (EPA) defines Reasonably Available Control Technology (RACT) as the lowest emission limitation that a particular source is capable of meeting by the application of control technology that is reasonably available considering technological and economic feasibility.

Title 6 of the New York Codes, Rules, and Regulations (NYCRR) contains several regulations that define Reasonably Available Control Technology (RACT) for certain categories of stationary sources in New York. These regulations seek emissions reductions of nitrogen oxides (NO_x) and/or volatile organic compounds (VOCs) to help attain and/or maintain the 8-hour ozone National Ambient Air Quality Standards (NAAQS).

Depending upon the relevant RACT regulation, a source that is required to implement RACT must meet a presumptive RACT limit, meet an alternate limit determined from an approved technical analysis if reaching a presumptive RACT limit is technically or economically infeasible, or meet an approved case-by-case RACT limit for sources which do not have a presumptive RACT limit established in regulation. Individual source specific RACT determinations that are included in a facility's operating permit must be submitted to EPA as a revision to the New York State Implementation Plan (SIP) to satisfy the NO_x and/or VOC RACT requirements under sections 182 and 184 of the Clean Air Act (CAA).

The New York State Department of Environmental Conservation's (DEC's) DAR-20 guidance, titled "Economic and Technical Analysis for Reasonably Available Control Technology (RACT)," provides procedures for the economic and technical feasibility analysis that needs to be used to evaluate source-specific RACT determinations and to determine appropriate RACT emission limits. This analysis must also be completed at each renewal of the emission source owner's permit. The re-evaluation must contain the latest control technologies and strategies available for review and allow for an inflation-adjusted economic threshold.

Source-specific RACT Determination and RACT Analysis

The Air Title V Facility Permit for Knowlton Technologies, LLC issued on December 27, 2022 contains a permit condition (Condition 32) that establishes a VOC emission limit for the tanks, because the removal efficiency is below the 81% required to be RACT under 212-3.

In accordance with 6 NYCRR 212-3 and the RACT analysis evaluating the technical feasibility of adjustments to the tanks, methanol throughput is limited to 2,500,000 pounds per year.

The technical analyses used by DEC to determine the RACT variance are included in this Source Specific SIP Revision (SSSR) as Appendix A.

Air Title V Facility Permit and Permit Review Report

The RACT variance permit conditions are included in Appendix B, but the complete Air Title V Permit issued on December 27, 2022 for Knowlton Technologies, LLC is available at: https://www.dec.ny.gov/dardata/boss/afs/permits/622180001700009_r3.pdf

The Permit Review Report for this facility is available at: https://www.dec.ny.gov/dardata/boss/afs/permits/prr_622180001700009_r3.pdf

Intended for
Knowlton Technologies, LLC, Watertown, New York

Document type
Report (Revised)

Date
March 2022

PART 212 VOC RACT EVALUATION
EMISSION POINT – TANK1

Bright ideas. Sustainable change.

PART 212 VOC RACT EVALUATION
EMISSION POINT – TANK1

Project name	Title V Renewals
Project no.	11443\73825 (Knowlton file number KT0532)
Recipient	New York State Department of Environmental Conservation (NYSDEC)
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Prepared by	CherylAnn Whitmore, PE
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CONTENTS

LIST OF TABLES

LIST OF APPENDICES

EXECUTIVE SUMMARY

This revised Reasonably Available Control Technology (RACT) evaluation was prepared for volatile organic compound (VOC) emissions from Knowlton Technologies, LLC, Inc (Knowlton) air emission point TANK1. This revised RACT evaluation replaces the previously submitted RACT evaluation dated January 15, 2020. Knowlton currently operates in accordance with Title V operating permit ID 6-2218-00017/00009 and the VOC emission rate potential (ERP) of emission point TANK1 is in excess of 3.0 lb/hr. Therefore, this emission point is subject to Title 6 of the New York Codes, Rules and Regulations (6 NYCRR) Part 212-3 RACT for Major Facilities.

Process change, material substitution/reformulation, and add-on control options were considered as possible means of reducing VOC emissions from these emission points. Process change and material substitution alternatives were not found to be technically and/or economically feasible.

Add-on control options that were potentially technically feasible were evaluated for cost. This update includes a more detailed cost estimate for the methanol vapor recovery control option. Of the add-on control options studied, none were found to be cost-effective.

None of the control alternatives evaluated were found to be both technically and economically feasible. Therefore, this evaluation concludes that emission point TANK1 has RACT since no other alternatives could be shown as feasible.

1. INTRODUCTION

1.1 Need for RACT Analysis

6 NYCRR Part 212-3 requires the application of RACT to certain general process emission points that emit VOCs. At a facility considered major with respect to VOC, an emission point subject to Part 212 must have RACT if its VOC ERP is equal to, or exceeds 3.0 lb/hr. In all cases, if an emission point has greater than or equal to 81 percent capture and control of VOCs, it is considered to have achieved RACT.

Emission point TANK1 has a VOC ERP greater than 3.0 lb/hr and is not currently equipped with 81 percent capture and control. A RACT analysis is, therefore, required.

Various VOC control options were analyzed for technical and economic feasibility for emission point TANK1. This document summarizes the results of the analyses and recommends RACT for this emission point.

1.2 General Facility Description

Knowlton, located in Watertown, New York, manufactures various specialty papers including paper media for use in filters and in friction products such as clutch plates or wet braking systems. The facility primarily consists of three paper machines, a resin saturator process line, a coating solution preparation area (resin kitchen), storage tanks, and related support equipment.

1.3 Emission Point Description

Emission point TANK1, located in the Beebee Island Building, vents two 10,000-gallon underground solvent storage tanks used to store and supply virgin methanol to the solvent saturator process line. It is noted that there is only one fill port associated with these tanks and only one tank can be filled at a time.

2. RACT METHODOLOGY

This section describes the general methodology used to evaluate and identify RACT for the underground storage tanks associated with emission point TANK1.

2.1 Approach

The first step in the RACT evaluation was to quantify VOC emissions from the storage tanks. Details are discussed in Section 3.

Next, potential emission control alternatives were identified. The types of control alternatives considered included:

- changes to the process generating the VOC air emissions
- substitution of non-VOC materials
- use of add-on control devices

Each VOC control alternative was first screened to identify whether it would be technically feasible for reducing VOC emissions from the underground storage tanks. Capital and annualized cost estimates were then prepared for each technically feasible control option. Finally, results of the economic analyses were compared to the RACT cost-effectiveness criteria to identify RACT for this emission point.

2.2 Cost-Effectiveness Criteria

New York State Department of Environmental Conservation (NYSDEC) guidance[1] suggests that a particular RACT alternative is cost-effective if the annualized cost of that control is less than $3,000 per ton of VOC removed (1994 dollars). Using the Consumer Price Index (CPI)[2], the adjusted cost-effectiveness criterion is $5,821 in 2022 dollars (February 2022). If more than one alternative is found to cost less than this criterion, the best option is chosen based on other factors such as energy usage, removal efficiency, schedule to implement, and compatibility with the existing process.

[1] *DAR-20, Economic and Technical Analysis for Reasonably Available Control Technology (RACT),* NYSDEC, August 8, 2013.
[2] https://www.bls.gov/data/inflation_calculator.htm

3. BASELINE EMISSIONS

Baseline annual VOC emissions for emission point TANK1 were derived from maximum allowable annual methanol (virgin and reclaimed) usage (*i.e.,* 2,500,000 million pounds per year) and working loss calculations provided by Knowlton. The emission rate potential (ERP) was calculated using the maximum fill rate of 80 gallons per minute and the maximum time required for filling one tank.

Table 3-1 summarizes the VOC emissions information for emission point TANK1. See Appendix A for additional data regarding the emission and source parameters used in the RACT analysis.

Table 3-1 Part 212 VOC RACT Evaluation, Emission Point TANK1.

NYSDEC Emission Point ID	Total VOC ERP (lb/hr)	Annual VOC (lb/yr)
TANK1	3.33	252

4. CONTROL OPTIONS

4.1 Process Changes

VOC emissions from emission point TANK1 are generated via vapor displacement during filling of the tanks. Whenever the tanks are filled, a volume of methanol-laden air is displaced that is equal to the volume of liquid added. This must always occur if the pressure in the tanks is to remain nearly constant. Thus, filling VOC losses from emission point TANK1 are inherent to this type of operation.

A vapor balance system was considered as a potential process change alternative. Specifically, the VOCs vented from the underground storage tanks during filling operations would be directed back to the delivery tank trailer. This process would, however, require that the methanol supplier's tank trailer be equipped to handle the returned methanol vapor. Based on discussions with the current methanol supplier, they could provide deliveries via a tank trailer equipped to handle these return vapors. Therefore, a vapor balance system, was considered technically feasible.

Conservation vents for the methanol tanks could also be considered. However, conservation vents are only effective at reducing breathing losses and not filling losses. Since the methanol tanks are located underground, little or no breathing losses occur, since the temperature of the tank contents is held virtually constant. Therefore, an economic evaluation of this alternative was not prepared.

Based on the discussion above, the only technically feasible process change was the installation of a vapor balance system. A cost estimate of the vapor balance system was prepared to evaluate the economic feasibility of this process change. The results are summarized in Appendix A and the supporting documentation is included in Appendix B.

4.2 Material Substitution and Reformulation

Prior to the use of methanol as the primary solvent, Knowlton used isopropanol in its resin coating/saturating solutions. In an effort to increase production rates, Knowlton switched to methanol as the primary solvent in the early 1990's because methanol has a lower drying curve than isopropanol. With this switch, Knowlton was able to increase its production rate as market demand increased. Therefore, the emissions associated with emission point TANK1 are directly a result of this solvent switch.

Since these resin solutions are not soluble in water, substituting water for methanol is not technically feasible, and was not considered further. For non-water soluble formulations, an organic solvent must be used.

Other VOC solvents, such as isopropanol and ethanol, are currently used at the facility. Therefore, a possible material substitution option would be to substitute isopropanol and/or ethanol for methanol. Even if this substitution did not adversely affect the resin solution properties, Knowlton could not substitute methanol with either isopropanol or ethanol without significantly lowering its production rate. As stated above, isopropanol has a higher drying curve than methanol and ethanol has a higher water content, which requires a longer drying time. Therefore, the use of isopropanol and/or ethanol was not considered a feasible option.

Finally, the use of non-VOC organic solvents, such as acetone and dichloromethane, were evaluated as material substitution options. Acetone is not considered a technically feasible material substitution option due to fire and explosion concerns in the resin saturator. Dichloromethane is much safer than acetone, with respect to fire/explosion issues, but it is more toxic and will oxidize in the incinerator/boiler system to form HCl. By switching to dichloromethane, Knowlton would potentially create a new environmental issue. Therefore, dichloromethane is also not considered a technically feasible material substitution option.

Based on the discussion above, technically feasible material substitution alternatives could not be identified which would significantly reduce VOC emissions from emission point TANK1.

4.3 Add-On Controls

The process of evaluating potential add-on controls for emission point TANK1 is outlined in this section.

4.3.1 Control Screening

An initial screening of add-on control technologies was performed to identify potentially feasible and demonstrated technologies. This screening was completed for the purpose of eliminating technologies that are inappropriate for reduction of the methanol emissions from emission point TANK1. Potential technologies for screening were derived from available references, including:

- *Handbook on Control Technologies for Hazardous Air Pollutants*, U.S. Environmental Protection Agency (EPA/625/6-91/014), June 1991
- *EPA Air Pollution Control Cost Manual*, Office of Air Quality Planning and Standards, Sixth Edition, January 2002
- Control equipment manufacturers
- Technical journals, reports, newsletters, and air pollution control seminars

This screening indicated that the following technologies could be considered as potential options for emission point TANK1.

- Recuperative thermal oxidation
- Regenerative thermal oxidation
- Catalytic thermal oxidation
- Liquid absorption (scrubber)
- Condensation
- Carbon adsorption

The above potential control options were reviewed in more detail to evaluate technical feasibility based on emission point-specific parameters. Table 4-1 shows the matrix used to summarize the screening for emission point TANK1. Refer to Appendix A for the emission and source parameters used in the RACT analysis.

Table 4-1 Control Technology Screening Matrix.

Technology Screening Criteria	Recup. Thermal Oxidation	Regen. Thermal Oxidation	Catalytic Oxidation	Absorption	Condensation	Carbon Adsorption
Significant VOC reduction?	Yes	Yes	Yes	Yes	Yes	No[1]
Proven or expected performance at concentration range?	Yes	Yes	Yes	Yes	Yes	No
Flexibility to variations in influent concentrations?	Yes	Yes	Yes	Yes	No	Yes
Inhibitory factors in gas stream?	No	No	No	No	Yes – Moisture	Yes- Moisture
Readily available equipment at scale?	Yes	Yes	Yes	Yes	Yes	Yes
Operating personnel requirements	Low	Low	Low	Low	Low	Low
Residual management issues?	No	No	No	Yes[2]	Yes[2]	Yes[2]
Include in economic screening evaluation?	Yes	Yes	Yes	Yes	Yes	No

[1]Methanol is the only VOC from emission point TANK1. Methanol does not readily adsorb onto activated carbon. Therefore, carbon adsorption technologies are not considered technically feasible for this application.
[2]The solvent-laden liquid effluent would require either pretreatment before disposal to the sewer or would be sent off-site for proper disposal.

4.3.2 Description of Add-on Control Options Considered

4.3.2.1 New Add-on Control

Thermal and Catalytic Oxidation

Thermal oxidizers are commonly used as add-on control devices for dilute organic streams. Thermal energy can be recovered by using a heat exchanger (recuperative thermal oxidizer) or, in the case of a regenerative thermal oxidizer, by cycling the inlet and outlet air streams through a heat retaining media. Catalytic oxidation is another thermal oxidation technique that uses a catalyst to lower the temperatures required for solvent destruction. The lower oxidation temperature may result in lower fuel use. A destruction efficiency of 98 percent or greater can be achieved with each of these oxidizers. Therefore, oxidation was considered technically feasible.

Absorption

Wet scrubbing is a liquid absorption technique where the gas stream is contacted with a liquid solvent stream to remove contaminants. While wet scrubbing as a control technique is typically used for inorganic vapors, it can still be used for organic gas streams and achieve removal efficiencies of 90% to an excess of 99%. Methanol is miscible in water; therefore, wet scrubbing could be expected to absorb or remove most of the VOC emitted from emission point TANK1. The disadvantage for using wet scrubbing is that treating methanol prohibits water recirculation in the scrubber, thus increasing utility (*i.e.,* water) requirements. Although costly, wet scrubbing is considered technically feasible.

<u>Condensation</u>
Condensation is the conversion of vapor/gas to a liquid. Due to the low exhaust flow rates from emission point TANK1 and relatively high VOC concentrations, condensation techniques would be capable of removing a significant quantity of VOC. Therefore, condensation was considered technically feasible.

<u>Regenerative Carbon Adsorption</u>
Low molecular weight compounds such as methanol are poorly adsorbed by carbon. Thus, carbon adsorption was not considered technically feasible. Please note that additional adsorption options, such as zeolite, may be technically feasible but were not considered in the analysis since prior RACT analyses for this source indicate that installation of new add-on control devices is significantly more costly than utilizing existing control devices (*i.e.,* routing to the existing incinerator/boiler).

Several add-on control technologies, specifically regenerative thermal oxidation, recuperative thermal oxidation, catalytic oxidation and condensation, would be technically feasible control devices for this emission point. However, because of the very low emissions from Emission Point 1-TANKS (252 lb/yr), installation of recuperative thermal oxidation, regenerative thermal oxidation, catalytic oxidation and condensation would not be practical or cost-effective. For example, preliminary cost estimates from air pollution control cost estimation spreadsheets developed by the United States Environmental Protection Agency (USEPA) showed that the annualized cost for recuperative thermal oxidation would be in excess of $25,000. Therefore, the annual cost of VOC removal would be over $200,000 per ton. This cost estimate is included in Appendix E. Given the magnitude of the cost, detailed cost analyses were not prepared for regenerative thermal oxidation, catalytic oxidation technologies or condensation.

4.3.2.2 Existing Control
The incinerator/boiler system used to control VOC and hazardous air pollutant (HAP) emissions from the resin saturator and its associated operations is located relatively close to emission point TANK1. Therefore, piping the tank vents to the incinerator/boiler system was considered technically feasible and an economic evaluation was prepared for this alternative. Although technically feasible, extensive measures would be required to address the concerns created by piping an explosive vapor to the incinerator. The results of a simplified economic analysis are found in Appendix E.

4.3.3 Economic Evaluation
For each of the control options that were deemed technically feasible, cost estimates were prepared using air pollution control cost estimation spreadsheets developed by the USEPA. The emission point parameters used for the cost analyses are provided in Appendix C, and the assumptions used are listed in Appendix D. The results are summarized in Appendix E. Finally, the detailed cost estimates themselves are attached as Appendix F.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Process change, material substitution, and add-on control alternatives were evaluated as potential RACT options for emission point TANK1. Process changes were evaluated, and installation of a vapor recovery system was deemed technically feasible. Material substitution alternatives were not considered technically feasible for reasons described in Section 4. Recuperative thermal oxidation, regenerative thermal oxidation, catalytic oxidation, liquid absorption, condensation, and piping VOC emissions to the existing incinerator/boiler system were found to be potentially technically feasible add-on control options.

Of the potentially technically feasible options investigated, none were found to be economically feasible. Table 5-1 summarizes the cost-effectiveness for the technically feasible control options studied. Appendices B, C, D, and E contain the cost assumptions, summaries, and details for these options.

Table 5-1 Summary of Control Cost-Effectiveness for Emission Point TANK1.

	Methanol Vapor Recovery	Recuperative Thermal Oxidation	Pipe to the Existing Incinerator/Boiler System
Cost Estimate #1 ($/ton of VOC removed)	$54,357	$208,583	$43,547
Cost Estimate #2 ($/ton of VOC removed)	$52,490	----	----
Cost Estimate #3 ($/ton of VOC removed)	$54,328	----	----
Cost Effective?	No	No	No

5.2 RACT Recommendation

Since add-on controls, process changes or material substitutions could not be identified which were both feasible and cost-effective, emission point TANK1 is considered to have RACT for VOC emissions. It is proposed that the RACT permit condition require records be maintained to demonstrate that the methanol throughput of the tanks is limited to a maximum of 2,500,000 pounds on a rolling 12-month basis.

APPENDIX A
PROCESS CHANGES COST ESTIMATION SUMMARY

Table A-1
Summary of Economic Impacts of Process Changes
Emission Points TANK1

Process Changes	Baseline Emissions (tpy)	Emission Reduction (tpy)	Economic Impacts: Installed Capital Cost ($)	Economic Impacts: Total Annualized Cost ($/yr)	Economic Impacts: Cost Effectiveness ($/ton)
Vapor Recovery System - Estimate #1	0.126	0.122	60,400	6,632	54,357
Vapor Recovery System - Estimate #2	0.126	0.123	59,033	6,482	52,490
Vapor Recovery System - Estimate #3	0.126	0.123	61,100	6,708	54,328

Table A-2
Methanol Vapor Recovery Cost Estimate
Methanol Storage Tanks

Category		Extended Cost
Total Direct Costs	$	22,500
Indirect Installation Costs (IDC)	$	37,900
Temp Equipmment/Consumables	$	1,100
Engineering Design/Construction Support	$	15,000
CM/Commissioning	$	20,000
Contractor's Fees	$	1,800
Contingencies	$	-
TOTAL CAPITAL INVESTMENT PER UNIT (TCI) [(1)]		$60,400
Direct Annual Costs (DAC)	$	-
Electricity (150 kW x 8760 hr/yr x $0.10/kwh)[(3)]	$	-
Natural Gas Consumption ($5.00 X 3.90 MMBtu/hr x 8760 hr/y	$	-
Operating Labor ($50/hr * 0.5 hr/shift * 3 shifts/day * 365 da	$	-
Maintenance Labor ($50/hr * 0.5 hr/shift * 3 shifts/day * 365	$	-
Other Maintenance Material Costs (100% of Maintenance Labo	$	-
Indirect Annual Costs (IDAC)	$	6,632
Administrative Charges (0.03*[Operator Labor Costs + (0.4 x	$	-
Capital Recovery Cost[(2)]	$	6,632
TOTAL ANNUALIZED EQUIPMENT COST	$	6,632

1) Based on Methanol Vapor Recovery Budgetary Cost Estimate (Class 5) prepared by Ramboll Americas Engineering Solutions in November 2021. This value assumes no contingency to be conservative.

2) Capital Recover Cost = TCI * Capital Recovery Factor(CRF); CRF $=(i \times (1+i)^n)/[(1+i)^n-1]$ where n= an equipment life of 15 years and i= an interest rate of 7%.

Table A-3
Methanol Vapor Recovery Cost Estimate - Mar. 4, 2022
Methanol Storage Tanks
Confirmatory Budget Cost from Prospective Mech. Installer #1

Category		Extended Cost
Total Direct Costs	$	22,780
Indirect Installation Costs (IDC)	$	36,253
Temp Equipment/Consumables	$	1,253
Engineering Design/Construction Support	$	15,000
CM/Commissioning	$	20,000
Contractor's Fees	$	-
Contingencies	$	-
TOTAL CAPITAL INVESTMENT PER UNIT (TCI) (1)		$59,033
Direct Annual Costs (DAC)	$	-
Electricity (150 kW x 8760 hr/yr x $0.10/kwh) (3)	$	-
Natural Gas Consumption ($5.00 X 3.90 MMBtu/hr x 8760 hr/yr) (4)	$	-
Operating Labor ($50/hr * 0.5 hr/shift * 3 shifts/day * 365 days/year)	$	-
Maintenance Labor ($50/hr * 0.5 hr/shift * 3 shifts/day * 365 days/year)	$	-
Other Maintenance Material Costs (100% of Maintenance Labor Cost)	$	-
Indirect Annual Costs (IDAC)	$	6,482
Administrative Charges	$	-
Capital Recovery Cost (2)	$	6,482
TOTAL ANNUALIZED EQUIPMENT COST	$	6,482

1) Basis of Design prepared by Ramboll Americas Engineering Solutions in November 2021. Estimated pipe, valve, and fittings costs (materials plus installation) provided by Burns Bros. Contractors.

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Table A-4
Methanol Vapor Recovery Cost Estimate - Mar. 4, 2022
Methanol Storage Tanks
Confirmatory Budget Cost from Prospective Mech. Installer #2

Category	Extended Cost
Total Direct Costs	$ 26,100
Indirect Installation Costs (IDC)	$ 35,000
Temp Equipment/Consumables	$ -
Engineering Design/Construction Support	$ 15,000
CM/Commissioning	$ 20,000
Contractor's Fees	$ -
Contingencies	$ -
TOTAL CAPITAL INVESTMENT PER UNIT (TCI) (1)	$61,100
Direct Annual Costs (DAC)	$ -
Electricity (150 kW x 8760 hr/yr x $0.10/kwh)(3)	$ -
Natural Gas Consumption ($5.00 X 3.90 MMBtu/hr x 8760 hr/yr)(4)	$ -
Operating Labor ($50/hr * 0.5 hr/shift * 3 shifts/day * 365 days/year)	$ -
Maintenance Labor ($50/hr * 0.5 hr/shift * 3 shifts/day * 365 days/year)	$ -
Other Maintenance Material Costs (100% of Maintenance Labor Cost)	$ -
Indirect Annual Costs (IDAC)	$ 6,708
Administrative Charges	$ -
Capital Recovery Cost(2)	$ 6,708
TOTAL ANNUALIZED EQUIPMENT COST	$ 6,708

1) Basis of Design prepared by Ramboll Americas Engineering Solutions in November 2021. Estimated pipe, valve, and fittings costs (materials plus installation) provided by Docteur.

2) Capital Recover Cost = TCI * Capital Recovery Factor(CRF); CRF $=(i \times (1+i)^n)/[(1+i)^n-1]$ where n= an equipment life of 15 years and i= an interest rate of 7%.

APPENDIX B
VAPOR RECOVERY DESIGN AND COST ESTIMATES

ENERGY

KNOWLTON TECHNOLOGIES – METHANOL VAPOR RECOVERY BUDGETARY COST ESTIMATE (CLASS 5)

Project name	Methanol Vapor Recovery Evaluation
Project no.	1940101556
Recipient	Knowlton Technologies
Document type	Budgetary Cost Estimate
Version	1
Date	November 18, 2021
Prepared by	Andrew Snyder
Checked by	Dimitri Sokolik
Approved by	Dimitri Sokolik
Description	Engineer's Opinion of Probable Construction Cost (Class 5 budgetary cost estimate) for Methanol Vapor Recovery System

CONTENTS

1. Introduction

The purpose of this memorandum is to provide Knowlton Technologies (Knowlton) with the Engineer's Opinion of Probable Construction Cost (budgetary cost estimate) prepared by Ramboll Americas Engineering Solutions, Inc. (Ramboll) for the proposed Methanol Vapor Recovery system installation at Knowlton's Watertown, NY facility.

This deliverable outlines the anticipated scope of work for the proposed modifications at the current level of process design development and summarizes the budgetary cost estimate approach and results.

2. Design Basis

The budgetary cost estimate is based on the preliminary process design concept developed by Ramboll in conjunction with Knowlton.

Currently, the two existing underground methanol storage tanks (Tank #1 and Tank #2) are filled through a common feed pipe via gravity from a tanker truck parked in the unloading area adjacent to the tank farm enclosure. The truck is connected via hose to a fill port located on the exterior wall of the enclosure for the Bulk Storage Tank Farm. Manual valves on the liquid fill line allow the operator to direct methanol to either Tank #1 or Tank #2. During chemical unloading, the displaced methanol vapor from the tanks vents freely through a shared vent header that discharges to the atmosphere outdoors. Tank #1 and Tank #2 are 10,000 gallon, carbon steel tanks designed to UL-58 and constructed by Highland Tank & Manufacturing Company Inc. (Highland), with a design pressure of 1.0 pounds per square inch gauge (psig) and a design vacuum of 0.5 psig (per Highland correspondence with Ramboll on 10/13/2021).

Knowlton is evaluating the installation of a vapor return line between the storage tanks and the tanker truck to reduce methanol emissions to the atmosphere during truck unloading operations. The existing liquid methanol unloading process will remain unchanged. A new, combined vent header will be provided so that the displaced methanol vapors will be directed back to the tanker truck during unloading; a hose connection will be provided proximal to the fill port for connection to the vapor recovery nozzle on the tanker truck. The vapor return line will be provided with a blocking valve and an inline detonation flame arrestor at the hose connection. A new combination detonation flame arrestor/conservation vent will also be installed on the combined atmospheric vent from the tanks to provide normal inbreathing and outbreathing venting of the storage tanks, as well as serve as emergency venting during unloading operations in the event the vapor return piping is not operational.

The preliminary design of the vapor return system is defined by the following.

2.1 Process Drawings

A preliminary piping and instrumentation diagram (P&ID) was developed at a conceptual level for the Methanol Vapor Recovery system. This P&ID identifies major process equipment, valves, instrumentation, piping and miscellaneous mechanical items required for this system.

The Process Drawings are provided as Attachment 1.

2.2 Equipment List

The preliminary P&ID was used to identify major process equipment, valves, instrumentation and miscellaneous mechanical items for the vapor return system. Costs for these devices were taken from

Ramboll's database of historical pricing records from previous projects for analogous devices and adjusted to 2021 values using the most recent Chemical Engineering Plant Cost Index for instrumentation and valves. Where information was not available in the Ramboll database budgetary vendor quotes were obtained.

The following equipment and materials (direct costs) are included in this scope of work.

Table 1: Direct Costs

ITEM	DESCRIPTION	ESTIMATED COST (USD)	NOTES
Flame Arrestor (DFA)	2" in-line flame arrestor, flanged, 304 SS	$7,000	Purchase price, 2021 budgetary vendor quote
Conservation Vent (CSV)	2" end of line pressure-vacuum vent, 304 SS	$3,000	Purchase price, 2021 budgetary vendor quote
Valve	2" butterfly valve, lug style, 304 SS	$1,000	Purchase price, estimate from database
Piping	2" sch 10 CS (qty 50 ft), threaded, with elbows (qty 8), flanges (qty 6) and hangers (qty 10)	$6,000	Installed cost, estimate from database ($120/linear foot)
Automation & Controls	No scope	$0	Assumed existing controls are adequate
Installation Cost	Installed cost for DFA, CSV, Valve	$5,500	Assumed 50% of directs due to small scope
TOTAL DIRECTS		$22,500	

2.3 Site Photographs

The following photographs were used, along field observations, to estimate piping runs for the addition of the new vapor recovery system.

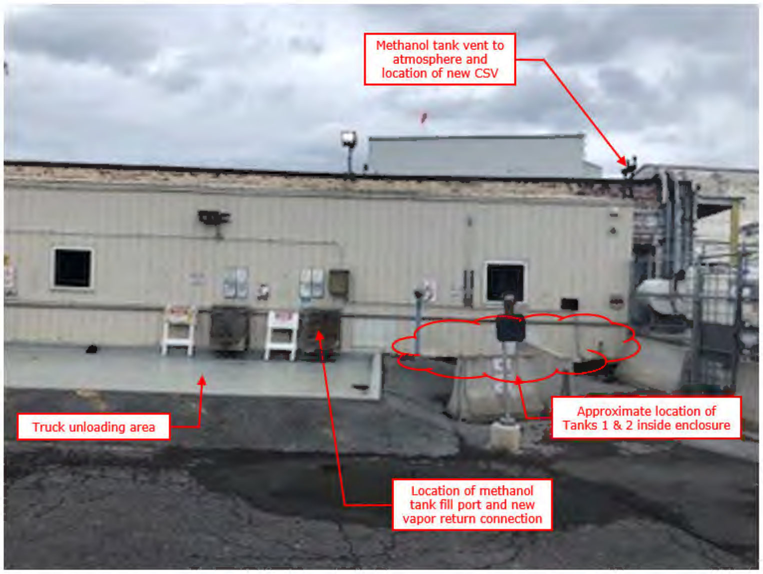


Figure 1: Bulk Chemical Tank Farm – Enclosure Exterior

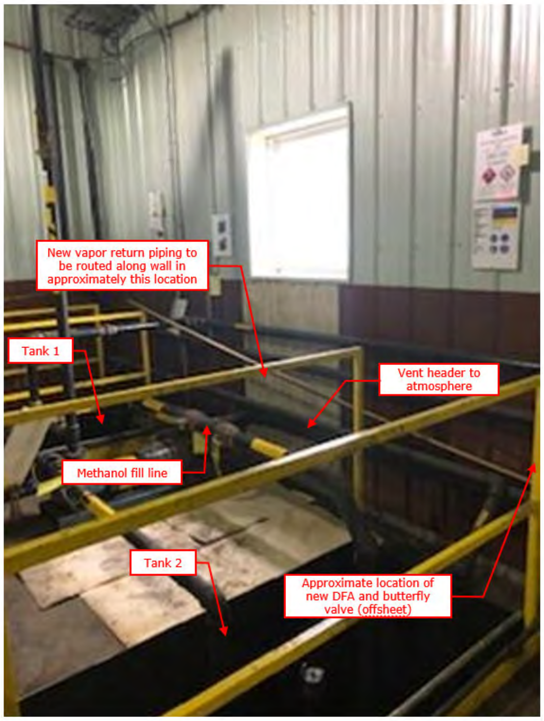


Figure 2: Bulk Chemical Tank Farm – Enclosure Interior

2.4 Hydraulic Calculations

Preliminary hydraulic calculations were performed to estimate the tanker truck gravity unloading rate and venting requirements for the vapor recovery system to define required pipe sizes. The truck unloading rate by gravity was estimated to be approximately 80 gallons per minute (gpm). The vapor recovery piping is sized to accommodate an equivalent amount of displacement losses from the tank due to filling; built-up pressure in the tank during filling will be much less than the design pressure of the tank and the setpoint pressure of the new conservation vent.

Calculations were also performed to estimate the maximum flow that the atmospheric vent header can achieve due to normal inbreathing and outbreathing. At the assumed conservation vent setpoints of 0.9 psig pressure and -0.45 psig vacuum, venting capacities should be adequate for normal operations of the tanks.

Hydraulic Calculations are provided as Attachment 2.

3. Budgetary Cost Estimate

The design definition described above was utilized to develop a budgetary construction cost estimate for the procurement and installation of the equipment and supporting systems associated with the Methanol Vapor Recovery system. The construction costs, labor and productivity rates were developed using Ramboll's internal databases, experience, and estimation software.

3.1 Summary of Results

Based on the level of design completion for this system (less than 5% design completion), the budgetary cost estimate summarized in Table 2 is categorized as a Class 5 estimate as defined by AACE International Recommended Practice No. 18R-97 v.2020 (AACE RP18R-97).

Table 2: Budgetary Cost Estimate

ITEM	ESTIMATED COST (USD)	NOTES
Total Directs	$22,500	Installed cost of materials and equipment, see Table 1
Total Indirects		
Temp Equipment/Consumables	$1,100	Assumed 5% of directs, allowance for scaffolding, etc.
Eng Design/Construction Support	$15,000	Assumed limited design details will be required
CM/Commissioning	$20,000	Assumed 2 people for 2 wks at $100/hr plus directs
Subtotal	*$36,100*	
Contingency	$17,600	Assumed 30% due to limited design completion
Profit/Fees	$1,800	Assumed 10% of project cost
Budgetary Cost Estimate	**$78,000**	
High End Accuracy +30%	$101,000	
Low End Accuracy -30%	$60,000	Assumed no contingency

3.2 Accuracy

Per AACE RP18R-97, a Class 5 cost estimate is expected to have a low-side accuracy range of -20% to -50% and a high-side accuracy range of +30% to +100%. Based on the level of design development completed and budgetary equipment quotes obtained from vendors for major cost items, it is Ramboll's opinion that this cost estimate is within the accuracy range of -30% to +30% with respect to the ***$78,000*** budgetary cost estimate identified above. Knowlton should take the full range of the Class 5 budgetary cost estimate, ***$60,000 to $101,000***, into consideration when evaluating project funding.

The accuracy of a budgetary cost estimate can be impacted by market conditions at the time of procurement and installation, scope changes, design development details and external factors (e.g., requests by the permitting authority, subsurface conditions).

3.3 Contingency

Ramboll recommends and has included a contingency of 30% applied to the overall installed cost. The contingency reflects costs for equipment and construction activities which are expected to be required for a complete system but have not been included in the estimate detail because that equipment or activity has not been identified at the current level of design understanding. It is strongly recommended that both contingency and accuracy be included in the cost estimate.

4. Assumptions and Clarifications

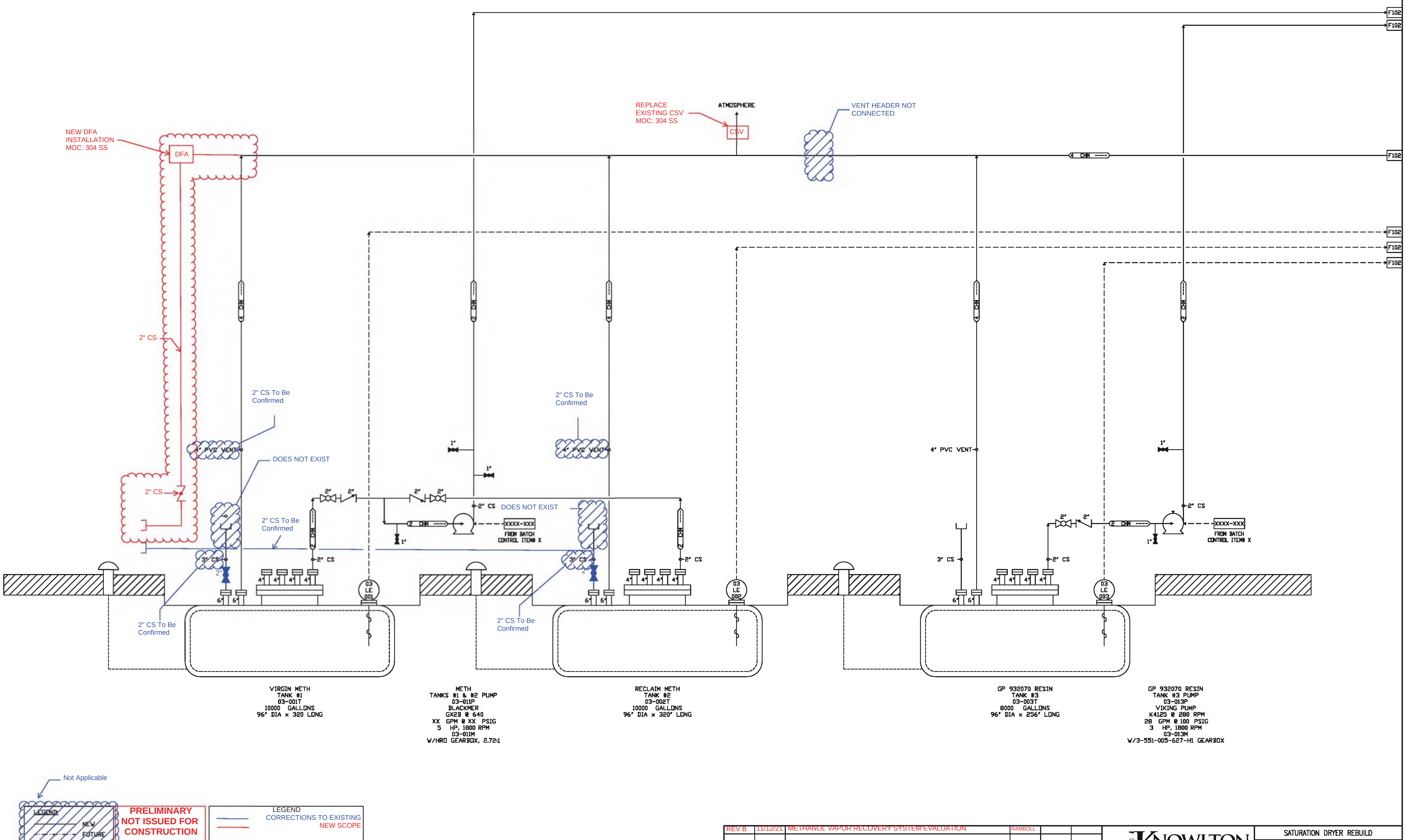
- The process design documents and budgetary cost estimate described above and included herein are preliminary in nature and do not represent the final or complete system design. Additional engineering will be required to finalize the design. These documents are not intended to be used for permitting, procurement, or construction.
- All identified scope is process-mechanical; no civil, structural, architectural, electrical, automation, ventilation, plumbing or fire protection work is included.
- Building and fire code evaluations and process hazard analysis of the system are excluded from this scope. It is assumed that the basic requirements and safeguards (e.g., explosion proof equipment, fire

containment and suppression, tank emergency pressure relief, overflow protection, etc.) are currently being met and will not be impacted by this proposed modification.
- Existing utilities and infrastructure (e.g., building code requirements, structural elements, fire protection, HVAC) are assumed to be adequate to support these modifications. No changes to these systems are included in this scope.
- Knowlton has confirmed that their methanol delivery vendor has the appropriate equipment to accommodate vapor return on their trucks.

5. Attachments

5.1 Process Drawings
5.2 Hydraulic Calculations

ATTACHMENT 1



PRELIMINARY NOT ISSUED FOR CONSTRUCTION

LEGEND
CORRECTIONS TO EXISTING
NEW SCOPE

NO.	DATE	DESCRIPTION	BY	CKD	APPVD
REV B	11/12/21	METHANOL VAPOR RECOVERY SYSTEM EVALUATION	RAMBOLL		
REV_0	01/18/13	UPDATED TITLE BLOCK	RRW	RSF	
REV_A	07/20/06	LAST ISSUE OF ORIGINAL APEC DWG. F101 (REV.1)	–	–	

HJH DWG NO.: 251253–PD02

KNOWLTON TECHNOLOGIES
Engineered Composites & Media
213 FACTORY STREET
WATERTOWN NY.

SATURATION DRYER REBUILD
JOB: P&ID
BULK STORAGE TANK FARM 1–3
DATE: 01–18–13 | SCALE: AS NOTED | DWG: XXXXXXX | REV: 0

ATTACHMENT 2

Process Description:

Methanol is transferred from a chemical storage truck via gravity into two underground storage tanks. During the tank filling process methanol vapors are vented back to the truck via a methanol vent header. During normal operation both tanks are vented to the atmosphere through another common vent header. The storage tanks are connected upstream of a methanol pump (03-011P) which supplies methanol to the site.

Pipe-Flo Design:

The maximum flowrate for each identified flow scenario are illustrated in the flowsheet. Maximum flow was achieved by minimizing pipe losses and maximizing hydrostatic pressure, within reason.

The storage tanks have a design pressure/vacuum of 1.0 psi and 0.5 psi respectively. Flows are defined as 85% of the design pressure/vacuum.

Liquid Fill:
Describes the existing process for filling the underground storage tanks from a full chemical storage truck via gravity.

Vapor Out-breathing To Truck:
Describes the flow of displaced methanol vapor from the underground storage tank, through the DFA and back to the chemical storage truck.

Vapor Out-breathing To Atmosphere:
Describes the flow of methanol vapors from the underground storage tank, through the conservation vent (CSV) then to the atmosphere.

Vapor In-breathing:
Describes the flow of air entering the underground storage tank through the CSV from the atmosphere.

Assumptions:

Piping:
Feed Line: 2" OD, Carbon Steel
Line Length: 35' (inc. allowance for hose)
Beginning El.: 3' (truck connection), End El.: 0' (top of tank)

Vapor Return Line: 2" OD, Carbon Steel
Line Length: 40' (inc. allowance for hose, onboard truck piping)
Beginning El.: 0 (top of tank)', End El.: 8' (top of truck)

Atmospheric Vent Line (Pressure & Vacuum): 2" OD, Carbon Steel
Vent Line Length: 30'
Beginning El.: 0' (top of tank), End El.: 15' (vent above roofline)

Equipment:
Distribution Pump gpm: < 750 gpm
DFA dP: 0.5 psi
CSV dP: 0.1 psi
CSV Setpoint: 0.9 psi

PIPE-FLO Advantage	
Program Version:	17.2.51801
Calculation Method:	Darcy-Weisbach
Maximum Iterations:	1000
Percent Tolerance:	0.01 %
Laminar Cutoff Re:	2100
Allowable Deviation:	1 %

Units					
Area:	ft²	**Flow rate:**	gpm	**Heat Transfer Rate:**	BTU/h
Length:	ft	**Pressure:**	psi	**Heat Transfer Coefficient:**	BTU/h*ft²°F
Elevation:	ft	**Power:**	kW	**Specific Heat Capacity:**	BTU/lb°F
Size:	mm	**Temperature:**	°F	**Thermal Capacitance:**	BTU/h°F
Velocity:	ft/s	**Density:**	lb/ft³	**Thermal Insulance:**	h*ft²°F/BTU
		Viscosity:	cP	**Atmospheric Pressure:**	14.7 psi a

Project Information	
Company:	Ramboll
Project:	Knowlton Methanol Vapor Recovery/1940101556
Drawn by:	
File Name:	11182021 Tank Fill.pipe
Lineup:	<Design Case>
Print Date:	Thursday, November 18, 2021 12:19 PM

Bill of Materials Report

File Name: 11182021 Tank Fill.pipe
Lineup: <Design Case>
Program Name: PIPE-FLO Advantage
Version: 17.2.51801

Company: Ramboll
Project: Knowlton Methanol Vapor Recovery/1940101556
by:
Date: Thursday, November 18, 2021 12:23 PM

Tanks

Tank Name	Geometry
Methanol Truck	Cylindrical Horizontal with Volume = 1169 ft³

Fixed dP Devices

Fixed dP Device Name	Fixed dP
CSV-Pressure	0.1 psi
CSV-Vacuum	0.1 psi
DFA	0.5 psi

Compressible Pipes

Pipeline	Specification	Size	Length	Valves and Fittings
Pressure Vent	Carbon Steel	2 in	29 ft	1 x Entrance - Sharp Edged 4 x Elbow - Standard 90° 1 x Tee - Flow Thru Branch
Pressure Vent1	Carbon Steel	2 in	1 ft	1 x Exit - Sharp Edged
Vacuum Vent	Carbon Steel	2 in	29 ft	1 x Exit - Sharp Edged 1 x Tee - Flow Thru Branch 4 x Elbow - Standard 90°
Vacuum Vent1	Carbon Steel	2 in	1 ft	1 x Entrance - Sharp Edged
Vapor Return Line	Carbon Steel	2 in	30 ft	1 x Entrance - Sharp Edged 4 x Elbow - Standard 90° 1 x Tee - Flow Thru Branch
Vapor Return Line1	Carbon Steel	2 in	10 ft	1 x Exit - Sharp Edged 1 x Butterfly

Pipelines

Pipeline	Specification	Size	Length	Valves and Fittings
Feed Line	Carbon Steel	2 in	30 ft	1 x Ball 4 x Elbow - Standard 90° 1 x Entrance - Sharp Edged 1 x Exit - Sharp Edged 1 x Tee - Flow Thru Branch

Pipeline Material Summary

Specification	Material	Size	Total Length	Valves & Fittings
Carbon Steel	Steel ASME B.36.10M Schedule: 40	2 in	130.00 ft	1 x Ball 1 x Butterfly 16 x Elbow - Standard 90° 4 x Entrance - Sharp Edged 4 x Exit - Sharp Edged 4 x Tee - Flow Thru Branch

List Report

File Name:	11182021 Tank Fill.pipe	**Calculation Method:**	Darcy-Weisbach	**Company:**	Ramboll
Lineup:	<Design Case>	**Laminar Cutoff Re:**	2100	**Project:**	Knowlton Methanol Vapor Recovery/1940101556
Progam Name:	PIPE-FLO Advantage	**Max Iterations:**	1000	**by:**	
Version:	17.2.51801	**Percent Tolerance:**	0.01	**Date:**	Thursday, November 18, 2021 12:23 PM
		Allowable Deviation:	1 %	**Atmospheric Pressure:**	14.7 psi a

Pipe Specifications

Specification Name / Valve Table	Material / Schedule	Absolute Roughness / Hazen Williams C Factor	Sizing Criteria / Sizing Criteria Value	Design Limits	Velocity	Pressure	Re Number	Mach
Carbon Steel	Steel ASME B.36.10M	1.800E-03 in	Criteria - none specified	**Min:**	ft/s	psi g		
standard	Schedule: 40	140	0.0	**Max:**	ft/s	psi g		

Fluid Zones

Fluid Zone Name / Table Name	Temperature / Pressure	Fluid State / Relative Molecular Mass	Density / Viscosity	Vapor Pressure / Critical Pressure	Specific Heat Capacity (cp) / Specific Heat Ratio (k)
Air	68 °F	Gas	0.0926 lb/ft³	--	0.2404 BTU/lb°F
Air (dry)	3.4 psi g	28.97	0.01821 cP	549 psi a	1.402
Methanol	80 °F	Liquid	48.99 lb/ft³	2.684 psi a	0.6078 BTU/lb°F
Methanol	0 psi g	32.04	0.5308 cP	1192 psi a	--

Pipelines

Pipeline Name / Specification / Fluid Zone	Size / Inside Diameter / Length	Inlet Device / Inlet Elevation / Outlet Device / Outlet Elevation	Flow Rate / Fluid Velocity / Reynolds Number / Pipe Friction Factor	Inlet Total Pressure / Inlet Static Pressure / Inlet Energy Grade / Inlet Hydraulic Grade	Total dP / Total Head Loss	Outlet Total Pressure / Outlet Static Pressure / Outlet Energy Grade / Outlet Hydraulic Grade	V&F Friction Factor / V&F Resistance K / V&F dP / V&F Head Loss
Feed Line	2 in	Methanol Truck	81.06 gpm	1.701 psi g	1.701 psi	0 psi g	0.01899
Carbon Steel	52.5 mm	3 ft	7.751 ft/s	1.383 psi g		-0.3176 psi g	4.97
Methanol	30 ft	Storage Tank Fill Rate	183378	8 ft	8 ft	0 ft	1.58 psi
		0 ft	0.02064	7.066 ft		-0.9336 ft	4.645 ft

Compressible Pipelines

Compressible Pipe Name / Fluid Zone / Specification	Inlet Device / Inlet Elevation / Outlet Device / Outlet Elevation	Mass Flow Rate / Choked Mass Flow / Standard Flow / Reynolds Number / Pipe Friction Factor	Inlet Mach Number / Inlet Velocity / Inlet Volumetric	Outlet Mach Number / Outlet Velocity / Outlet Volumetric	Inlet Total Pressure / Inlet Static Pressure / Inlet Static Temperature / Inlet Static Density	Outlet Total Pressure / Outlet Static Pressure / Outlet Static Temperature / Outlet Static Density	Total Pressure Drop / Static Pressure Drop / Pressure Drop Ratio / dP per 100 / Head Loss / Head Loss per 100
Pressure Vent	torage Tank Design Pressur	679.7 lb/h	0.09055	0.09481	0.9 psi g	0.2068 psi g	0.6932 psi
Air	0 ft	1917 lb/h	102 ft/s	106.8 ft/s	0.8107 psi g	0.1133 psi g	0.6974 psi
Carbon Steel	CSV-Pressure	8904 scfh	1067 gpm	1117 gpm	67.13 °F	67.05 °F	0.04497
Size: 2 in	14 ft	114052			0.07945 lb/ft³	0.07589 lb/ft³	2.39 psi per 100 ft
Inside Diameter: 52.5 mm		0.02145					--
Length: 29 ft							--
V&F Resistance K: 3.92							

Compressible Pipelines

Compressible Pipe Name Fluid Zone Specification	Inlet Device Inlet Elevation Outlet Device Outlet Elevation	Mass Flow Rate Choked Mass Flow Standard Flow Reynolds Number Pipe Friction Factor	Inlet Mach Number Inlet Velocity Inlet Volumetric	Outlet Mach Number Outlet Velocity Outlet Volumetric	Inlet Total Pressure Inlet Static Pressure Inlet Static Temperature Inlet Static Density	Outlet Total Pressure Outlet Static Pressure Outlet Static Temperature Outlet Static Density	Total Pressure Drop Static Pressure Drop Pressure Drop Ratio dP per 100 Head Loss Head Loss per 100
Pressure Vent1	CSV-Pressure	679.7 lb/h	0.09546	0.09616	0.1068 psi g	0 psi g	0.1068 psi
Air	14 ft	3066 lb/h	107.5 ft/s	108.3 ft/s	0.01264 psi g	-0.09489 psi g	0.1075 psi
Carbon Steel	Atmosphere	8904 scfh	1124 gpm	1132 gpm	67.03 °F	67.02 °F	7.311E-03
Size: 2 in	15 ft	114052			0.07537 lb/ft^3	0.07482 lb/ft^3	10.68 psi per 100 ft
Inside Diameter: 52.5 mm		0.02145					--
Length: 1 ft							--
V&F Resistance K: 1.00							
Vacuum Vent	CSV-Vacuum	434.9 lb/h	0.06186	0.06328	-0.1245 psi g	-0.45 psi g	0.3255 psi
Air	14 ft	1748 lb/h	69.69 ft/s	71.29 ft/s	-0.1635 psi g	-0.4899 psi g	0.3264 psi
Carbon Steel	Storage Tank Design Vacuun	5698 scfh	728.9 gpm	745.7 gpm	67.59 °F	67.58 °F	0.02246
Size: 2 in	0 ft	72987			0.07439 lb/ft^3	0.07272 lb/ft^3	1.122 psi per 100 ft
Inside Diameter: 52.5 mm		0.02251					--
Length: 29 ft							--
V&F Resistance K: 4.42							
Vacuum Vent1	Atmosphere1	434.9 lb/h	0.06134	0.06144	0 psi g	-0.0245 psi g	0.0245 psi
Air	15 ft	3359 lb/h	69.1 ft/s	69.22 ft/s	-0.0387 psi g	-0.06327 psi g	0.02457 psi
Carbon Steel	CSV-Vacuum	5698 scfh	722.7 gpm	723.9 gpm	67.6 °F	67.6 °F	1.676E-03
Size: 2 in	14 ft	72987			0.07503 lb/ft^3	0.0749 lb/ft^3	2.45 psi per 100 ft
Inside Diameter: 52.5 mm		0.02251					--
Length: 1 ft							--
V&F Resistance K: 0.50							
Vapor Return Line	Storage Tank Vent	49.9 lb/h	6.787E-03	6.789E-03	0.5068 psi g	0.5019 psi g	4.824E-03 psi
Air	0 ft	1858 lb/h	7.649 ft/s	7.651 ft/s	0.5063 psi g	0.5015 psi g	4.824E-03 psi
Carbon Steel	DFA	653.7 scfh	80 gpm	80.03 gpm	68 °F	68 °F	3.173E-04
Size: 2 in	1 ft	8373			0.07776 lb/ft^3	0.07774 lb/ft^3	0.01608 psi per 100 ft
Inside Diameter: 52.5 mm		0.03359					--
Length: 30 ft							--
V&F Resistance K: 3.92							
Vapor Return Line1	DFA	49.9 lb/h	7.020E-03	7.021E-03	1.942E-03 psi g	0 psi g	1.942E-03 psi
Air	1 ft	2406 lb/h	7.912 ft/s	7.913 ft/s	1.434E-03 psi g	-5.079E-04 psi g	1.942E-03 psi
Carbon Steel	Top of Truck Vapor Return	653.7 scfh	82.75 gpm	82.76 gpm	67.99 °F	67.99 °F	1.321E-04
Size: 2 in	8 ft	8373			0.07518 lb/ft^3	0.07517 lb/ft^3	0.01942 psi per 100 ft
Inside Diameter: 52.5 mm		0.03359					--
Length: 10 ft							--
V&F Resistance K: 1.85							

Tanks

Tank Name / Fluid Zone / Tank Geometry	Bottom Elevation / Liquid Level / Liquid Volume	Surface Pressure / Bottom Pressure / Total Tank Volume	Hydraulic Grade / Net Flow Rate	Connecting Pipelines: Pipeline Name	Penetration Height	Pipeline Flow Rate	Pressure at Penetration
Methanol Truck	3 ft	0 psi g	8 ft				
Methanol	5 ft	1.701 psi g	-81.06 gpm				
Cylindrical Horizontal with Volume = 1169 ft³	1042 ft³	1169 ft³					
				Feed Line	0 ft	81.06 gpm	1.701 psi g

Fixed dP Devices

Fixed dP Device Name	Inlet Elevation / Inlet Pressure	Outlet Elevation / Outlet Pressure	dP / Head Loss	Flow Rate
CSV-Pressure	14 ft	14 ft	0.1 psi	1117 gpm
	0.2068 psi g	0.1068 psi g	--	
CSV-Vacuum	14 ft	14 ft	0.1 psi	723.9 gpm
	-0.0245 psi g	-0.1245 psi g	--	
DFA	1 ft	1 ft	0.5 psi	80.03 gpm
	0.5019 psi g	1.942E-03 psi g	--	

Pressure Boundaries

Pressure Boundary Name / Operation	Elevation	Total Pressure / Static Pressure / Dynamic Pressure	Energy Grade / Hydraulic Grade / Dynamic Head	Flow Rate
Atmosphere	15 ft	0 psi g	--	1132 gpm
P Total @ 0 psi g		-0.09489 psi g	--	
		0.09489 psi	--	
Atmosphere1	15 ft	0 psi g	--	722.7 gpm
P Total @ 0 psi g		-0.0387 psi g	--	
		0.0387 psi	--	
Storage Tank Design Pressure	0 ft	0.9 psi g	--	1067 gpm
P Total @ 0.9 psi g		0.8107 psi g	--	
		0.08934 psi	--	
Storage Tank Design Vacuum	0 ft	-0.45 psi g	--	745.7 gpm
P Total @ -0.45 psi g		-0.4899 psi g	--	
		0.03993 psi	--	
Storage Tank Fill Rate	0 ft	0 psi g	0 ft	81.06 gpm
P Total @ 0 psi g		-0.3176 psi g	-0.9336 ft	
		0.3176 psi	0.9336 ft	
Top of Truck Vapor Return	8 ft	0 psi g	--	82.76 gpm
P Total @ 0 psi g		-5.079E-04 psi g	--	
		5.079E-04 psi	--	

Flow Demands

Flow Demand Name Operation Flow Direction	Elevation	Total Pressure Static Pressure Dynamic Pressure	Energy Grade Hydraulic Grade Dynamic Head	Flow Rate
Storage Tank Vent	0 ft	0.5068 psi g	--	80 gpm
Flow Rate @ 80 gpm		0.5063 psi g	--	
Flow in		4.910E-04 psi	--	

DOCTEUR ENVIRONMENTAL

MJDNY, LLC
33112 Nys Rte 12e
Cape Vincent, NY 13618
(315) 654-2585
Fax (315) 501-4034

February 24, 2022

Knowlton Technologies, LLC
213 Factory Street
Watertown, NY 13601

RE; Methanol Vapor Recovery Cost Estimate using carbon steel pipe and fittings

Black iron pipe is an excepted product for use with methanol gas. We revised the previous quote to include all carbon steel products.

Material $7,400.00

Installation costs $8,700.00

Michael Docteur

Docteur Environmental

DOCTEUR ENVIRONMENTAL
MJDNY, LLC
33112 Nys Rte 12e
Cape Vincent, NY 13618
(315) 654-2585
Fax (315) 501-4034

February 24, 2022

Knowlton Technologies, LLC
213 Factory Street
Watertown, NY 13601

RE; Methanol Vapor Recovery Cost Estimate using 304 stainless steel

Material as directed in table 1 direct costs

Material $22,880.00

Installation costs $9,800.00

Michael J Docteur

Michael Docteur

Docteur Environmental

Burns Bros Contractors
HVAC • PLUMBING • PROCESS

400 Leavenworth Avenue
Syracuse, New York 13204

(315) 422-0261

Date: 1/14/2022

Attention: Greg Ebersbach

Burns Bros Contractors offers the following quotation for the services listed below:

Description of work: Knowlton Methanol Vapor Recovery System (Budgetary Estimate):
Procure and install (1) 2" flame arrestor (DFA), (1) 2" pressure-vacuum vent (CSV), (1) 2" butterfly valve, 2" carbon steel sch 10 piping, 2" carbon steel fittings (elbows and flanges), and hangers (DFA and CSV equipment costs included in quote are from vendor quotations to Ramboll).

Burns to provide: Labor, equipment, and material required for the above listed scope of work.

Customer to provide: Shutdown, access, and permits.

Subcontractor:	**$0**
Material:	**$13,619**
Equipment:	**$1,253**
Labor:	**$9,161**
Total:	**$24,033**
Contingency (30%):	**$7,210**
Grand Total:	**$31,243**

Notes:
- All labor rates are based on normal business hours M-F.
- State tax is excluded.
- Insulation and painting of piping is excluded.
- Design, commissioning, electrical, and automation/controls services are excluded.

Submitted by: Madeline Slominski

APPENDIX C
BASELINE EMISSION POINT PARAMETERS

Table C-1
Baseline Emission Point Parameters
Emission Point TANK1

	Emission Point TANK1
Exhaust Flow Rate at tank vent (scfm @ 60°F, 14.7 psia)	11.781[a]
Exit Temperature (°F)	70
Moisture	Ambient
Typical Operation:	
hr/day	2
day/yr	39
hr/yr	78
Total VOC ERP (lb/hr)[b]	3.33
Annual VOC (lb/yr)[b]	252

[a]A 500 cfm flow rate was used for estimating oxidizer costs.

[b]Emission rates were calculated by Knowlton.

APPENDIX D
ADD-ON CONTROL COST ESTIMATE ASSUMPTIONS

Add-On Control Cost Estimate Assumptions

D.1 Add-On Control Cost Analysis Assumptions

The control cost estimates were developed using air pollution control cost estimation spreadsheets developed by the United States Environmental Protection Agency (USEPA). The assumptions used are summarized below. Some of these assumptions were made in an effort to simplify the cost analysis. The resulting costs are lower than would actually be encountered if all parameters were included. Thus, each control option will appear to be more cost-effective than it would be in reality.

D.2 Capital Costs for Recuperative Thermal Oxidation

The following assumptions were used:

- The oxidizer was assumed to be installed at grade level.
- Site preparation costs were not included.
- Standard materials of construction were assumed (no additional corrosion protection).
- Utilities were assumed to be readily available without the need for significant capital expenditures.

D.3 Annualized Costs for Recuperative Thermal Oxidation

The following assumptions were used:

- Default operator and maintenance labor costs were included.
- Current utility rates were used.
- A 7 percent interest rate and 10 year equipment life were assumed to calculate the capital recovery.
- Destruction efficiency was assumed to be 98 percent.
- Hours of operation were assumed to be 78 hr/yr.

D.8 Capital Costs to Pipe to the Existing Incinerator/Boiler System

The following assumptions were used:

- A minimum of 250 feet of 2” diameter carbon steel pipe and associated piping support was assumed.
- Cost for piping insulation, and tie-ins were not included.
- Cost for piping infrastructure and labor were included.
- Cost for a detonation arrestor was included, but other required explosion prevention measures were not included.

D.9 Annualized Costs to Pipe to the Existing Incinerator/Boiler System

The following assumptions were used:

- A 7 percent interest rate and 10 year equipment life were assumed to calculate the capital recovery.
- A 99.9% VOC removal efficiency was assumed.

APPENDIX E
ADD-ON CONTROL COST ESTIMATION SUMMARY

Table E-1
Summary of Economic Impacts of Add-On Control Alternatives
Emission Points TANK1

	Ba Em (				
Thermal Oxidation - Recuperative	0.126	0.122	133,641	25,361	208,583
Pipe to Existing Incinerator/Boiler	0.126	0.126	38,493	5,481	43,547

APPENDIX F
ADD ON CONTROL DETAILED COST ESTIMATES

Data Inputs

Select the type of oxidizer

Enter the following information for your emission source:

Composition of Inlet Gas Stream				
Pollutant Name	Concentration (ppmv)	Lower Explosive Limit (LEL) (ppmv)*	Heat of Combustion (Btu/scf)	Molecular Weight
Methanol	1,281	60,000	818	32

Note: The lower explosion limit (LEL), heat of combustion and molecular weight for some commonly used VOC/HAP are provided in the table below.

Enter the design data for the proposed oxidizer:

Number of operating hours/year	78	hours/year
Inlet volumetric flow rate(Q_{wi}) at 77°F and 1 atm.	500	scfm
Inlet volumetric flow rate(Q_{wi}) (actual conditions)	500	acfm
Pressure drop (ΔP)	23	inches of water*
Motor/Fan Efficiency (ε)	60	percent*
Inlet Waste Gas Temperature (T_{wi})	70	°F
Operating Temperature (T_{fi})	1,600	°F
Destruction and Removal Efficiency (DRE)	98	percent
Estimated Equipment Life	10	Years

Percent Energy Recovery (HR) =

* 23 inches of water is the default pressure drop for thermal oxidizers; 19 inches of water is the default pressure drop for catalytic oxidizers. Enter actual value, if known.
* 60% is a default fan efficiency. User should enter actual value, if known.
* Note: Default value for Tfi is 1600°F for thermal recuperative oxidizers. Use actual value if known.

Enter the cost data:

Desired dollar-year	2017			
CEPCI* for 2017	567.5	Enter the CEPCI value for 2017	390.6	1999 CEPCI
Annual Interest Rate (i)	7	Percent		
Electricity ($Cost_{elect}$)	0.0628	$/kWh		
Natural Gas Fuel Cost ($Cost_{fuel}$)	0.00373	$/scf		
Operator Labor Rate	$26.61	per hour		
Maintenance Labor rate	$27.40	per hour		
Contingency Factor (CF)	10.0	Percent		

* $26.61 per hour is a default labor rate. User should enter actual value, if known.
* $27.40 per hour is a default labor rate. User should enter actual value, if known.
* 10 percent is a default value for construction contingencies. User may enter values between 5 and 15 percent.

* CEPCI is the Chemical Engineering Plant Cost Escalation/De-escalation Index. The use of CEPCI in this spreadsheet is not an endorsement of the index for purposes of cost escalation or de-escalation, but is there merely to allow for availability of a well-known cost index to spreadsheet users. Use of other well-known cost indexes (e.g., M&S) is acceptable.

Data Sources for Default Values Used in Calculations:

Parameters for Common Compounds:

Compound	LEL (ppmv)	Heat of Combustion (Btu/scf)	Molecular Weight
Methane*	50,000	911	16.04
Ethane	30,000	1,631	30.07
Propane	21,000	2,353	44.09
Butane	19,000	3,101	58.12
Pentane	14,000	3,709	72.15
Hexane	11,000	4,404	86.17
Octane	10,000	5,796	114.23
Nonane	8,000	6,493	128.25
Decane	8,000	7,190	142.28
Ethylene**	27,000	1,499	28.05
Propylene	20,000	2,182	42.08
Cyclohexane	13,000	4,180	84.16
Benzene**	14,000	3,475	78.11
Toluene**	11,000	4,274	92.13
Methyl Chloride (Chloromethane)**	82,500	705	50.49

Footnotes
* Greenhouse gas.
** Hazardous air pollutant.

Data Element	Default Value	Sources for Default Values used in the calculation . . .	If you used your own site-specific values, please enter the value used and the reference source . . .	Recommended data sources for site-specific information
Electricity Cost ($/kWh)	0.0674	Average annual electricity cost for industrial plants is based on 2016 price data compiled by the U.S. Energy Information Administration from data reported on Form EIA-861 and 861S, (http://www.eia.gov/electricity/data.cfm#sales).		Plant's utility bill or use U.S. Energy Information Administration (EIA) data for most recent year. Available at http://www.eia.gov/electricity/data.cfm#sales.
Fuel Cost ($/MMBtu)	3.34	Annual average price paid for natural gas by industrial facilities in 2016 from the U.S. Energy Information Administration. Available at http://www.eia.gov/dnav/ng/hist/n3035us3A.htm.		Check with fuel supplier or use U.S. Energy Information Administration (EIA) data for most recent year." Available at Available at http://www.eia.gov/dnav/ng/hist/n3035us3A.htm.
Operator Labor ($/hour)	26.61	Bureau of Labor Statistics, May 2016 National Occupational Employment and Wage Estimates – United States, May 2016 (https://www.bls.gov/oes/current/oes_nat.htm). Hourly rates for operators based on data for plant and System Operators – other (51-8099).		Use plant-specific labor rate.
Maintenance Labor ($/hour)	27.40	Bureau of Labor Statistics, May 2016 National Occupational Employment and Wage Estimates – United States, May 2016 (https://www.bls.gov/oes/current/oes_nat.htm). Hourly rates for maintenance workers based on electrical and electronics commercial and industrial equipment repairers (49-2094).		Use plant-specific labor rate.

Design Parameters

The following design parameters for the oxidizer were calculated based on the values entered on the *Data Inputs* tab. These values were used to prepare the costs shown on the *Cost Estimate* tab.

Composition of Inlet Gas Stream		
Pollutant Name	Concentration in Waste Stream (ppmv) From Data Inputs Tab	Adjusted Concentration with Dilution Air (ppmv)
Methanol	1,281	NA
0	0	NA
Total	1,281	0

Constants used in calculations:

Temperature of auxiliary fuel (T_{af}) =	Reference Temperature (T_{ref}) =	77.0	°F
Density of auxiliary Fuel at 77 °F (ρ_{af}) =		0.0408	lb/ft^3
Heat Input of auxiliary fuel ($-\Delta h_{caf}$) =		21,502	Btu/lb
Density of waste gas at 77 °F (ρ_{wi}) =		0.0739	lb/ft^3
Mean Heat Capacity of Air (C_{pmair})	(For thermal oxidizers)	0.255	Btu/lb °F

Parameter	Equation	Calculated Value	Units	Value	Units
Sum of volume fraction of combustible components =	$= (\sum x_i) =$	1,281	ppmv		
Lower Explosive Limit of waste gas (LEL_{mix})	$= [\sum((x_j)/((\sum x_i) \times LEL_j))]^{-1} =$ Where x_j is the volume fraction and LEL_j the lower explosive limit for each combustible component in the waste gas.	60,000	ppmv	* Note: Since the LEL of the waste gas stream is below 25%, no dilution air is needed.	
% LEL_{mix}	= (Total Combustible Conc. In Mixture/LEL_{mix}) × 100 =	2.13	percent		
Dilution Factor	$= (LEL_{mix} \times 0.249)/(\sum x_i) =$	Not applicable			
Lower Explosive Limit (LEL) of waste gas after addition of dilution air	= (Total Adjusted Conc. With Dilution Air/LEL_{mix}) × 100 =	Not Applicable			
Inlet volumetric flow rate(Qwi) at 77°F and 1 atm.	(From Data Inputs Tab) =	500	scfm		
Oxygen Content of gas stream	$= 100 - (\sum x_j \times 100/10^6) \times 0.209 =$	20.87	percent		
Fan Power Consumption (FP)	$= [(1.17 \times 10^{-4}) \times Q_{wi} \times \Delta P]/\varepsilon$	2.2	kW		
Q_{wo}	$\approx Q_{wi} =$	500	scfm		
Operating temperature of oxidizer (T_{fi})	(From Data Inputs Tab)	1,600	°F		
Temperature of waste gas at outlet to preheater (T_{wo})	$=$ Heat Recovery $\times (T_{fi} - T_{wi}) + T_{wi} =$	70	°F		
Temperature of flue gas exiting the oxidizer (T_{fo})	$= T_{fi} - T_{wo} + T_{wi} =$	1,600	°F	Recuperative/catalytic oxidizer	
Heat Input of waste gas ($-\Delta h_{cwi}$)	$= \sum (-\Delta h_{ci})\, x_i$ Where $(-\Delta h_{ci})$ is the heat of combustion and x_i the fraction of component "i" at 77 °F.	1.05	Btu/scf	14.2	Btu/lb
Estimated Auxiliary Fuel Flow (Q_{af}) at 77 °F and 1 atm.	(Calculated using Equation 2.21 in Chapter 2 of the Cost Manual)	17.83	scfm		
Auxiliary fuel Energy Input =		15,638	Btu/min		
Minimum Energy required for combustion stabilization =	$= 5\% \times$ Total Energy Input $= 0.05 \times \rho_{fi} \times Q_{fi} \times C_{pmfi} \times (T_{fi} - T_{ref}) =$	743	Btu/min		
Is the calculated auxiliary fuel sufficient to stabilize combustion? (Note: If the auxiliary fuel energy input > 5% of Total Energy Input, then the auxilary fuel is sufficient.)		Yes			
Auxiliary fuel flow (Qaf) at 77°F and 1 atm. =		18	scfm		
Total Volumetric Throughput (Q_{tot}) at 77 °F and 1 atm.	$= Q_{fi} = Q_{wo} + Q_a + Q_{af} = Q_{wi} + Q_{af} =$	518	scfm		

Capital Recovery Factor:

Parameter	Equation	Calculated Value
Capital Recovery Factor (CRF) =	$i\,(1+i)^n/(1+i)^n - 1 =$ Where n = Equipment Life and i= Interest Rate	0.1424

Cost Estimate

Direct Costs

Total Purchased equipment costs (in 2017 dollars)

Incinerator + auxiliary equipment[a] (A) =			
Equipment Costs (EC) for Recuperative Thermal Oxidizer	= (10,294 x Qtot^(0.2355))x (2017 CEPI/1999 CEPCI) =	$65,164	in 2017 dollars
Instrumentation[b] =	0.10 × A =	$6,516	
Sales taxes =	0.03 × A =	$1,955	
Freight =	0.05 × A =	$3,258	
	Total Purchased equipment costs (B) =	$76,894	in 2017 dollars

Footnotes

a - Auxiliary equipment includes equipment (e.g., duct work) normally not included with unit furnished by incinerator vendor.

b - Includes the instrumentation and controls furnished by the incinerator vendor.

Direct Installation Costs (in 2017 dollars)

Foundations and Supports =	0.08 × B =	$6,151	
Handlong and Errection =	0.14 × B =	$10,765	
Electrical =	0.04 × B =	$3,076	
Piping =	0.02 × B =	$1,538	
Insulation for Ductwork =	0.01 × B =	$769	
Painting =	0.01 × B =	$769	
Site Preparation (SP) =		$0	
Buildings (Bldg) =		$0	
	Total Direct Installaton Costs =	$23,068	
Total Direct Costs (DC) =	Total Purchase Equipment Costs (B) + Total Direct Installation Costs =	$99,962	in 2017 dollars

Total Indirect Installation Costs (in 2017 dollars)

Engineering =	0.10 × B =	$7,689	
Construction and field expenses =	0.05 × B =	$3,845	
Contractor fees =	0.10 × B =	$7,689	
Start-up =	0.02 × B =	$1,538	
Performance test =	0.01 × B =	$769	
	Total Indirect Costs (IC) =	$21,530	
Contincency Cost (C) =	CF(IC+DC)=	$12,149	
Total Capital Investment	**DC + IC +C**	**$133,641.01**	**in 2017 dollars**

Direct Annual Costs

Annual Electricity Cost	= Fan Power Consumption × Operating Hours/year × Electricity Price =	$11	
Annual Fuel Costs for Natural Gas	= $Cost_{fuel}$ × Fuel Usage Rate × 60 min/hr × Operating hours/year	$311	
Operating Labor	Operator = 0.5hours/shift × Labor Rate × (Operating hours/8 hours/shift)	$130	
	Supervisor = 15% of Operator	$19	
Maintenance Costs	Labor = 0.5 hours/shift × Labor Rate × (Operating Hours/8 hours/shift)	$134	
	Materials = 100% of maintenance labor	$134	
Direct Annual Costs (DC)		**$738**	**in 2017 dollars**

Indirect Annual Costs

Overhead	= 60% of sum of operating, supervisor, maintenance labor and maintenance materials	$250	
Administrative Charges	= 2% of TCI	$2,673	
Property Taxes	= 1% of TCI	$1,336	
Insurance	= 1% of TCI	$1,336	
Capital Recovery	= CRF x TCI	$19,027	
Indirect Annual Costs (IC)		**$24,623**	**in 2017 dollars**
Total Annual Cost	**DC + IC**	**$25,361**	**in 2017 dollars**

Cost Effectiveness

Cost Effectiveness = (Total Annual Cost)/(Annual Quantity of VOC/HAP Pollutants Destroyed)

Total Annual Cost (TAC) =	$25,361.40	per year in 2017 dollars
VOC/HAP Pollutants Destroyed =	0.122	tons/year
Cost Effectiveness =	$208,583	per ton of pollutants removed in 2017 dollars

Piping Emissions from TANK1 to Existing Incinerator/Boiler System

Equipment Required

250 feet of 2" diameter steel piping
Detonation Arrestor

Costing Information [1]

Cost of 250 ft. of steel piping and associated piping support, including installation
Nominal cost of $4,000 for detonation arrestor

Assumptions

The capital recovery for the piping system is based on a 7 percent interest rate and 10 year effective equipment life. Therefore the capital recovery factor is 0.1424.

Calculation

Capital Cost

Piping & Support	=	$	34,493
Detonation arrestor		$	4,000
Total		$	38,493

Annualized Cost

38,493	dollars	x	0.1424	=	$	5,481

Cost per Ton Removed

5,481	dollars	÷	*0.126*	=	$	43,547	per ton

[1] Piping cost based on estimates provided to O'Brien & Gere for similar jobs. The detonation arrestor cost was provided by Protectoseal (Model No. C25004).

Appendix B: Case-by-case Permit Conditions

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

[redacted]

Condition 32: Compliance Certification
Effective between the dates of 12/27/2022 and 12/26/2027

Applicable Federal Requirement:6 NYCRR 212-3.1 (a) (2)

Item 32.1:
The Compliance Certification activity will be performed for the facility:
The Compliance Certification applies to:

Emission Unit: 1-TANKS

Regulated Contaminant(s):
CAS No: 0NY998-00-0 VOC

Item 32.2:
Compliance Certification shall include the following monitoring:

Monitoring Type: WORK PRACTICE INVOLVING SPECIFIC OPERATIONS
Monitoring Description:

The methanol storage tanks are operating under a VOC RACT variance. Reductions of VOC emissions below the current level has been demonstrated to the Department to be economically infeasible.

VOC emissions from this emission unit will be limited by restricting the methanol throughput of the tanks (Emission point: TANK1) to 2,500,000 pounds/year. Facility must maintain records that verify the throughput of the methanol tanks on a monthly basis in support of a 12-month rolling total. Any increase in throughput beyond this limit will require the facility to submit a VOC RACT demonstration that addresses RACT options at the higher methanol throughput rate.

Facility must continue to investigate VOC RACT strategies for this emission unit and submit an updated VOC RACT demonstration as part of it's Title V renewal application. The demonstration must include an evaluation of the possibility of reformulation, abatement techonlogy and/or process modification.

This process specific RACT variance has been submitted to the EPA for their review, approval and inclusion in the State Implementation Plan (SIP).

Work Practice Type: PROCESS MATERIAL THRUPUT
Process Material: VOLATILE ORGANIC LIQUID
Upper Permit Limit: 2500000 pounds per year
Monitoring Frequency: MONTHLY
Averaging Method: ANNUAL MAXIMUM ROLLED MONTHLY
Reporting Requirements: SEMI-ANNUALLY (CALENDAR)
Reports due 30 days after the reporting period.
The initial report is due 1/30/2023.
Subsequent reports are due every 6 calendar month(s).

[redacted]

Appendix C: Public Notice Documents

NEW YORK STATE | Department of Environmental Conservation

ENB Region 6 Completed Applications 07/13/2022

Region 6 SEQR and Other Notices
Region 6 SPDES Renewals

Jefferson County

Applicant:

Knowlton Technologies LLC
213 Factory St
Watertown, NY 13601

Facility:

Knowlton Technologies LLC
213 Factory St
Watertown, NY 13601

Application ID:

6-2218-00017/00009

Permit(s) Applied for:

Article 19 Air Title V Facility

Project is Located:

Watertown, Jefferson County

Project Description:

The Department has prepared a draft permit, pursuant to Article 19 (Air Pollution Control) of the Environmental Conservation Law, and has made a tentative determination, subject to public comment or other information, to approve a renewal Title V Facility Permit to Knowlton Technologies LLC for their Knowlton Technologies Facility located at 213 Factory St., City of Watertown, Jefferson County, New York for the operation of air pollution sources. Knowlton Technologies LLC is engaged in the production of various types of specialty papers, including automotive filter and friction papers. The primary Standard Industrial Classification representative of this facility is 2621, Paper Mills.

The facility is permitted for the operation of 3 paper machines (Emission Unit 1-PAPER), solvent coating operations and pollution control equipment (Emission Unit 1-SVSAT), solvent storage tanks (Emission Unit 1-TANKS), beater rooms (Emission Unit 1-BTRRM), and Wastewater Treatment (1-WWTMP).

The facility has emissions of methanol (a Hazardous Air Pollutant - HAP), phenol (HAP), Total HAP and Volatile Organic Compounds (VOC) above the major source thresholds.

The paper coating operations and associated pollution control equipment are subject to the VOC RACT (Reasonable Available Control Technology) requirements of 6 NYCRR Part 212, Surface Coating Processes, the National Emission Standards for Hazardous Air Pollutants of 40 CFR 63 Subpart JJJJ, Paper and Other Web

Coating, the National Emission Standards for Hazardous Air Pollutants of 40 CFR 63 Subpart QQQQQ, Friction Materials Manufacturing Facilities, the National Emission Standards for Hazardous Air Pollutants of 40 CFR 63 Subpart EEEE, Organic Liquids Distribution (non-gasoline), and National Emission Standards for Hazardous Air Pollutants of 40 CFR 63 Subpart DDDDD, Industrial, Commercial, and Institutional Boilers and Process heaters. In addition, the pollution control equipment is subject to New Source Performance Standard 40 CFR 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units.
Pursuant to 6 NYCRR 212-3.1, this draft permit revision contains a condition that establishes a case-by-case Volatile Organic Compounds Reasonably Available Control Technology (VOC RACT) limit that varies from the presumptive RACT limit of emission rate potentials less than 3.0 pounds per hour. Volatile Organic Compound (VOC) emissions from the two 10,000 gallon methanol tanks will be limited by restricting the methanol throughput of the tanks (Emission points: TANK1 and TANK2) to 2,500,000 pounds/year. Facility must maintain records that verify the throughput of the methanol tanks on a monthly basis in support of a 12-month rolling total. The draft Title V permit that contains the proposed conditions and Permit Review Report for this facility is available at: https://www.dec.ny.gov/dardata/boss/afs/draft_atv.html Process specific Reasonably Available Control Technology (RACT) determinations that are included in this permit action will be submitted to the United States Environmental Protection Agency for approval as a revision to the State Implementation Plan (SIP).

In accordance with 6NYCRR Parts 621.7(b)(9) and 201-6.3(c), the Administrator of the United States Environmental Protection Agency (USEPA) has the authority to bar issuance of any Title V Facility Permit if it is determined not to be in compliance with applicable requirements of the Clean Air Act or 6NYCRR Part 201.

Persons wishing to inspect the subject Title V files, including the application with all relevant supporting materials, the draft permit, and all other materials available to the DEC (the "permitting authority") that are relevant to this permitting decision should contact the DEC representative listed below. The Draft Permit and Permit Review Report may be viewed and printed from the Department web site at: https://www.dec.ny.gov/chemical/8569.html.

DEC will evaluate the application and the comments received on it to determine whether to hold a public hearing. Comments and requests for a public hearing should be in writing and addressed to the Department representative listed below. A copy of the Department's permit hearing procedures is available upon request or on the Department web site at: https://www.dec.ny.gov/permits/6234.html.

Availability of Application Documents:

Filed application documents, and Department draft permits where applicable, are available for inspection during normal business hours at the address of the contact person. To ensure timely service at the time of inspection, it is recommended that an appointment be made with the contact person.

This project is subject to the Department's Environmental Justice Policy and an enhanced public participation plan has been prepared and accepted as a component of application completeness. As part of the plan, a document repository has been established near the project area that contains application and project related materials. Information on the repository location and other outreach components of the plan is available from the identified DEC contact.

State Environmental Quality Review (SEQR) Determination:

Project is not subject to SEQR because it is a Type II action.

SEQR Lead Agency: None Designated

State Historic Preservation Act (SHPA) Determination:

The proposed activity is not subject to review in accordance with SHPA. The application type is exempt and/or the project involves the continuation of an existing operational activity.

Coastal Management:

This project is not located in a Coastal Management area and is not subject to the Waterfront Revitalization and Coastal Resources Act.

DEC Commissioner Policy 29, Environmental Justice and Permitting (CP-29)

The proposed action is subject to CP-29. An enhanced public participation plan was submitted by the applicant and has become part of the complete application.

Opportunity for Public Comment:

Comments on this project must be submitted in writing to the Contact Person no later than *Aug 12, 2022*.

Contact:

Miranda M Gilgore
NYSDEC Region 6 Headquarters
State Office Building - 317 Washington St
Watertown, NY 13601
(315)785-2245
DEP.R6@dec.ny.gov

Region 6 SEQR and Other Notices
Region 6 SPDES Renewals

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AFFIDAVIT OF PUBLICATION

STATE OF NEW YORK
COUNTY OF JEFFERSON

WATERTOWN DAILY TIMES

KNOWLTON TECHNOLOGIES LLC
213 FACTORY ST
WATERTOWN NY 13601-2748

REFERENCE: 66438
20454990 NEW YORK STATE

Christa Woodward, being duly sworn, says that she/he is a Legal Representative of the Johnson Newspaper Corp., a Corporation duly organized and existing Under the laws of the State of New York, and Having its principal place of business in the City Of Watertown, New York, and that said corporation Is the publisher of the WATERTOWN DAILY TIMES, A Newspaper published in the City of Watertown, Jefferson County and State of New York, and that A Notice, of which the annexed is a printed copy, Has been published in said newspaper on dates listed below.

Christa Woodward

Christa Woodward, Legal Representative

Published on: 7/13

AD SPACE: 2X158 LINES
FILED ON: 7/13/22

Sworn to and subscribed before me this)
19th day of July 2022

Jami L. Edwards)

JAMI L EDWARDS
NOTARY PUBLIC-STATE OF NEW YORK
No. 01ED6283808
Qualified in Jefferson County
My Commission Expires 06-17-2026

Johnson Newspaper Corporation

Client:	66438	KNOWLTON TECHNOLOGIES LLC	Phone:	(315) 782-0600
Class.:	213 FACTORY ST			
	MAYBETH LAVALLEE			WATERTOWN, NY 13601-2748
Ad #:	20454990	Requested By: JOAN	Fax:	(315) 782-7517

Sales Rep.:	W312	Scott Parks	Phone:	(315) 782-1000
		sparks@wdt.net	Fax:	(315) 661-2521

Class.:	0610	Announcements			
Start Date:	07/13/2022	End Date:	07/13/2022	No. of Inserts:	1
PO #:		Entered By:	SPARKS		
Publications:	Watertown Daily Times				
Paid Amount:	$0.00	Balance:	$845.38		
Total Price:	$845.38			Page 1 of 3	

New York State Department of Environmental Conservation
Notice of Complete Application

Date: 07/05/2022

Applicant: KNOWLTON TECHNOLOGIES LLC
213 FACTORY ST
WATERTOWN, NY 13601

Facility: KNOWLTON TECHNOLOGIES LLC
213 FACTORY ST
WATERTOWN, NY 13601

Application ID: 6-2218-00017/00000

Permit(s) Applied for: 1 - Article 19 Air Title V Facility

Project is located:
in WATERTOWN in JEFFERSON COUNTY

Project Description:

The Department has prepared a draft permit, pursuant to Article 19 (Air Pollution Control) of the Environmental Conservation Law, and has made a tentative determination, subject to public comment or other information, to approve a renewal Title V Facility Permit to Knowlton Technologies LLC for their Knowlton Technologies Facility located at 213 Factory St., City of Watertown, Jefferson County New York for the operation of air pollution sources. Knowlton Technologies LLC is engaged in the production of various types of specialty papers, including automotive filter and friction papers. The primary Standard Industrial Classification representative of this facility is 2621, Paper Mills.

The facility is permitted for the operation of 3 paper machines (Emission Unit 1-PAPER), solvent coating operations and pollution control equipment (Emission Unit 1-SVSAT), solvent storage tanks (Emission Unit 1-TANKS), beater rooms (Emission Unit 1-BTRRM), and Wastewater Treatment (1-WWTMP).

The facility has emissions of methanol (a Hazardous Air Pollutant - HAP), phenol (HAP), Total HAP and Volatile Organic Compounds (VOC) above the major source thresholds.

The paper coating operations and associated pollution control equipment are subject to the VOC RACT

(Reasonably Available Control Technology) requirements of 6 NYCRR Part 212, Surface Coating Processes, the National Emission Standards for Hazardous Air Pollutants of 40 CFR 63 Subpart JJJJ, Paper and Other Web Coating, the National Emission Standards for Hazardous Air Pollutants of 40 CFR 63 Subpart QQQQQ, Friction Materials Manufacturing Facilities, the National Emission Standards for Hazardous Air Pollutants of 40 CFR 63 Subpart EEEE, Organic Liquids Distribution (non-gasoline), and National Emission Standards for Hazardous Air Pollutants of 40 CFR 63 Subpart DDDDD, Industrial, Commercial, and Institutional Boilers and Process Heaters. In addition, the pollution control equipment is subject to New Source Performance Standard 40 CFR 60 Subpart Dc, Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units.

Pursuant to 6 NYCRR 212-3.1, this draft permit revision contains a condition that establishes a case-by-case Volatile Organic Compounds Reasonably Available Control Technology (VOC RACT) limit that varies from the presumptive RACT limit of emission rate potential less than 3.0 pounds per hour. Volatile Organic Compound (VOC) emissions from the two 10,000 gallon methanol tanks will be limited by restricting the methanol throughput of the tanks (Emission points: TANK1 and TANK2) to 2,500,000 pounds/year. Facility must maintain records that verify the throughput of the methanol tanks on a monthly basis in support of a 12-month rolling total. The draft Title V permit that contains the proposed conditions and Permit Review Report for this facility is available at:
https://www.dec.ny.gov/dardata/boss/afs/issued_atv.html
Process specific Reasonably Available Control Technology (RACT) determinations that are included in this permit action will be submitted to the United States Environmental Protection Agency for approval as a revision to the State Implementation Plan (SIP).

In accordance with 6NYCRR Parts 621.7(b)(8) and 201-6.2(c), the Administrator of the United States Environmental Protection Agency (USEPA) has the authority to bar issuance of any Title V Facility Permit if it is determined not to be in compliance with applicable requirements of the Clean Air Act or 6NYCRR Part 201.

Persons wishing to inspect the subject Title V files, including the application with all relevant supporting materials, the draft permit, and all other materials available to the DEC (the "permitting authority") that are relevant to this permitting decision should contact the DEC representative listed below. The Draft Permit and Permit Review Report may be viewed and printed from the Department web site at: *https://www.dec.ny.gov/chemical/8569.html*.

DEC will evaluate the application and the comments received on it to determine whether to hold a public hearing. Comments and requests for a public hearing should be in writing and addressed to the Department representative listed below. A copy of the Department's permit hearing procedures is available upon request or on the Department web site at: *https://www.dec.ny.gov/permits/6234.html*

Availability of Application Documents
Filed application documents, and Department draft permits where applicable, are available for inspection during normal business hours at the address of the contact person. To ensure timely service at the time of inspection, it is recommended that an appointment be made with the contact person.
This project is subject to the Department's Environmental Justice Policy and an enhanced public participation plan has been prepared and accepted as a component of application completeness. As part of the plan a document repository has been established near the project area that contains application and project related materials. Information on the repository location and other outreach components of the plan is available from the identified DEC contact.

State Environmental Quality Review (SEQR) Determination
Project is not subject to SEQR because it is a Type II action.

SEQR Lead Agency None Designated

State Historic Preservation Act (SHPA) Determination
The proposed activity is not subject to review in accordance with SHPA. The application type is exempt and/or the project involves the continuation of an existing operational activity.

DEC Commissioner Policy 29, Environmental Justice and Permitting (CP-29)
The proposed action is subject to CP-29. An enhanced public participation plan was submitted by the applicant and has become part of the complete application.

Availability For Public Comment
Comments on this project must be submitted in writing to the Contact Person no later than 08/12/2022 or 30 days after the publication date of this notice, whichever is later.

Contact Person
MIRANDA M GILGORE
NYSDEC
State Office Building - 317 Washington St
Watertown, NY 13601