

AIR QUALITY CONSTRUCTION PERMIT PREVENTION OF SIGNIFICANT DETERIORATION

PERMIT NUMBER: CP07-0018

Facility Name: NatureWorks, LLC

NDEQ Facility ID#: 69585

Mailing Address:

PO Box 564
Blair, Nebraska 68008-0564

Facility Location:

SE¼ Section 18, Township 18N, Range 12E
650 Industrial Road
Blair, Washington County, Nebraska 68008

Project Description: Modification to an existing facility with annual production capacity of 175,000 tons of polylactic acid (PLA)

Standard Industrial Classification (SIC) Code: 2869, Industrial Organic Chemicals

Revised or Superseded Construction Permits: Supersedes the construction permit issued January 29, 2002, to Cargill Dow LLC

Pursuant to Chapter 14 of the Nebraska Air Quality Regulations, the public has been notified by prominent advertisement of this proposed construction of an air contaminant source and the thirty (30) day period allowed for comments has elapsed. This construction permit approves the proposed project as identified in the air quality construction permit application #07-0018 received March 8, 2007 and the revised application received January 25, 2008, in addition to any supporting information received prior to issuance of this permit. Additional details of the proposed project, including estimated pollutant emissions caused by the project, can be found in the accompanying Fact Sheet.

Compliance with this permit shall not be a defense to any enforcement action for violation of an ambient air quality standard. The permit holder, owner, and operator of the facility shall assure that the installation, operation, and maintenance of all equipment is in compliance with all of the conditions of this permit.

The undersigned issues this permit on behalf of the Director under the authority of Title 129 – Nebraska Air Quality Regulations as amended February 6, 2008.

D R A F T

Date

Shelley Kaderly, Air Administrator
Air Quality Division

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I. ABBREVIATIONS, SYMBOLS, and UNITS OF MEASURE

AP-42	Compilation of Air Pollutant Emission Factors, Volume I, Stationary Point and Area Sources	NAAQS	National Ambient Air Quality Standards
		NDEQ	Nebraska Department of Environmental Quality
BACT	Best Available Control Technology	NESHAP	National Emission Standards for Hazardous Air Pollutants
bhp	Brake Horsepower	NO ₂	Nitrogen Dioxide
Btu	British Thermal Unit	NO _x	Nitrogen Oxides
bu	Bushel	NSPS	New Source Performance Standard
CAA	Clean Air Act	NSR	New Source Review
CE	Control Equipment		
CEM	Continuous Emissions Monitor	PAL	Plant-wide Applicability Limit
CEMS	Continuous Emissions Monitoring System	Pb	Lead
cf	Cubic feet	PbR	Permit-by-Rule
CFR	Code of Federal Regulations	PE	Professional Engineer
CO	Carbon Monoxide	PM	Particulate Matter
CO ₂	Carbon Dioxide	PM ₁₀	Particulate Matter with and aerodynamic diameter equal to or less than 10 microns
CP	Construction Permit	PM _{2.5}	Particulate Matter with and aerodynamic diameter equal to or less than 2.5 microns
D-EtOH	Denatured Ethanol	ppb	Parts per Billion
dscf	Dry Standard Cubic feet	ppm	Parts per Million
dscfm	Dry Standard Cubic feet per minute	ppmvd	Parts per Million by Volume, dry
EMIS	Emergency Management Information System	PSD	Prevention of Significant Deterioration
EPA	Environmental Protection Agency	PTE	Potential to Emit
EQC	Environmental Quality Council		
EP	Emission Point		
ESP	Electrostatic Precipitator	RATA	Relative Accuracy Test Audit
EtOH	Ethanol		
EU	Emission Unit	RMP	Risk Management Plant
		RTO	Regenerative Thermal Oxidizer
FGR	Flue Gas Recirculation	scf	Standard Cubic Feet
FIP	Federal Implementation Plan	SIC	Standard Industrial Classification
FR	Federal Register	SIP	State Implementation Plan
ft	Feet	SO ₂	Sulfur Dioxide
FTIR	Fourier Transform Infrared	SO _x	Sulfur Oxides
GACT	Generally Available Control Technology	TDS	Total Dissolved Solids
H ₂ S	Hydrogen Sulfide	TO	Thermal Oxidizer
HAP	Hazardous Air Pollutant	tpy	Tons per year
HC	Hydrocarbon	TRS	Total Reduced Sulfur
HP	Horsepower	TSP	Total Suspended Particulate Matter
hr	Hour	ULNB	Ultra Low NO _x Burner
LDAR	Leak Detection and Repair	UST	Underground Storage Tank
LNB	Low NO _x Burner	UTM	Universal Transverse Mercator
MACT	Maximum Achievable Control Technology	VHAP	Volatile Hazardous Air Pollutant
Mgal	One thousand gallons	VMT	Vehicle Miles Traveled
MMBtu	Million British Thermal Units	VOC	Volatile Organic Compound
MMscf	One million standard cubic feet		
MSDS	Material Safety Data Sheet		
MW	Megawatt		

I. GENERAL CONDITIONS

- (A) This permit is not transferable to another source or location. {Chapter 17}
- (B) Holding of this permit does not relieve the owner or operator of the source from the responsibility to comply with all applicable portions of the Nebraska Air Quality Regulations and any other requirements under local, State, or Federal law. Any permit noncompliance shall constitute a violation of the Nebraska Environmental Protection Act and the Federal Clean Air Act, and is grounds for enforcement action or permit revocation. {Chapter 41 & Chapter 17, Section 011}
- (C) Application for review of plans or advice furnished by the Director will not relieve the owner or operator of legal compliance with any provision of these regulations, or prevent the Director from enforcing or implementing any provision of these regulations. {Chapter 37}
- (D) Any owner or operator who failed to submit any relevant facts or who submitted incorrect information in a permit application shall, upon becoming aware of such failure or incorrect submittal, promptly submit such supplementary facts or corrected information. If the owner or operator wishes to make changes at the source that will result in change(s) to values, specifications, and/or locations of emission points that were indicated in the permit application (or other supplemental information provided by the owner or operator and reviewed by the Department in issuance of this permit), the owner or operator must receive approval from the Department before the change(s) can be made. In addition, any modification which may result in an adverse change to the air quality impacts predicted by atmospheric dispersion modeling (such as changes in stack parameters or increases in emission rates, potential emissions, or actual emissions) shall have prior approval from the Department. The owner or operator shall provide all necessary information to verify that there are no substantive changes affecting the basis upon which this permit was issued. Information may include, but not be limited to, additional engineering, modeling and ambient air quality studies. {Chapter 17, Section 006, 007, & 008}
- (E) Approval to construct, reconstruct and/or modify the source will become invalid if a continuous program of construction is not commenced within 18 months after the date of issuance of the construction permit, if construction is discontinued for a period of 18 months or more, or if construction is not completed within a reasonable period of time. {Chapter 17, Section 012}
- (F) The owner/operator of the source shall provide the following notifications to the Department:
 - (1) The date construction, reconstruction or modification commenced as defined in Chapter 1, Section 031. Notification shall be postmarked no later than 30 days after such date and include a summary description of whether the requirement was met through: {Chapter 17, Section 012}
 - (a) Initiating physical on-site construction activities of a permanent nature that meet the definition of “begin actual construction”, or
 - (b) Entering into binding agreements or contractual obligations. If this option is used, the notice shall also include a brief summary of each binding agreement or contractual obligation entered into, the date of the agreement or contract, and why it cannot be cancelled or modified without substantial loss to the owner or operator.

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- (2) The date of initial startup of operations postmarked within 15 days after such date. {Chapter 7, Section 002.03}
- (G) The owner or operator shall allow the Department, EPA or an authorized representative, upon presentation of credentials to: {Neb. Rev. Statute §81-1504}
- (1) Enter upon the owner or operator's premises at reasonable times where a source subject to this permit is located, emissions-related activity is conducted or records are kept, for the purpose of ensuring compliance with the permit or applicable requirements;
- (2) Have access to and copy, at reasonable times, any records, for the purpose of ensuring compliance with the permit or applicable requirements;
- (3) Inspect at reasonable times any facilities, pollution control equipment, including monitoring and air pollution control equipment, practices, or operations, for the purpose of ensuring compliance with the permit or applicable requirements;
- (4) Sample or monitor at reasonable times substances or parameters for the purpose of ensuring compliance with the permit or applicable requirements.
- (H) When requested by the Department, the owner or operator shall submit completed emission inventory forms for the preceding year to the Department by March 31 of each year. {Chapter 6}
- (I) Open fires are prohibited except as allowed by Chapter 30.
- (J) Particulate Matter – General Requirements: {Chapter 32}
- (1) The owner or operator shall not cause or permit the handling, transporting or storage of any material in a manner, which allows particulate matter to become airborne in such quantities and concentrations that it remains visible in the ambient air beyond the property line.
- (2) The owner or operator shall not cause or permit the construction, use, repair or demolition of a building, its appurtenances, a road, a driveway, or an open area without applying all reasonable measures to prevent particulate matter from becoming airborne and remaining visible beyond the property line. Such measures include, but not limited to, paving or frequent cleaning of roads, driveways and parking lots; application of dust-free surfaces; application of water; and planting and maintenance of vegetative ground cover.
- (K) If and when the Director declares an air pollution episode as defined in Chapter 38, Sections 003.01B, 003.01C, or 003.01D, the owner or operator shall immediately take all required actions listed in Title 129, Appendix I until the Director declares the air pollution episode terminated.
- (L) This permit may be revised (reopened and reissued) or revoked for cause in accordance with Title 129 and Title 115, Rules of Practice and Procedure. Conditions under which this permit will be revised or revoked for cause, include but are not limited to: {Chapter 15, Section 006}
- (1) A determination by the Director, or the Administrator of EPA that:
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- (a) the permit must be revised to ensure compliance with the applicable requirements;
 - (b) the permit contains a material mistake or that inaccurate statements were made in the emissions standards or other terms or conditions of the permit.
- (2) The existence at the source of unresolved noncompliance with applicable requirements or a term or condition of the permit, and refusal of the owner or operator to agree to an enforceable schedule of compliance to resolve the noncompliance;
 - (3) The submittal by the owner or operator of false, incomplete, or misleading information to the Department or EPA;
 - (4) A determination by the Director that the source or activity endangers human health or the environment and that the danger cannot be removed by a revision of the permit; or
 - (5) The failure of the owner or operator to pay a penalty owed pursuant to court order, stipulation and agreement, or order issued by the Administrator of the EPA.

II. SPECIFIC CONDITIONS

- (A) Recordkeeping: Records of all measurements, results, inspections, and observations as required to ensure compliance with all applicable requirements shall be maintained on-site as follows:
 - (1) All calculations and records required throughout this permit shall be completed no later than the fifteenth (15th) day of each calendar month and shall include all information through the previous calendar month, unless otherwise specified in this permit.
 - (2) All records required throughout this permit shall be kept for a minimum of five years and shall be clear and readily accessible to Department representatives, unless otherwise specified in this permit.
 - (3) Copies of all notifications, reports, test results, and plans.
 - (4) Calibration records for all operating parameter monitoring equipment.
 - (5) Operation and Maintenance manuals detailing proper operation and maintenance of all permitted emission units, required control equipment, and required monitoring equipment shall be kept for the life of the equipment.
 - (6) Records documenting equipment failures, malfunctions, or other variations, including date and time of occurrence, remedial action taken, and when corrections were made to each piece of permitted equipment, required control equipment, and required monitoring equipment.
 - (7) The quantity of polymer produced at this facility each calendar month and during the previous 12 consecutive calendar months to show compliance with Condition II.(F). The total for the previous 12 consecutive calendar months shall be calculated by the 15th day of each calendar month.

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- (8) The number of trucks for outgoing finished product, raw materials, and miscellaneous items shall be recorded each calendar month to show compliance with Condition II(G).
- (B) All permitted emission units, control equipment, and monitoring equipment shall be properly installed, operated, and maintained.
- (C) Any emissions due to malfunctions, unplanned shutdowns, and ensuing start-ups that are, or may be, in excess of applicable emission limits shall be reported to the Department in accordance with Chapter 35, Section 005.
- (D) The performance tests required in the permit shall be completed and submitted to the Department as follows: {Chapter 34}
- (1) Performance tests shall be conducted while operating at full capacity within sixty (60) days after reaching the maximum capacity, but not more than 180 days after the start-up of operations of each unit, unless otherwise specified by the Department.
 - (2) Testing shall be conducted according to the methodologies found in Title 129, Chapter 34, Section 002, or other NDEQ approved methodologies.
 - (3) The owner or operator of a source shall provide the Department at least thirty (30) days written notice prior to testing to afford the Department an opportunity to have an observer present. The owner or operator shall also provide the Department with an emissions testing protocol at least thirty (30) days prior to testing.
 - (4) The owner or operator shall monitor the operating parameters for process and control equipment during the performance testing required in the permit.
 - (5) A written copy of the test results signed by the person conducting the test shall be provided to the Department within forty-five (45) days of completion of the test and will, at a minimum, contain the following items:
 - (a) A description of the source's operating parameters (i.e. production rates, firing rates of combustion equipment, fuel usage, etc.), control equipment parameters (i.e. baghouse fan speeds, scrubber liquid flow rates, TO temperatures, etc.), and ambient conditions (i.e. weather conditions, etc.) during testing.
 - (b) Copies of all data sheets from the test run(s).
 - (c) A description and explanation of any erroneous data or unusual circumstance(s) and the cause for such situation.
 - (d) A final conclusion section describing the outcome of the testing.
- (E) The following conditions apply to the verification of NAAQS and increment modeling analyses: {Chapters 4 and 19}
- (1) The stack dimensions of the following emission points shall be constructed as indicated below:
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Emission Point Model ID#	Emission Point Description	Stack Height (meters)	Stack Inside Diameter (m)
CDP1	Cooling Tower - Cell 1	12.95	7.32
CDP2	Cooling Tower - Cell 2	12.95	7.32
CDP3	Cooling Tower - Cell 3	13	7.32
CDP4	Hot Oil Heater No. 1	49.7	1.35
CDP5	Hot Oil Heater No. 2	49.7	1.35
CDP6	Precoat Filter Receiver	0.91	0.20
CDP8	Processing Aid Filter Receiver	43.13	0.15
CDP9	Product Finishing Filter	3.2	0.41
CDP10	Product Separation Filter	3.2	0.41
CDP11	Pellet Storage and Loading Filter	3.2	0.41
CDP13	Finished Product Transfer Filter Receiver	2.99	0.30
CDP14	Packaging Feed System Filter	3.2	0.36

A site survey, or similar documentation containing the as-built stack dimensions, shall be maintained on-site and kept for the life of the source. If stack dimensions do not comply with the table above, the owner or operator shall submit a revised air dispersion modeling analysis to the Department prior to start-up of any emission unit, to ensure that the source will not interfere with the attainment or maintenance of the ambient air quality standards in Chapter 4.

- (2) The source shall demonstrate that there is sufficient restriction of public access to the facility at the ambient air boundary relied upon in the modeling analysis. A site survey or similar documentation outlining the methods and means by which the public will be restricted access shall be kept on site and readily available to Department representatives within 180 days after the permit issuance date. The site survey or similar documentation shall provide sufficient detail to verify that an ambient air restriction plan has been fully implemented.
- (F) Total production of polymer at this facility shall not exceed 17,500 tons during any calendar month and 175,000 tons during any 12 consecutive calendar month period.
- (G) Truck traffic shall not exceed a total of 600 trucks per month for incoming raw materials, outgoing finished product, and other miscellaneous items.

III.(A) Specific Conditions for Hot Oil Heaters

- (1) Permitted Emission Points: The source is permitted to construct the emission points and associated emission units identified in the following table at the capacity and using the fuel types listed:

Emission Point ID#	Control Equipment ID# and Description	Emission Unit ID# and Description	Maximum Capacity (MMBtu/hr)	Permitted Fuel Type	New / Existing Source
CDP 4	Low-NO _x burners and flue gas recirculation	Hot Oil Heater No. 1	75	Natural Gas	Existing/Modified
CDP 5	Low-NO _x burners and flue gas recirculation	Hot Oil Heater No. 2	75	Natural Gas	Existing/Modified

- (2) Emission Limitations and Testing Requirements:

The boilers are subject to the applicable emission limitations and opacity standards contained in NSPS, Subpart Dc.

- (3) Operational and Monitoring Requirements and Limitations:

- (a) CDP 4 and 5 are subject to the applicable operational and monitoring requirements and limitations per 40 CFR 60 Subpart Dc.
- (b) CDP 4 and 5 shall be equipped with a low-NO_x burners and designed with flue gas recirculation.
- (c) The hot oil heaters shall be tuned according to the vendor’s recommendations and schedule.

- (4) Applicable NSPS, NESHAP, and MACT Requirements:

The following standards apply to CDP 4 and 5:

Applicable Standard	Title	Rule Citation
NSPS, Subpart A	General Provisions	Chapter 18, Sec. <u>001.01</u> 40 CFR 60.1
NSPS, Subpart Dc	Small Industrial, Commercial, Institutional Steam Generation Units	Chapter 18, Sec. <u>001.52</u> 40 CFR 60.40c

- (5) Reporting and Recordkeeping Requirements:

- (a) Notifications and record keeping as required by 40 CFR 60.7.
- (b) Reporting and recordkeeping as required by 40 CFR 60.48c.
- (c) Records documenting when the hot oil heaters are tuned, any data collected during the tuning procedure, and a description of any corrective actions taken to show compliance with Conditions III(A)(3)(c) and II.(B).

III.(B) Specific Conditions for Cooling Towers

- (1) Permitted Emission Points: The source is permitted to construct the emission points and associated emission units identified in the following table with the number of cooling tower cells and at the circulation rate listed:

Emission Point ID#	Control Equipment Description	Emission Unit Description	Number of Cooling Tower Cells	Maximum Circulation Rate (gal/hr)	New / Existing Unit
CDP 1	-	Cooling Tower #1	1	510,000	Existing
CDP 2	-	Cooling Tower #2	1	510,000	Existing
CDP 3	-	Cooling Tower #3	1	510,000	New

- (2) Emission Limitations and Testing Requirements:

The cooling towers identified above are not subject to any emissions limitations. Testing shall be conducted to ensure compliance with the TDS limitation established and is discussed below.

- (3) Operational and Monitoring Requirements and Limitations:

- (a) Drift loss from each cooling tower shall be limited to 0.005 percent. Verification of drift loss shall be by manufacturer's guarantee. Manufacturer's drift loss guarantee shall be kept on site and readily available to Department representatives, upon request, for the life of the unit. {Chapter 19}
- (b) TDS concentration of the cooling water in each cooling tower shall not exceed 5,000 ppm. A representative TDS sample shall be collected and tested from the cooling tower a minimum of once per calendar month. The test method used to determine TDS concentration shall be in accordance with an EPA approved method and be documented. {Chapter 19}

- (4) Applicable NSPS, NESHAP, and MACT Requirements:

No NSPS, NESHAP, or MACT requirements apply to the cooling towers.

- (5) Reporting and Recordkeeping Requirements:

- (a) TDS concentration in cooling water for each sampling event.
- (b) Vendor guarantee for drift loss for the cooling tower.

III.(C) Specific Conditions for PLA Production/Thermal Oxidizer

- (1) Permitted Emission Points: The source is permitted to construct the emission points and associated emission units identified in the following table:

Emission Point ID#	Required Control Equipment	Emission Unit Description
CDP 15	Thermal Oxidizer	PLA Production Vacuum System Vent
		Waste Water Tank (TK30-96101)

- (2) Emission Limitations and Testing Requirements:

Emission rates from CDP 15 shall not exceed the permitted limits identified in the table below. Initial performance testing shall be conducted in accordance with Specific Condition II.(D).

Emission Point ID#	Pollutant	Permitted Limit	Averaging Period	Basis for Permit Limit	Initial Performance Testing Required (Yes/No)
CDP 15	CO	Minimum 90% control efficiency and outlet emission limit of 13.35 lb/hr	3-hr or test method average	Chapter 19	Yes
	VOC	Minimum 98% control efficiency and outlet emission limit of 0.67 lb/hr	3-hr or test method average	Chapter 19	Yes
	HAP	Control by 98% or to 20 ppmv	Per 40 CFR 63, Subpart FFFF	40 CFR 60, Subpart FFFF	Yes

- (3) Operational and Monitoring Requirements and Limitations

- (a) The permanent thermal oxidizer shall be installed and operational prior to startup of the new distillation column (DC1A).
- (b) CO, VOC, and HAP emissions from the PLA Production Vacuum Vent and waste water tank (TK30-96101) shall be controlled by a thermal oxidizer.
- (c) The source shall comply with the applicable operational and monitoring requirements and limitations of 40 CFR 63 Subpart FFFF.

- (4) Applicable NSPS, NESHAP, and MACT Requirements:

Applicable Standard	Title	Rule Citation
MACT, Subpart A	General Provisions	Chapter 28, Sec. <u>001.01</u> 40 CFR 63.1
MACT, Subpart FFFF	Miscellaneous Organic Chemical Manufacturing	Chapter 28, Sec. <u>001.78</u> 40 CFR 63.2430

(5) Reporting and Recordkeeping Requirements:

- (a) Notifications, reports, and records as required by 40 CFR 63 Subparts A and FFFF.
- (b) Notification of startup of the permanent thermal oxidizer shall be made to the Department within 15 calendar days of startup.

III.(D) Specific Conditions for Material Handling

- (1) Permitted Emission Points: The source is permitted to construct the emission points and associated emission units identified in the following table:

Emission Point ID#	Required Control Equipment	Emission Unit Description
CDP 6	Fabric Dust Collector	Precoat Filter Receiver
CDP 8	Fabric Dust Collector	Processing Aid Filter Receiver
CDP 9	Fabric Dust Collector	Product Finishing Filter *
CDP 10	Fabric Dust Collector	Product Separation Filter *
CDP 11	Fabric Dust Collector	Pellet Storage and Loading Filter *
CDP 13	Fabric Dust Collector	Finished Product Transfer Filter Receiver
CDP 14	Fabric Dust Collector	Packaging Feed System Filter *

*These fabric dust collectors control emissions from product separation cyclones

- (2) Emission Limitations and Testing Requirements:

The emission points identified above are not subject to any emissions limitations or testing requirements as part of this permit.

- (3) Operational and Monitoring Requirements and Limitations

- (a) Operation and maintenance of each fabric dust collector shall be in accordance with the following requirements: {Chapters 19 and 20}

- (1) The fabric dust collectors shall be operated at all times associated equipment is in operation.
- (2) The fabric dust collectors shall be properly installed, operated, and maintained. Manufacturer's instructions, if available, shall be kept on site and readily available to Department representatives.
- (3) Each fabric dust collector shall be equipped with an operational pressure differential indicator.
- (4) Routine observations (at least once each day of dust collector operation) shall be conducted to determine whether there are visible emissions from the stack, leaks or noise, atypical pressure differential readings, or other indications which may necessitate corrective action. Corrective action shall be taken immediately if necessary.
- (5) Collected waste material from the fabric dust collectors shall be handled, transported, and stored in a manner that ensures compliance with Condition II.(J).

- (4) Applicable NSPS, NESHAP, and MACT Requirements:

At this time the Department has not identified any NSPS, NESHAP, or MACT requirements that apply to the emission points or emission units listed in Condition III.(C)(1).

(5) Reporting and Recordkeeping Requirements:

- (a) Fabric filter maintenance and inspection records to show compliance with Condition III.(C)(3) including:
 - (a) Records documenting when routine observations were performed with a description including pressure differential readings and any atypical observations.
 - (b) Records documenting when routine maintenance and preventive actions were performed with a description of the maintenance and/or preventive action performed.
 - (c) Filter replacement records including filter position, type, and date of filter installation.
 - (d) Records documenting equipment failures, malfunctions, or other variations, including time of occurrence, remedial action taken, and when corrections were made.

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FACT SHEET

NatureWorks LLC
650 Industrial Road
Blair, Nebraska 68008

March 12, 2008

DESCRIPTION OF THE FACILITY OR ACTIVITY:

NatureWorks LLC (NatureWorks), a 50/50 joint venture between Cargill Inc. and Teijin Holdings USA Inc., produces polylactic acid (PLA) polymers utilizing lactic acid as the raw material (SIC Group 28). The polymers are sold in the form of pellets that can be used to manufacture a wide variety of polymer products. The facility is located adjacent to Cargill's wet corn milling operation and ethanol facility at 650 Industrial Rd in Blair, Nebraska.

NatureWorks previously consisted of two primary production operations: a lactic acid production facility and a polymer production facility. With the formation of the NatureWorks joint venture, Cargill Inc. assumed sole ownership and operation of the lactic acid production facility. The lactic acid production facility was issued a construction permit on May 8, 2001, which was superseded by a construction permit issued November 6, 2002.

The NatureWorks polymer production facility, the focus of this permit action, was issued a construction permit on February 3, 2000, which was superseded by a construction permit issued January 29, 2002. NatureWorks was issued a construction permit on July 20, 2006, for the construction of one new emission unit at the existing polymer production facility, referred to herein as the 'deduster project'. The 18-month period allowed for commencing construction on the deduster has expired; therefore, the 2006 permit is obsolete. This proposed permit supersedes the January 29, 2002, construction permit.

NatureWorks submitted an application, received March 8, 2007 (application no. 07-0018), to modify the existing polymer production facility. Under the current design configuration, the facility cannot operate at its permitted production level. Therefore, NatureWorks is requesting to modify the facility so that production can reach the currently permitted design capacity of 175,000 tons per year of lactide polymers. In order to accommodate the production increase, NatureWorks is proposing to install a new distillation column (DC1A, exhausting to the TO), one new cooling tower cell, and modify the two existing hot oil heaters.

In October 2007, NatureWorks conducted performance tests on the polymer production vacuum vent (CDP 15). The test results showed that emissions of volatile organic compounds (VOC), hazardous air pollutants (HAP), and carbon monoxide (CO) were higher than previously thought. As a result of the performance tests, NatureWorks has proposed to control HAP emissions with a thermal oxidizer (TO) in order to satisfy the 40 CFR 63 Subpart FFFF requirements. NatureWorks also conducted a Prevention of Significant Deterioration (PSD) Best Available Control Technology (BACT) analysis for VOC and CO emissions and concluded that use of the TO would satisfy BACT requirements. NatureWorks submitted an application amendment in the form of a revised application, received January 25, 2008, to address changes necessitated as a result of the October 2007 performance tests.

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TYPE AND QUANTITY OF AIR CONTAMINANT EMISSIONS ANTICIPATED:

Emissions from this facility consist of CO, with lesser amounts of particulate matter (PM), PM less than or equal to 10 microns (PM₁₀), nitrogen oxides (NO_x), sulfur dioxide (SO₂), VOC, and HAP emissions. PM₁₀, NO_x, SO₂, CO, VOC, and HAPs will result from natural gas combustion in the hot oil heaters and the thermal oxidizer PM/PM₁₀ emissions will result from pneumatic transfer of materials, product loadout, cooling tower losses, and haul roads. All of the material transfer points use fabric dust collectors for product recovery and emissions control. CO, VOC, and HAP emissions will be emitted from polymer processing operations.

Material Handling Equipment (CDP's 6, 8, 9, 10, 11, 13, and 14)

Potential emissions from the filter receivers (CDP's 6 and 8) were estimated using maximum design air flows and an estimated grain loading of 0.02 grains per dry standard cubic foot (gr/dscf). Potential emissions from polymer handling operations (CDP's 9, 10, 11, 13, and 14) were estimated using an uncontrolled emission estimate of 0.02 lb/1000 lb of dry air (as provided by the applicant and used in the 2002 permitting action) and 95% control efficiency for fabric filters. Baseline actual emissions (BAE) for the material handling equipment were calculated using stack test results and average annual actual hours of operation during the 24-month period preceding submittal of the application. Potential emissions from all existing, unmodified material handling equipment were included because of increased utilization. The results of stack testing in Nov/Dec. 2002 indicate the source's actual emission rates are comfortably less than the above emission factors used to calculate potential emissions.

Cooling Tower (CDP's 1, 2, and 3)

NatureWorks is adding a third cooling tower cell (CDP 3) and has requested that the drift loss of the existing two cooling tower cells be revised from 0.0005% to 0.005%. Potential emissions from the cooling tower cells were estimated using a corrected vendor estimate for drift loss of 0.005% submitted to the Department, the maximum total dissolved solids (TDS) allowed by the cooling tower water system design (5,000 parts per million (ppm)), and the maximum recirculation rate for each cell of 8,500 gallons per minute (gpm). PM₁₀ emissions are estimated to equal 30% of the PM emissions, in accordance with "Calculating Realistic PM₁₀ emissions from Cooling Towers" (Reisman and Frisbie). BAE for the two existing cooling tower cells were calculated using the average annual TDS concentration during the 24-month period preceding submittal of the application.

Hot Oil Heaters (CDP's 4 and 5)

NatureWorks is proposing to modify the two natural gas-fired existing hot oil heaters by increasing the heat input for each from 62.4 MMBtu/hr to 75 MMBtu/hr. The hot oil heaters are used in a closed loop to provide heat to support process operations. The emission factors for all pollutants except NO_x remain unchanged as a result of the modification. The NO_x emission factor will increase from 0.03 lb/MMBtu to 0.06 lb/MMBtu, as a result of preliminary stack testing conducted in January 2008, that resulted in emissions of 0.035 lb/MMBtu (a compliance margin was added to be conservative). Potential emissions for the heaters were estimated using vendor guarantees, except for SO₂ and HAPs, for which emission factors from AP-42 Tables 1.4-2, 1.4-3, and 1.4-4 were used. BAE for the two existing hot oil heaters were calculated using the average annual heat input during the period of November 2004 to November 2006. Because maximum potential emissions are below any regulatory thresholds, no emission limits are needed on this equipment.

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PLA Production Vacuum Vent and Waste Water Tank (TK30-96101) through a Thermal Oxidizer (CDP 15)

The degradation of process material created during PLA production will result in CO and VOC/HAP emissions from the vacuum vent (previously labeled CDP15). The VOC/HAP emissions are expected to be primarily acetaldehyde. Potential emissions were estimated by NatureWorks based upon the results of the October 2007 performance tests. NatureWorks has scaled emissions to reflect the permitted production rate at the facility and to include a compliance margin. Use of a compliance margin was deemed appropriate given the unique nature of the process and the lack of industry data for such a process. BAE were estimated using permitted limits from the 2002 construction permit for the polymer production facility.

PLA Production Operations; Processing Filter (CDP 9) and Purge Containers (Fugitive Emissions)

The dryer cooler that vents thru CDP 9 will be modified in order to allow the facility to reach full production capacity. CDP 9 was permitted in the 2002 permit; however, at that time no VOC or CO emissions were expected from CDP 9. As a result of the October 2007 testing, VOC emissions are estimated at 2.28 tpy, CO emissions are estimated at 2.01 tpy, and HAP (acetaldehyde) emissions are estimated at 0.26 tpy.

Fugitive emissions from purge containers used to discard of byproduct were identified during the October 2007 performance tests. Based upon the tests, emissions from the purge containers are estimated at 1.05 tpy of VOC, 0.88 tpy of CO, and 0.40 tpy of HAP (acetaldehyde).

Storage Tanks

NatureWorks was originally permitted to construct one 664,000 gallon lactic acid storage tank (TK30-10001), two 664,000 gallon lactide process tanks (TK30-36001 & TK30-36101), and one 208,000 gallon lactide process tank (TK30-36401). In 2004, the facility added two new lactide tanks (TK 30-365 and TK 30-366) and the facility determined it did not need a construction permit. Lactic acid is the raw material for this process and will be brought in from off-site, or from the Cargill Lactic Acid production facility. The five lactide tanks will serve as intermediate buffer vessels between lactide production and the polymerization process. VOC emissions from the lactic acid storage tank is negligible (vapor pressure at 40°F for lactic acid is 0.004 mm Hg or 0.00053 kPa), and from the lactide tanks was estimated using the Tanks 4.06 program, as reported in a March 10, 2008, email. The low vapor pressures at 230°F for lactide (3.23 mm Hg/ 0.43 kPa) result in VOC emissions from the tanks of 4.2 tpy. No new tanks are being added, nor are the existing tanks being modified, as part of the proposed modification. Potential emissions from the tanks have been included because of increased utilization.

Haul Roads

Truck traffic fugitive emissions were estimated in the January 29, 2002, using AP-42, Chapter 13.2.1. To be consistent with the rest of the site, haul road emissions estimated as part of this project were estimated using the site-approved emission rate of 0.04 lb/VMT.

Potential emissions for the modified polymer production facility, as limited by the permit, are as follows:

<u>Regulated Pollutant</u>	<u>Emissions (tons/year)</u>
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Regulated Pollutant	Emissions (tons/year)
Particulate Matter (PM)	28.89
PM smaller than or equal to 10 microns (PM ₁₀)	19.11
Oxides of Nitrogen (NO _x)	41.48
Sulfur Dioxide (SO ₂)	0.41
Carbon Monoxide (CO)	71.88
Volatile Organic Compounds (VOC)	13.42
Hazardous Air Pollutants (HAPs):	
Acetaldehyde	3.1
Hexane	1.2
Total HAPs	4.34

APPLICABLE REQUIREMENTS AND VARIANCES OR ALTERNATIVES TO REQUIRED STANDARDS:

Chapters 4 and 19 – Air Quality Impact Analyses

Introduction

This air quality impact analysis for the proposed expansion project consists of two components. The first component of the air quality analysis consists of a preliminary modeling analysis of all new or modified emission sources at the facility for which the increase in lb/hr emission rates is above the thresholds in Table 1.0-1 of the Department's *Atmospheric Dispersion Modeling Guidance for Permits*. The preliminary modeling analysis is used to determine if the emissions from the new and/or modified sources would cause ambient pollutant concentrations in excess of the significant impact levels (SILs). If a modeled concentration for a pollutant exceeds the SIL, refined modeling, which includes concentrations from nearby sources and a background concentration, is required on a pollutant-by-pollutant basis. The preliminary modeling analysis was completed for CO and PM₁₀.

Based upon the results of the preliminary modeling, a multi-source impact analysis was not necessary for CO, but it was for PM₁₀. As such, the source conducted a multi-source impact analysis for PM₁₀. Although the source conducted a refined analysis for PM₁₀, modifications to the scope of the project resulted in PSD no longer being triggered for PM₁₀. Even though PM₁₀ increment modeling is not required for this permit, the results are presented herein since they were submitted by the source.

The second component of the analysis consists of a refined modeling analysis to determine whether or not the proposed project will not cause or contribute to any violations of applicable Ambient Air Quality Standards (AAQS) or PSD Increments for those pollutants with concentrations above the respective SILs. This analysis includes sources that contribute to baseline concentrations of each pollutant and sources that have been determined to consume available increment for each pollutant. The refined analysis was completed for 24-hour and annual PM₁₀ concentrations because these were the pollutants and averaging periods for which maximum concentrations from the proposed project were predicted to exceed the SILs. The stack parameters and emission rates for the emission points modeled can be found in the PSD application received by the Department on March 8, 2007, in the supplemental information received September 11, 2007, and in the revised application received January 25, 2008.

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Preliminary Analysis for Significant Impacts

The purpose of the preliminary dispersion modeling analysis was to determine if emissions from the proposed project would cause ambient pollutant concentrations in excess of concentration thresholds above which pre-application ambient air quality monitoring may be required. In addition, the results were reviewed to determine if SILs would be exceeded for any pollutant. The EPA-preferred AERMOD dispersion model (AERMOD, Version 04300 with Prime) was used for the analysis.

The meteorological data used for this analysis consisted of five years (2000-2004) of National Weather Service surface data from the Omaha Eppley Airfield Airport in Omaha (station number 14942) and mixing height data for Omaha (station number 94980).

The following table shows the results of the SIL and pre-application ambient monitoring threshold analysis for CO. The results indicate that the proposed expansion project will not cause a significant impact in the area surrounding NatureWorks for the 1-hour or 8-hour averaging periods for CO and that pre-application monitoring would not be required for CO.

Modeled Concentrations for the Proposed Project, Significant Impact Levels, and Pre-application Monitoring Thresholds

Pollutant	Averaging Period	Modeled Concentration ($\mu\text{g}/\text{m}^3$)	SIL ($\mu\text{g}/\text{m}^3$)	Pre-application Monitoring Threshold Concentration ($\mu\text{g}/\text{m}^3$)
CO	1-hr	93.2	2,000	No threshold
	8-hr	33.6	500	575

Note: The highest-second-high (H2H) concentration was identified for each of 5 years (2000-2004) for each averaging period; the highest concentration for each averaging period for the 5-year period is identified in the table.

The following table shows the results of the SIL and pre-application ambient monitoring threshold analysis for PM_{10} . The results indicate that pre-application monitoring would not be required for the project for PM_{10} . Since the SILs are exceeded for the project, refined modeling is required for PM_{10} .

Modeled Concentrations for the Proposed Project, Significant Impact Levels, and Pre-application Monitoring Thresholds

Pollutant	Averaging Period	Modeled Concentration ($\mu\text{g}/\text{m}^3$)	SIL ($\mu\text{g}/\text{m}^3$)	Pre-application Monitoring Threshold Concentration ($\mu\text{g}/\text{m}^3$)
PM_{10}	24-hr ^a	7.6	5	10
	Annual	1.1	1	No threshold

^a The high-sixth-high (H2H) concentration is identified for the 5-year period (2000-2004) for the 24-hr averaging period.

Refined Modeling Analysis for NAAQS and PSD Increment Compliance

The purpose of the final refined modeling analysis is to demonstrate that the proposed project will not cause or contribute to violations of applicable NAAQS or PSD Increments PM_{10} (24-hour and annual averaging periods). The AAQS and PSD increments are listed in the following table. The Nebraska and National AAQS and PSD increments are identical.

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Nebraska and National Ambient Air Quality Standards and PSD Increments					
Pollutant	Averaging Period	Ambient Air Quality Standards ($\mu\text{g}/\text{m}^3$)		PSD Class II Increments ($\mu\text{g}/\text{m}^3$)	
		National	Nebraska	National	Nebraska
PM ₁₀	24-hour ^a	150	150	30	30
	Annual	50	50	17	17

^a Concentration can be exceeded five times in a five-year period at a single receptor.

This ambient air quality impact analysis takes into account the combined impacts of emissions from the existing and proposed NatureWorks sources, contributions from nearby major and minor sources, and background concentrations. Based on the potential emissions from the NatureWorks project and other sources' allowable and actual emissions, this analysis demonstrates that the proposed project will not cause a violation of the AAQS and PSD Increments for PM₁₀.

PM₁₀ Results

The AERMOD modeling results for the PM₁₀ increment consumption analyses indicate that the total PM₁₀ concentrations would not exceed the PSD allowable concentration increments. Results of the PM₁₀ PSD increment consumption analyses are summarized in the following below.

PM ₁₀ Increment Consumption					
Averaging Period	Year	UTM Coordinates (m)		Increment Consumption ($\mu\text{g}/\text{m}^3$)	Allowable PSD Increment ($\mu\text{g}/\text{m}^3$)
		X	Y		
24-hour ^a	2000	741,732.1	4,601,317	24.6	30
	2001	741,732.1	4,601,317	24.2	
	2002	741,444.1	4,603,461	26.8	
	2003	741,731.1	4,601, 218	24.7	
	2004	741,731.1	4,601,218	25.8	
Annual	2000	741,292.1	4,603,250	7.1	17
	2001	741,296.1	4,603,250	7.1	
	2002	741,732.1	4,603,250	6.8	
	2003	741,732.1	4,603,250	7.3	
	2004	741,732.1	4,602,717	6.7	

^a Value shown is the highest-second-high (H2H) concentration (one exceedence is allowed per year).

The AERMOD modeling results for the PM₁₀ ambient air quality analyses indicate that the total PM₁₀ concentrations would not exceed the ambient air quality standards. Results of the PM₁₀ ambient air quality analyses are summarized in the following below.

Ambient PM ₁₀ Concentrations							
Averaging Period	Year	UTM Coordinates (m)		Background ($\mu\text{g}/\text{m}^3$)	Modeled ($\mu\text{g}/\text{m}^3$)	Total ($\mu\text{g}/\text{m}^3$)	AAQS ($\mu\text{g}/\text{m}^3$)
		X	Y				
24-hour ^a	2002	741444.1	4603183.5	60	35.7	95.7	150

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Annual	2000	741,292.1	4,602,482	25	7.9	32.9	50
	2001	741,296.1	4,602,512		8.7	33.7	
	2002	741,732.1	4,601,317		8.8	33.7	
	2003	741,732.1	4,601,317		8.4	33.4	
	2004	741,732.1	4,601,317		8.5	33.5	

^a Value shown is highest-sixth-high (H6H) concentration per 5-year period at receptor for which the H6H is highest.

Chapter 17 – Construction Permit Requirements:

A State construction permit is required for this source because this construction project has an uncontrolled net increase in emissions at the site greater than one or more of the threshold levels identified in Title 129, Chapter 17, Section 001.01 for PM₁₀, SO_x (SO₂ and/or SO₃), NO_x, CO, VOC and HAPs. The thresholds are as follows:

Pollutant	Threshold
PM ₁₀	15 tons/yr
NO _x	40 tons/yr
SO _x (SO ₂ and/or SO ₃)	40 tons/yr
CO	50 tons/yr
VOC	40 tons/yr
Individual HAP	2.5 tons/yr
Total combined HAPs	10 tons/yr

The facility-wide potential emissions from the facility after the issuance of this permit falls into the following category:

- 100 tons or more per year of any regulated air pollutant; or
- 10 tons or more per year of any single HAP; or
- 25 tons or more per year of any combination of HAPs

Therefore, the facility submitted a \$3,000 fee when submitting their Air Quality Construction Permit Application, in accordance with Title 129, Chapter 17, Section 003.01.

Chapter 18 – New Source Performance Standards (NSPS), and 40 CFR Part 60:

Subpart A – General Provisions: This subpart, adopted by reference in Title 129, Chapter 18, Section 001.01, applies to those units covered by the specific NSPSs as discussed below. The permittee is required to submit notification of the date construction commenced postmarked no later than 30 days after such date {40 CFR 60.7(a)(1)}, notification of the anticipated date of initial startup of the equipment postmarked not more than 60 days nor less than 30 days prior to such date {40 CFR 60.7(a)(2)}, and notification of the actual date of initial start up of the equipment postmarked within 15 days after such date {40 CFR 60.7(a)(3)}.

Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units: This subpart, adopted by reference in Title 129, Chapter 18, Section 001.52, is for steam generating units with a design rate greater than 10 MMBtu/hr and less than or equal to 100 MMBtu/hr, installed after June 9, 1989. Each of the three hot oil heaters located at this facility are subject to Subpart Dc since their heat input ratings are greater than 10 MMBtu/hr and less than or equal to 100 MMBtu/hr.

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Since the hot oil heaters combust natural gas, the only applicable requirements of NSPS Subpart Dc are the recordkeeping requirements in 40 CFR 60.48c.

Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced after July 23, 1984: No changes are being made to the tanks as part of this project. However, Subpart Kb was originally applied to the facility in the January 29, 2002, permit. Subpart Kb was modified October 15, 2003, to increase the vapor pressure thresholds (68 FR 59332). The vapor pressure of the lactic acid tanks is 0.0005 kPa; the typical vapor pressure of the lactide tanks is 1.31 kPa. Since this is less than 3.5 kPa, Subpart Kb does not apply to the facility.

Chapter 19 – Prevention of Significant Deterioration (PSD):

The Cargill – Blair complex currently consists of a source under SIC code 20 that includes Cargill’s wet corn milling operation and integrated ethanol facility; a source group under the SIC code 28 that consists of several joint ventures and wholly owned subsidiaries at the complex (NatureWorks LLC, Cargill Polyols LLC, Cargill’s Lactic Acid facility, and PGLA-1 Company); and two independently owned lessees (Evonik Degussa and Purac). The SIC code 28 source group is considered a single source, while the wet corn milling operation and ethanol facility comprise a separate source, as discussed in a July 15, 1999 memo to file – 65024-P, for purposes of PSD. The SIC code 28 source group is a major PSD source because potential VOC and CO emissions are greater than 100 tpy (sources with 2-digit SIC code 28 are considered “chemical process plants”, which is one of the 28 listed source categories with 100 tpy PSD thresholds). As a result of the new equipment, increased utilization of existing equipment, and results of the October 2007 performance tests for CDP 15, PSD review has been triggered for CO and VOC emissions.

BACT

Pursuant to 40 CFR 52.21(j)(3), a major modification shall apply BACT for each regulated NSR pollutant for which it would result in a significant net emissions increase at the source (the source in this instance is the group of facilities identified as the joint ventures, as noted previously). This requirement applies to each proposed emission unit at which a net emissions increase in the pollutant, regardless of the amount, would occur as a result of a physical change or change in the method of operation in the unit.¹ BACT is defined as an emission limitation established based on the maximum degree of pollutant reduction, determined on a case-by-case basis, considering technical, economic, energy, and environmental factors. However, BACT cannot be less stringent than emission limits established by an applicable NSPS.

In a memorandum dated December 1, 1987, the EPA stated its preference for a “top-down” analysis regarding BACT determinations. The Department uses an approach similar to the “top-down” approach outlined below. The first step in a top-down BACT analysis is to determine, for the emissions unit and pollutant in question, the most stringent control technology and emission limit available for a similar or identical source or source category. If it can be shown that this level of control is infeasible on the basis of technical, economic, energy, and environmental impacts for the source in question, then the next most stringent level of control is identified and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any technical, economic, energy or environmental consideration.

A “Top-Down” BACT analysis is comprised of the following five basic steps:

¹ Increased utilization is not considered a change in the method of operation.

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- Step 1: Identify all potentially applicable control technologies: All control technologies for similar processes, as well as Lowest Achievable Emission Rate (LAER) technologies are included.
- Step 2: Eliminate technically infeasible options: Technologies demonstrated to be infeasible based on physical, chemical, and engineering principles are excluded from further consideration.
- Step 3: Rank remaining technologies by control effectiveness: Technically feasible control technologies are ranked in the order of highest expected emission reduction to lowest expected emission reduction. The ranking also includes expected emission rate, control effectiveness, energy impacts, environmental impacts (including toxic and hazardous air emissions), and economic impacts.
- Step 4: Evaluate most effective controls and document results: The technology ranking is evaluated and case-by-case consideration is given to energy, environmental, and economic impacts. The most effective option not rejected is chosen as BACT and is used to express an enforceable emission limitation for the affected emission unit.
- Step 5: Propose BACT

BACT review is required for CO and VOC emissions. The only units for which BACT review is required are the modified natural gas-fired hot oil heaters (CDP's 4 and 5) and the PLA production vacuum vent. (CDP 15). The BACT determinations are summarized below. Refer to the application and supplemental BACT information submitted on July 27, 2007 and August 28, 2007 for the BACT analyses.

BACT for the Hot Oil Heaters (CDP 4 and 5)

Given the low potential emissions for the natural gas-fired heaters, no additional control is considered cost effective. Therefore, the BACT determination for the natural gas-fired hot oil heaters is no additional control and the use of good combustion practices. As a result of the BACT analysis, no emission limits are being established in the permit for the hot oil heaters, however there are requirements to properly operate and maintain the heaters to ensure that good combustion practices are utilized.

BACT for the PLA Production Vacuum Vent

In October 2007, NatureWorks conducted testing on the PLA Production Vacuum Vent. The production capacity during testing was 50% of the nameplate capacity of the plant. As a result, NatureWorks scaled up the testing results by 50% to account for emissions at full capacity. In addition, NatureWorks added a 50% margin of safety to the uncontrolled emission rates used for the BACT analysis. This margin of safety is appropriate given uncertainty as to what the emissions profile will be at full load, and even though emissions (and emission limits) are estimated with a 50% margin of safety, the required control efficiency of 90% (for CO) and 98% (for VOC) must be met.

NatureWorks has proposed the use of a thermal oxidizer (TO) with 98% control efficiency across the unit and an outlet emission rate of 0.64 lb/hr for process-related VOC emissions. The hourly BACT VOC limit in the permit includes approximately 0.03 lb/hr of combustion-related emissions ($0.64+0.03=0.67$). The minimum control efficiency of 98% includes any emissions generated due to fuel combustion in the TO (outlet emission rate must be 98% less than inlet rate). Since the source has elected the top level control technology for this type of source, no further analysis is required.

Based upon the results of the October 2007 stack tests, NatureWorks now estimates uncontrolled CO emissions of 568 tpy, which includes a safety margin of 50% as proposed by the applicant. Tests have shown that even with the temporary TO operating at 1,700°F only 75% CO reduction was being achieved. NatureWorks has proposed the use of the TO with 90% control efficiency and an outlet emission rate of 12.97 lb/hr for process-related CO emissions anticipating that the permanent TO will perform better than

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the temporary TO when fine-tuned. The hourly BACT CO limit includes approximately 0.38 lb/hr of combustion-related emissions ($12.97+0.38=13.35$). The minimum control efficiency of 90% includes any emissions generated due to fuel combustion in the TO (outlet emission rate must be 90% less than the inlet CO rate). Given the nature of the emission source being controlled, the results of the October 2007 testing, and engineering analyses conducted by NatureWorks, the Department agrees with the conclusion of the BACT analysis. Therefore, BACT for CO is the use of a TO to control emissions by 90% with a maximum outlet emission rate of 13.35 lb/hr.

Increment Modeling – See discussion above under ‘Chapters 4 and 19’

Additional Impacts Analysis

NatureWorks conducted additional analyses on growth, soils, and vegetation and concluded that no significant adverse impact would occur as a result of the operation of the NatureWorks facility. Although a visibility analysis was not conducted, NatureWorks concluded that given the increases in emissions as a result of the project and given the results of previous visibility analyses, no visibility impairment would be caused as a result of the project.

Chapter 20 – Particulate Matter Emissions: The facility is expected to be in compliance with the requirements of Chapter 20 because of the exclusive use of natural gas and because particulate-generating emission units are controlled by baghouses.

Chapter 24 – Sulfur Compound Emissions: The facility is expected to be in compliance with Chapter 24 since natural gas is the only fuel combusted at the facility.

Chapter 27 – Hazardous Air Pollutants: The facility is subject to the requirements of this chapter for the PLA production vacuum vent because the modification results in an increase of potential emissions of a single HAP acetaldehyde of greater than 2.5 tpy. Compliance with Chapter 28, Subpart FFFF (discussed below) has been determined to satisfy the requirements of Chapter 27.

Chapter 28 – Hazardous Air Pollutant Emission Standards (MACT):

The source, for purposes of MACT applicability, are the sources including the NatureWorks, Cargill Polyols, PGLA-1, the Cargill Lactic Acid facility, the corn milling plant, and the ethanol plant because Cargill, Inc. has an ownership interest in all of the sources. Degussa and Purac are not included in MACT applicability for NatureWorks because they do not share common ownership or control with the rest of the entities on site. The source is subject to MACT because emissions are greater than 10 tons/year of any individual HAP and greater than 25 tons/year of combined HAPs. As such, the source is a major source of HAPs, and NatureWorks must comply with any applicable MACT.

NatureWorks is subject to the MACT for Miscellaneous Organic Chemicals (the MON) in Chapter 28, Section 001.78 (40 CFR 63 Subpart FFFF). NatureWorks is considered an existing source (because the source was constructed prior to November 10, 2003) for purposes of Subpart FFFF and must comply by May 10, 2008. In order to comply with the requirements of Subpart FFFF, NatureWorks will use a thermal oxidizer to control HAP emissions from CDP 15 and the wastewater tank/oil-water separator (TK 30-96101) by 98% or to 20 ppmv.

NatureWorks was previously subject to the MACT for Industrial, Commercial, and Institutional Boilers and Process Heaters in Chapter 28, Section 001.90 (40 CFR 63 Subpart DDDDD); however, this standard has been vacated. Therefore, at this time NatureWorks is not subject to Subpart DDDDD.

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This permit supersedes all conditions of the January 29, 2002. The following section identifies the specific conditions of the January 2002 permit followed by the location in the new permit or a discussion of why the condition was removed and not needed in the new permit.

XIII.(A) *The source is permitted to construct a polymer production facility consisting of the following emission points:*

**Table A-1
Emission Points**

<i>Emission Point *</i>	<i>Emission Unit</i>
CDP1	Cooling Tower No. 1
CDP2	Cooling Tower No. 2
CDP4	Hot Oil Heater No. 1
CDP5	Hot Oil Heater No. 2
CDP6	Precoat Filter Receiver
CDP7	Polymerization Aid Filter Receiver
CDP8	Processing Aid Filter Receiver
CDP9	Product Finishing Filter
CDP10	Product Separation Filter
CDP11	Pellet Storage & Loading Filter
CDP13	Finished Product Transfer Filter Receiver
CDP14	Packaging Filter
CDP15	Vacuum System Vent
CDP-TK30-10001	Lactic Acid Tank
CDP-TK30-36001	Lactide Tank
CDP-TK30-36101	Lactide Tank
CDP-TK30-36401	Lactide Tank
	Paved Road Fugitives

**Emission points CDP3 and CDP12 were not used (do not exist).*

This condition was removed and not placed in the new permit because the source has already constructed these emission points and the authority given to NatureWorks to construct this equipment is granted through the issuance of this and previous permits. This type of condition does not need to be carried on into future permits.

XIII.(B) *The source shall use fabric dust collectors to separate materials from pneumatic transfer air and to control PM₁₀ emissions from the processes listed in the following table:*

**Table B-1
Processes Requiring Fabric Dust Collectors**

<i>Emission Point</i>	<i>Process</i>
CDP6	Precoat Bulk Bag System
CDP7	Polymerization Aid Bulk Bag System
CDP8	Processing Aid Bulk Bag System
CDP9	Product Finishing *
CDP10	Product Separation *
CDP11	Pellet Storage & Loading *
CDP13	Finished Product Transfer Filter Receiver
CDP14	Packaging Feed System *

**These fabric dust collectors control emissions from product separation cyclones*

Operation of each fabric dust collector shall be in accordance with the following requirements:

- (1) *The fabric dust collectors shall be operated at all times associated equipment is in operation.*
- (2) *The fabric dust collectors shall be properly installed, operated, and maintained. Manufacturer's instructions, if available, shall be kept on site and readily available to Department representatives.*
- (3) *Each fabric dust collector shall be equipped with an operational pressure differential indicator.*

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- (4) *Routine observations (at least once each day of dust collector operation) shall be conducted to determine whether there are visible emissions from the stack, leaks or noise, atypical pressure differential readings, or other indications which may necessitate corrective action. Corrective action shall be taken immediately if necessary.*
- (5) *Collected waste material from the fabric dust collectors shall be handled, transported, and stored in a manner that ensures compliance with Condition X.*

Condition XIII.(B) of the January 2002 permit has been reformatted and the requirements are now located in Condition III.(D). The source did not construct CDP 7 (Polymerization Aid Bulk Bag System) so it is not included in the new permit.

XIII.(C) The following New Source Performance Standards (NSPS) are applicable:

- (1) *The hot oil heaters (CDP4 and CDP5) are subject to the New Source Performance Standard (NSPS) in 40 CFR 60, Subpart A and Subpart Dc. The requirements of these subparts include:*
 - (a) *The source shall provide notifications in accordance with 40 CFR 60.7, 60.48c(a)(1), and 60.48c(a)(3).*
 - (b) *The source shall record and maintain records of the amounts of each fuel combusted during each day in each hot oil heater. {40 CFR 60.48c(g)}*
- (2) *The lactic acid tank (TK30-10001) and the lactide tanks (TK30-36001, -36101, and -36401) are subject to the New Source Performance Standard (NSPS) in 40 CFR 60 Subpart Kb. The requirements of this subpart include:*
 - (a) *The source shall keep readily accessible records showing the dimension of the tanks and an analysis showing the capacity of the tanks for the life of the source. {40 CFR 60.116b(b)}*
 - (b) *The source shall determine and maintain records of the maximum true vapor pressure of the liquids stored in the tanks in accordance with 40 CFR 60.116b(e).*
 - (c) *The source shall notify the Department within 30 days if the maximum true vapor pressure of any of the liquids stored in the tanks exceeds 5.2 kPa. {40 CFR 60.116b(d)}*

Condition XIII.(C)(1) was moved to Conditions III.(A)(4) & (A)(5) in this permit. The hot oil heaters are still subject to all the requirements of NSPS Subparts A and Dc. Condition XIII.(C)(2) was removed from the permit as the lactic acid and lactide tanks are not subject to NSPS Subpart Kb, based on the vapor pressure of the material in the tanks. For additional information, see earlier discussion on NSPS Subpart Kb applicability in this fact sheet. It is also important to note that the duty for a source to comply with an applicable NSPS is not contingent on whether a permit requires them to comply. An affected facility must comply with the requirements of the applicable NSPS whether it is in their permit or not.

XIII.(D) The hot oil heaters (emission points CDP4 and CDP5) shall be limited as follows:

- (1) *Natural gas shall be the only fuel combusted in the hot oil heaters.*
- (2) *The maximum heat input rate for each hot oil heater shall not exceed 62.4 MMBtu/hr.*
- (3) *The hot oil heaters shall be equipped with low NOx burners and flue gas recirculation.*

Condition XIII.(D) was moved to Condition III.(A)(1) in this permit. The heat input capacity of the hot oil heaters was increased from 62.4 to 75 MMBtu/hr as part of this permitted modification.

XIII.(E) Total production of polymer at this facility shall not exceed 17,500 tons during any calendar month and 175,000 tons during any 12 consecutive calendar month period.

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Condition XIII.(E) was unchanged and moved to Condition II.(F) in this permit.

XIII.(F) Emission rates from this facility shall not exceed the limits in the following tables. For the purposes of the following tables, a year is defined as any 12 consecutive calendar month period. The yearly limits are all based on 8760 hours per year.

**Table F-1
VOC Emission Limits**

Emission Point	Description	VOC Emission Limits	
		(lb/hr)	(ton/year)
CDP4	Hot Oil Heater No. 1	0.28	1.23
CDP5	Hot Oil Heater No. 2	0.28	1.23
CDP15	Vacuum System Vent	0.31	1.36
Total		0.87	3.82

**Table F-2
PM₁₀ Emission Limits**

Emission Point	Description	PM ₁₀ Emission Limits	
		(lb/hr)	(ton/year)
CDP1	Cooling Tower No. 1	0.11	0.48
CDP2	Cooling Tower No. 2	0.11	0.48
CDP4	Hot Oil Heater No. 1	1.25	5.47
CDP5	Hot Oil Heater No. 2	1.25	5.47
CDP6	Precoat Filter Receiver	0.19	0.83
CDP7	Polymerization Aid Filter Receiver	0.09	0.41
CDP8	Processing Aid Filter Receiver	0.02	0.10
CDP9	Product Finishing Filter	0.03	0.13
CDP10	Product Separation Filter	0.03	0.12
CDP11	Pellet Storage & Loading Filter	0.03	0.11
CDP13	Finished Product Transfer Filter Receiver	0.01	0.04
CDP14	Packaging Filter	0.03	0.11
	Paved Road Fugitives	0.63	1.38
Total		3.78	15.13

**Table F-3
SO₂ Emission Limits**

Emission Point	Description	SO ₂ Emission Limits	
		(lb/hr)	(ton/year)
CDP4	Hot Oil Heater No. 1	0.04	0.16
CDP5	Hot Oil Heater No. 2	0.04	0.16
Total		0.08	0.32

**Table F-4
NO_x Emission Limits**

Emission Point	Description	NO _x Emission Limits	
		(lb/hr)	(ton/year)
CDP4	Hot Oil Heater No. 1	1.87	8.20
CDP5	Hot Oil Heater No. 2	1.87	8.20
Total		3.74	16.40

**Table F-5
CO Emission Limits**

Emission Point	Description	CO Emission Limits	
		(lb/hr)	(ton/year)
CDP4	Hot Oil Heater No. 1	1.00	4.37
CDP5	Hot Oil Heater No. 2	1.00	4.37

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<i>CDP15</i>	<i>Vacuum System Vent</i>	<i>12.10</i>	<i>53.00</i>
<i>Total</i>		<i>14.10</i>	<i>61.74</i>

Condition XIII.(F) included emission limits for various emission points at the facility. Many of these emission limits have been removed as unnecessary or have been incorporated/revised in the new permit.

CDP1 & 2 (cooling towers): PM₁₀ emission limits for the cooling towers have been removed and are unnecessary in this permit. An error in reporting the drift loss of the cooling towers (vendor only guaranteed drift loss of 0.005% instead of 0.0005%) results in an increase in emission estimates from these two cooling tower cells. Revised conditions for the cooling towers are located in Condition III.(B) of this permit. The increased PM₁₀ emissions were reflected in the dispersion modeling conducted by the facility.

CDP4 & 5 (hot oil heaters): All emission limits have been removed and are unnecessary in this permit. The emission limits were originally based solely on vendor guarantees (except for SO_x, which was based on AP-42) and there is no regulatory basis to have emission limits set in a permit unless it is protecting a standard. Emission estimates from the hot oil heaters are based on natural gas usage and use of low-NO_x burners and FDR (which the source is required to operate). The NO_x emission factor used to estimate emissions was increased from 0.03 to 0.06 lb/MMBtu to better represent actual emissions and give the source a margin of compliance. Stack testing done on January 17, 2008, resulted in emissions of 0.035 lb/MMBtu. This increased emission factor does not trigger any additional regulatory reviews as the PTE-BAE increase is still less than 40 tpy.

CDP6, 8, 9, 10, 11, 13 & 14 (material handling baghouses): PM₁₀ emission limits for all of these baghouse emission points have been removed and are unnecessary in this permit. Performance testing as required in the January 2002 permit verified that actual emissions were well below the corresponding emission estimates (and permitted limits) such that emission limits and/or additional performance testing are not warranted at this time. If the source was requesting aggressive emission estimates (with little margin of safety) to comply with a regulatory requirement or standard, the Department would be inclined to include specific emission limits and require additional performance testing. The permit still requires the baghouses be operated and monitored to ensure they perform at the same levels as they were originally tested at [see Condition III.(D)(3)]. Dispersion modeling for PM₁₀ was conducted using the higher (more conservative) emission estimates as represented in the calculations accompanying this fact sheet.

CDP15 (Vacuum system vent): Emission limits for VOC and CO have been replaced since CD15 now represents the exhaust from the thermal oxidizer. The new VOC and CO emission limits and control efficiencies requirements are a result of the BACT analysis. See Condition III.(C).

Paved road fugitives: The PM₁₀ emission limits in Table F-2 were removed and are unnecessary in this permit. These limits equated to the AP-42 emission estimates and there is no basis for having them as limits in the permit. The approved emission factor for this facility (and the entire Cargill complex) is 0.04 lb/VMT. Potential emissions based on the number of trucks limited by the January 2002 permit and this permit [see Condition II.(G)] is 0.18 tpy, compared to the January 2002 permit limit of 1.38 tpy.

XIII.(G) The source will be considered in compliance with the emission limits in Tables F-1 through F-5 based on the following:

- (1) Drift loss from the cooling towers (CDP1 and CDP2) shall not exceed 0.0005% as guaranteed by the vendor. The cooling tower water system shall be designed such that Total Dissolved Solids (TDS) will not exceed 5,000 ppm.*
- (2) The hot oil heaters (CDP4 and CDP5) shall be tuned according to the vendor's recommendations and schedule. Emissions from the hot oil heaters shall not exceed the following rates as guaranteed by the vendor:*

NO_x: 0.03 lb/MMBtu PM₁₀: 0.02 lb/MMBtu

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CO: 0.016 lb/MMBtu VOC: 0.0045 lb/MMBtu

- (3) *Emissions testing shall be conducted as follows:*
- (a) *Filter receiver CDP6 shall be tested to verify that the outlet grain loading does not exceed 0.02 gr/dscf.*
 - (b) *Filter receiver CDP7 shall be tested to verify that the outlet grain loading does not exceed 0.01 gr/dscf.*
 - (c) *Filter receiver CDP8 shall be tested to verify that the outlet grain loading does not exceed 0.005 gr/dscf.*
 - (d) *The polymer handling operations (CDP9, CDP10, and CDP11) shall be tested to verify that the outlet grain loading does not exceed 0.02 lb/1000 lb dry air (0.011 gr/dscf). CDP13 and CDP14 are not required to be tested at this time.*
 - (e) *The polymer process vacuum system vent (CDP15) shall be tested to verify that CO emissions do not exceed 12.10 lb/hr.*
 - (f) *The polymer process vacuum system vent (CDP15) shall be tested to verify that VOC emissions do not exceed 0.31 lb/hr.*
 - (g) *Testing shall be conducted by an independent testing firm no later than 180 days after commencing production.*
 - (h) *The emission units requiring testing shall be operated as close to maximum production levels as reasonable during emissions testing. The Department may require additional emissions testing when the facility reaches maximum production levels.*
 - (i) *An emissions testing protocol shall be submitted and must be approved by the Department before emissions testing can be conducted.*
 - (j) *The source shall notify the Department of the anticipated testing date at least 30 days prior to such date for any testing performed to demonstrate compliance with this permit.*
 - (k) *A written report of performance test results shall be furnished to the Department within 45 days after completion of the tests.*
- (4) *The source will be considered in compliance with the remaining emission limits, in the absence of source specific test data, based on the emission factors used in the fact sheet and compliance with Conditions XIII(D) and XIII(E).*

Condition XIII.(G) included many of the methods by which the source demonstrated compliance with the emission limits in Tables F-1 through F-5 in the January 2002 permit. Since all of these emission limits have either been removed or revised in the new permit, much of these conditions are not carried over into the new permit. Condition XIII.(G)(1) relates to the cooling towers and these requirements are now located in Condition III.(B) of the new permit. It should be noted that the vendor guaranteed drift loss has been revised. As discussed earlier, the emission limits for hot oil heaters CDP4 and 5 are not necessary and have not been transferred to the new permit. The basis for these limits was based solely on vendor guarantees and not regulatory requirements or standards. Proper operation and “tuning” of the hot oil heaters is covered under Condition III.(A)(3) of the new permit. The testing requirements in Condition XIII.(G)(3) have been completed by the source and have not been carried over to the new permit. Condition XIII.(G)(4) was removed and is unnecessary in the new permit because most of the emission limits have been removed (refer to earlier discussions) or are included in other parts of the new permit. As indicated earlier, Conditions XIII.(D) and (E) have been transferred into the new permit.

XIII.(H) The following requirements of Title 129, Chapter 20 are applicable:

- (1) *Opacity shall be less than 20% in accordance with Section 005.*

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- (2) *The source shall not exceed the particulate matter emission limits in Sections 001 and 003. Compliance with this condition may be demonstrated through compliance with Condition XIII(F), Table F-2.*

Condition XIII.(H) has been removed and not placed in the new permit. It has been removed to simplify the contents of the permit as the source is subject to the requirements of Chapter 20 whether it is in the permit or not.

- XIII.(I) *Emissions of sulfur oxides from the hot oil heaters (CDP4 and CDP5) shall not exceed 2.5 pounds per million Btu input, maximum 2 hour average, in accordance with Title 129, Chapter 24. Compliance with this condition may be demonstrated through compliance with Condition XIII(F), Table F-3.*

Condition XIII.(I) has been removed and not placed in the new permit. It has been removed to simplify the contents of the permit as the source is subject to the requirements of Chapter 24 whether it is in the permit or not. The requirement to burn natural gas in the hot oil heaters ensures compliance with Chapter 24.

- XIII.(J) *Truck traffic shall not exceed a total of 600 trucks per month for incoming raw materials, outgoing finished product, and other miscellaneous items.*

This condition is unchanged and now located in Condition II.(G).

- XIII.(K) *Records shall be maintained on-site for a minimum period of five (5) years unless otherwise indicated. These records shall be clear and readily accessible to Department representatives and shall include the following:*

- (1) *Fabric filter maintenance and inspection records to show compliance with Condition XIII(B) including:
 - (a) *Records documenting when routine observations were performed with a description including pressure differential readings and any atypical observations.*
 - (b) *Records documenting when routine maintenance and preventive actions were performed with a description of the maintenance and/or preventive action performed.*
 - (c) *Filter replacement records including filter position, type, and date of filter installation.*
 - (d) *Records documenting equipment failures, malfunctions, or other variations, including time of occurrence, remedial action taken, and when corrections were made.**
- (2) *The type and quantity of fuel combusted in the hot oil heaters each day to show compliance with Conditions XIII(C)(1)(b), XIII(D)(1), and XIII(D)(2).*
- (3) *The dimensions and analyses of the capacities of the lactic acid and lactide tanks to show compliance with Condition XIII(C)(2)(a). These records shall be maintained for the life of the source.*
- (4) *The maximum true vapor pressures of the liquids stored in the lactic acid and lactide tanks to show compliance with Condition XIII(C)(2)(b).*
- (5) *The quantity of polymer produced at this facility each calendar month and during the previous 12 consecutive calendar months to show compliance with Condition XIII(E). The total for the previous 12 consecutive calendar months shall be calculated by the 15th day of each calendar month.*
- (6) *The vendor guarantee for drift loss from the cooling towers (CDP1 and CDP2) shall be maintained for the life of the source to show compliance with Condition XIII(G)(1).*

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- (7) *The vendor guarantees for NO_x, CO, PM₁₀, and VOC emissions from the hot oil heaters (CDP4 and CDP5) shall be maintained for the life of the source to show compliance with Condition XIII(G)(2).*
- (8) *Records documenting when the hot oil heaters (CDP4 and CDP5) are tuned, any data collected during the tuning procedure, and a description of any corrective actions taken to show compliance with Condition XIII(G)(2).*
- (9) *The number of trucks for outgoing finished product, raw materials, and miscellaneous items shall be recorded each calendar month to show compliance with Condition XIII(J).*

Most recordkeeping requirements have been transferred to Condition II.(A) in the new permit or the “Reporting and Recordkeeping Requirements” paragraphs in Conditions III.(A) through (D). In addition, recordkeeping requirements such as those found in Conditions XIII.(K)(2), (3), and (4) are requirements specific to the applicable NSPS Subparts and do not need to be explicitly stated in the new permit.

Permit conditions specific to the proposed permit are discussed as follows:

- II.(A) This condition contains general recordkeeping and reporting requirements that apply to all permitted emission units, control equipment, and monitoring devices. These requirements establish several things including, a completion date when records must be completed, how long records need to be maintained, and identifying specific types of records that must be maintained. Records are required to be maintained to ensure compliance with all applicable requirements, specifically those required in this permit. However, additional recordkeeping requirements may be established in the future to better ensure compliance. Documentation detailing operation and maintenance can be operational and maintenance manuals provided by the manufacturer. If manufacturer manuals are not available, the owner or operator must develop a document containing proper operation and maintenance requirements for each permitted emission unit and piece of required control equipment.
- II.(B) This condition requires all emission units, control equipment, and monitoring equipment to be properly installed, operated, and maintained. It is expected that the installation, operation, and maintenance conducted will be similar to the items contained in the documents detailing proper operation, inspection, and maintenance of the equipment (required in Specific Condition II.(A)(5)). It is very important that permitted and required equipment is operating properly and maintained since un-maintained equipment has the potential to emit greater amounts of pollution into the atmosphere or monitor items incorrectly or inaccurately. Emission estimates for this permitting action assume that all equipment is operating properly and being properly maintained.
- II.(C) This condition requires any emissions resulting from equipment failures, malfunctions, or other variations in control or process equipment performance that are, or may be, in excess of the applicable emission control regulations to be reported to the Department in accordance with Title 129, Chapter 35, Section 005. The Department needs to be notified when excess emissions have, or may have occurred along with the cause of the emissions in order to determine the appropriate enforcement action. These reports also assist with verifying proper operation and maintenance of process and control equipment.
- II.(D) This condition specifies general initial performance testing requirements. All performance tests required throughout this permit are required to be conducted in accordance with these conditions.
- II.(E) This condition specifies the stack heights upon which the dispersion modeling analysis is based. If any stack exit point dimensions differ from the information used in modeling for the basis of this permit, the permittee shall provide a discussion of the discrepancy with respect to the

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modeling analysis and submit justification as to why the modeling analysis remains valid with supporting conclusions. Alternately, the permittee may submit revised modeling based on the as-built stack parameters. The Department may require that revised modeling based on as-built conditions be submitted to demonstrate compliance with Title 129, Chapters 4 and 19. The property must restrict public access. The restriction plan shall be submitted to the NDEQ prior to start up of operations. Site surveys (or other similar documentations) must be kept in order to demonstrate compliance.

- II.(F) This condition has been carried over from the January 2002 construction permit unchanged.
- II.(G) This condition has been carried over from the January 2002 construction permit unchanged.
- III.(A) This condition establishes requirements for the modified hot oil heaters. Condition III.(A)(1) establishes that both hot oil heaters are permitted to combust natural gas at a capacity of 75 MMBtu/hr and shall be equipped with low NO_x burners and designed with flue gas recirculation. Condition III.(A)(2) indicates that no emission limitations or testing requirements apply to the hot oil heaters because potential emission rates are well below regulatory standards. BACT emission limits for CO and VOC are also unnecessary since BACT was considered “no additional control”. Requirements for BACT are met with proper operation and maintenance of the heaters. Condition III.(A)(3) indicates that the hot oil heaters are subject to the operational and monitoring requirements of NSPS Subpart Dc, shall be equipped with low NO_x burners and designed with flue gas recirculation, and shall be properly tuned. These requirements were carried over from the previous permit. Condition III.(A)(4) identifies the applicability of NSPS Subparts A and Dc. And Condition III.(A)(5) identifies recordkeeping requirements.
- III.(B) This condition establishes requirements for the new cooling tower cell. Condition III.(B)(1) identifies the maximum circulation rate of the new cooling tower cell. Condition III.(B)(2) indicates that no emission limitations or testing requirements apply to the new cooling tower cell. Condition III.(B)(3) identifies the maximum drift loss and TDC concentration and requires monthly sampling of the TDS concentration. Condition III.(B)(4) indicates that no NSPS, NESHAP, or MACT requirements apply. And Condition III.(B)(5) identifies recordkeeping requirements.
- III.(C) This condition establishes requirements for CDP15. Condition III.(C)(1) establishes that the PLA production vent shall be controlled by a TO. As a result of the significant CO, VOC, and HAP emissions identified in the October 2007 testing, NatureWorks installed a temporary TO in January 2008 to control emissions until the permanent TO can be ordered and installed. Condition III.(C)(2) establishes the BACT and MACT limits for CDP 15 and requires testing. Condition III.(C)(3) requires that emissions from the vacuum vent be controlled by the TO and identifies the applicability of operational and monitoring requirements of MACT Subpart FFFF. In addition, Condition III.(C)(3) establishes a date by which the permanent TO shall be installed and operational. Installation and operation of the distillation column (CD1A) is the trigger date because it will be the point at which the production capacity will increase from current capacity to permitted production and emission levels anticipated by this project. Condition III.(C)(4) identifies the applicability of MACT Subparts A and FFFF. And Condition III.(C)(5) identifies recordkeeping requirements.
- III.(D) This condition transfers the necessary requirements related to material handling processes from the January 2002 construction permit. No new requirements have been established.

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STATUTORY OR REGULATORY PROVISIONS ON WHICH PERMIT REQUIREMENTS ARE BASED:

Applicable regulations: Title 129 - Nebraska Air Quality Regulations as amended February 6, 2008.

PROCEDURES FOR FINAL DETERMINATION WITH RESPECT TO THE PROPOSED CONSTRUCTION PERMIT:

The public notice, as required under NAQR Chapter 14, shall be published on March 18, 2008, in the Enterprise Publishing Company newspaper in Blair. Persons or groups shall have 30 days from that issuance of public notice (April 16, 2008) to provide the NDEQ with any written comments concerning the proposed permit action and/or to request a public hearing, in accordance with NAQR Chapter 14. If a public hearing is granted by the Director, there will be a notice of that meeting published at least 30 days prior to the hearing. Persons having comments or requesting a public hearing may contact:

W. Clark Smith-Permitting Section Supervisor
Air Quality Division
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-8922

If no public hearing is requested, the permit may be granted at the close of the 30-day comment period. If a public hearing is requested, the Director of the NDEQ may choose to extend the date on which the permit is to be granted until after that public hearing has been held. During the 30-day comment period, persons requiring further information should contact:

Brad Reid-Environmental Engineer
Air Quality Division-Permitting Section
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, Nebraska 68509-8922

Telephone inquiries may be made at:

(402) 471-2189

TDD users please call 711 and ask the relay operator to call us at (402) 471-2186.

PUBLIC NOTICE

Nebraska Department of Environmental Quality

Air Quality Division

Notice is given to the public, according to Chapter 14 of Title 129 - Nebraska Air Quality Regulations, of the application of NatureWorks, LLC for a Prevention of Significant Deterioration (PSD) permit to modify an existing polymer production facility located at 650 Industrial Road in Blair, Nebraska.

The potential emissions of air contaminants from the facility after the proposed modifications are estimated in the following table:

Regulated Pollutant	Emissions (tons/year)
Particulate Matter (PM)	28.89
PM smaller than or equal to 10 microns (PM ₁₀)	19.11
Oxides of Nitrogen (NO _x)	41.48
Sulfur Dioxide (SO ₂)	0.41
Carbon Monoxide (CO)	71.88
Volatile Organic Compounds (VOC)	13.42
Hazardous Air Pollutants (HAPs):	
Acetaldehyde	3.1
Hexane	1.2
Total HAPs	4.34

Washington County is in attainment with the National Ambient Air Quality Standards (NAAQS) for all regulated pollutants and is expected to continue to be in attainment. Predicted consumption of the PSD Class II increment for PM₁₀ is 26.8 micrograms per cubic meter (ug/m³) for the 24-hour averaging period and 7.3 ug/m³ for the annual averaging period. Washington County is in compliance with the state Total Reduced Sulfur (TRS) standards and no TRS emissions are expected as a result of this permit amendment. No impact is anticipated on habitat for any rare or threatened species.

The Department proposes to issue a PSD construction permit with specific conditions, based on Title 129 - Nebraska Air Quality Regulations, which:

- Allow two existing natural gas-fired hot oil heaters to be modified to increase the maximum heat input from 62.4 MMBtu/hr to 75 MMBtu/hr each.
- Allow the construction of one new cooling tower cell.
- Require emissions from the polymer production vacuum vent to be controlled by a thermal oxidizer.
- Identify inspection, operation, maintenance, and monitoring requirements;
- Specify minimum stack height requirements and require public access restriction to property;
- Specify testing, recordkeeping and reporting requirements.

The proposed permit and supporting materials are available for inspection at the office of the Nebraska Department of Environmental Quality, Suite 400, 1200 "N" Street, Lincoln, Nebraska 68508. These

materials were also forwarded to the Blair Public Library. Telephone inquiries may be made at (402) 471-2189. Please notify the Department of Environmental Quality if alternate formats of materials are needed. Contact phone number is (402) 471-2186. TDD users please call 711 and ask the relay operator to call us at (402) 471-2186. Persons requiring further information should contact:

Brad Reid-Environmental Engineer
Air Quality Division-Permitting Section
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, NE 68509-8922

Within 30 days after the initial publication of this notice, persons may request or petition the Director for public hearing, or submit comments relative to the issuance of the proposed permit. Comments received during the 30 day public notice period, ending April 16, 2008, will be considered prior to the final decision to issue or to deny the proposed permit. A request or petition for hearing must state the nature of the issues to be raised and all arguments and factual grounds supporting such position. If a public hearing is granted by the Director, the hearing will be advertised by public notice at least 30 days prior to its occurrence. Comments and requests should be mailed to:

W. Clark Smith-Permitting Section Supervisor
Air Quality Division
Nebraska Department of Environmental Quality
PO Box 98922
Lincoln, NE 68509-8922

Fact Sheet Attachment Emission Calculations Summary**Facility Name:** NatureWorks LLC - PLA Facility**Facility ID:** 69585**Potential Emissions**

Process/Emission Unit	PM	PM ₁₀	NO _x	SO ₂	CO	VOC	HAP
Material Handling	1.44	1.44	--	--	--	--	--
Hot Oil Heaters	13.14	13.14	39.42	0.39	10.51	2.96	1.24
Cooling Towers	13.97	4.19	--	--	--	--	--
Tanks (<i>calculated using TANKS 4.06</i>)	--	--	--	--	--	4.20	--
Polylactic Acid Production Vacuum Vent	--	--	--	--	567.74*	141.04*	120.09*
Thermal Oxidizer Combustion Emissions	0.15	0.15	2.06	0.01	1.65	0.11	0.04
Haul Roads	0.18	0.18					--
Potential Emissions	28.89	19.11	41.48	0.41	579.90	148.31	121.37

* Potential emissions of CO, VOC, and HAP reflect the emissions testing performed in October 2007, and do not reflect post project emissions after control by the thermal oxidizer. Potential post-project emissions from the TO are 58.47 tpy of CO, 2.93 tpy of VOC, and 2.44 tpy of HAP as shown in the table titled "Potential Emissions as limited by the permit" (last page of fact sheet attachment).

Baseline Actual Emissions Summary

Process/Emission Unit	PM	PM ₁₀	NO _x	SO ₂	CO	VOC	HAP*
Material Handling	0.15	0.15	--	--	--	--	--
Hot Oil Heaters	4.27	4.27	6.41	0.13	3.42	0.96	0.83
Cooling Tower	2.94	0.88	--	--	--	--	--
Tanks (<i>calculated using TANKS 4.06</i>)	--	--	--	--	--	0.42	--
Polylactic Acid Production Vacuum Vent	--	--	--	--	53.00	1.36	1.36
Haul Roads	0.11	0.11					--
Baseline Actual Emissions	7.47	5.41	6.41	0.13	56.42	2.74	2.19

*HAP emissions are potential emissions as limited by 2002 construction permit.

	PM	PM ₁₀	NO _x	SO ₂	CO*	VOC*
Increase in Emissions	21.42	13.69	35.07	0.28	523.48	145.57
PSD Significance Threshold	25	15	40	40	100	40
Significant Increase?	NO	NO	NO	NO	YES	YES

* Increase in emissions of CO and VOC reflect the emissions testing performed in October 2007, and do not reflect post project emissions after control by the thermal oxidizer. PSD is required because the source did not obtain a PSD avoidance permit prior to installation.

Fact Sheet Attachment Emission Calculations: Material Handling

Facility Name: NatureWorks LLC - PLA Facility

Facility ID: 69585

Potential Emissions

Emission Point ID#	Control Equipment ID	Emission Unit Name	(A)	(B)	Controlled PM/PM ₁₀ PTE ³	
			Flow Rate ¹	Emission Factor ²	(C) = (A)x(B)x60/70 00 (lb/hour)	(D) = (C)x8760/200 0 (ton/year)
CDP 6	Baghouse	Precoat Filter Receiver	1,100	0.02	0.19	0.83
CDP 8	Baghouse	Processing Aid Filter Receiver	550	0.005	0.02	0.10
CDP 9	Baghouse	Product Finishing Filter	6,500	0.00053	0.03	0.13
CDP 10	Baghouse	Product Separation Filter	6,100	0.00053	0.03	0.12
CDP 11	Baghouse	Pellet Storage and Loading Filter	5,700	0.00053	0.03	0.11
CDP 13	Baghouse	Finished Product Transfer Filter Receiver	2,000	0.00053	0.01	0.04
CDP 14	Baghouse	Packaging Feed System Filter	5,500	0.00054	0.03	0.11
					Total	1.44

Conversion Factor: 7000 grains per pound

¹Flow rate based on fan rating (from applicant)

²Emission factors based on vendor guarantees; emission factors for CDP's 9, 10, 11, 13, and 14, are converted to grains/dscf from an uncontrolled emission estimate of 0.02 lb/1000 lb dry air and a 95% control efficiency for fabric filters

³Assume PM emissions equal PM₁₀ for baghouses

Baseline Actual Emissions

Emission Point ID#	Control Equipment ID	Emission Unit Name	(A) lb/hr Emissions ¹	(B) Hours ²	Controlled PM/PM ₁₀ BAE ³	
CDP 6	Baghouse	Precoat Filter Receiver	0.002	528	0.001	
CDP 8	Baghouse	Processing Aid Filter Receiver	0.003	31	0.000	
CDP 9	Baghouse	Product Finishing Filter	0.016	5694	0.046	
CDP 10	Baghouse	Product Separation Filter	0.003	4954	0.007	
CDP 11	Baghouse	Pellet Storage and Loading Filter	0.009	4718	0.021	
CDP 13	Baghouse	Finished Product Transfer Filter Receiver	0.010	1264	0.006	
CDP 14	Baghouse	Packaging Feed System Filter	0.030	4289	0.064	
					Total	0.145

¹Emissions for CDP 6, 9, 10, and 11 based upon 12/10/02 and 12/11/02 stack test; Emissions for CDP 8 based upon 11/7/02 stack test; emissions for CDP 13 and 14 estimated based upon 12/02 testing;

²Hours based upon 24-month ave. previous to application submittal

³Assume PM emissions equal PM₁₀ for baghouses

Fact Sheet Attachment Emission Calculations: Hot Oil Heaters

Facility Name: NatureWorks LLC - PLA Facility
Facility ID: 69585

Hot Oil Heater Emissions

Number of Units: 2 (CDP 4 and 5)
 Total Firing Capacity: 150 MMBTU/hr
 Heating Value: 1,000 BTU/cf

Total Boiler HAP PTE Calculations

	Emission	Potential
	Factor	Emissions
Pollutant	(lb/MMcf)	(ton/yr)
n-Hexane	1.8	1.18
Total HAPs	1.889	1.24

HAP emission factors are from AP-42 (7/1998), Tables 1.4-3 and 1.4-4.

Max Potential Firing Capacity: 150 MMBtu/hr
 Annual Maximum Fuel Use: 1,314,000 MMBtu/yr

	Emission	Emission	Emission Rate	Potential
Pollutant	Factor	Rate per boiler	per 2 oil heaters	Emissions
	(lb/MMBtu)	(lb/hr)	(lb/hr)	(tons/yr)
PM	0.0200	1.50	3.00	13.14
PM ₁₀	0.0200	1.50	3.00	13.14
NO _x	0.0600	4.50	9.00	39.42
SO _x	0.0006	0.05	0.09	0.39
CO	0.0160	1.20	2.40	10.51
VOC	0.0045	0.34	0.68	2.96

Emission factors from vendor, except emission factor for SO_x, which is from AP-42, Table 1.4-2

Baseline Actual Emissions

Actual Fuel Use¹: 427,488 MMBtu/yr

	Emission	
Pollutant	Factor	BAE
	(lb/MMBtu)	(tons/yr)
PM	0.0200	4.27
PM ₁₀	0.0200	4.27
NO _x	0.0300	6.41
SO _x	0.0006	0.13
CO	0.0160	3.42
VOC	0.0045	0.96

Emission factors from vendor and January 2002 construction permit limits

¹Fuel use for existing hot oil heaters (CDP 4 and 5) is based upon average annual heat input from November 2004 to November 2006

Fact Sheet Attachment Emission Calculations: Cooling Tower

Facility Name: NatureWorks LLC - PLA Facility

Facility ID: 69585

Calculations for Emissions from Cooling Tower (CDP 1, 2, and 3)

Circulation rate: 1,530,000 gal/hr (total)
 13,402,800 Mgal/yr (based on 8,760 hrs/yr)
 Drift loss percent: 0.005 %
 Water density: 8.34 lbs/gal
 TDS concentration: 5,000 ppm single sample event

Emission Factor Calculation for PM and PM₁₀

Emission factor equation from AP-42, Section 13.4-2 (01/1995)

$$\left(\frac{\text{ppm TDS}}{1,000,000 \text{ lbs water}} \right) \left(\frac{8.34 \text{ lbs water}}{\text{gal}} \right) \left(\frac{1,000 \text{ gal}}{1 \text{ Mgal}} \right) \left(\frac{0.005 \text{ driftloss}}{100} \right)$$

PM emission factor = 0.00209 lbs/Mgal single sample event (highest hourly rate)
 PM₁₀ emission factor = 0.00063 lbs/Mgal single sample event (PM10 is 30% PM at 5,000 ppm per
 "Calculating Realistic PM₁₀ Emissions from Cooling Towers" - Reisman, Frisbie)

Hourly Emissions = (lbs/Mgal single sample event)(hourly throughput gal/hr)(1 Mgal/1,000 gal)

Annual Emissions = (lbs/Mgal average annual rate)(annual throughput Mgal/yr)/(2,000 lbs/ton)

Cooling Tower PTE Summary		
Pollutant	Hourly PTE	Annual PTE
	(lbs/hr)	(tons/year)
PM	3.19	13.97
PM ₁₀	0.957	4.19

Baseline Actual Calculations for existing cooling tower cells (CDP 1 and 2): Based upon ave. TDS of 1537 ppm and drift loss of 0.005% during the 24 months previous to application submittal

Cooling Tower BAE Summary		
Pollutant		Annual PTE
		(tons/year)
PM		2.94
PM ₁₀	(30% of PM)	0.88

SUMMARY

Route	PM ₁₀ Emission rate (lb/day)	PM ₁₀ Emission rate (Tons/yr)
R1/R5A	0.27	0.05
R20 (ISC #388-398)/R23	0.56	0.10
R20 (ISC #383-384)	0.02	0.003
R20 (ISC #385-387)	0.05	0.01
R27	0.02	0.003
R28	0.02	0.004
R29	0.02	0.003
R30	0.02	0.003
	Total	0.18

Type of Truck	Status	Number of trips per month	Number of trips per day	PM ₁₀ (lb/VMT)	VMT per trip (mile)	PM ₁₀ Emission Rate (lb/day)
R1 (ISC #201-206) R5A (ISC #252-254)						
NWP Loadout (5 axle - 18 wheels)	full	300	10.00	0.040	0.170	0.07
NWP Loadout (5 axle - 18 wheels)	empty	300	10.00	0.040	0.170	0.07
NWP Warehouse (5 axle - 18 wheels)	full	300	10.00	0.040	0.170	0.07
NWP Warehouse (5 axle - 18 wheels)	empty	300	10.00	0.040	0.170	0.07
					Total	0.27
PM ₁₀ Emissions Per Hour Over 12 Hours (lb/hr)						0.02
PM ₁₀ Emissions Per 100' Road Segment (g/s/100')						0.0003
PM ₁₀ Emissions Per Year (ton/yr)						0.05

NOTE: The VMT per trip is irrelevant to the emissions per 100' road segment that is put into model.

Type of Truck	Status	Number of trips per month	Number of trips per day	PM ₁₀ (lb/VMT)	VMT per trip (mile)	PM ₁₀ Emission Rate (lb/day)
Portion of R20 (ISC #388-398) R23 (ISC #425-432)						
NWP Loadout (5 axle - 18 wheels)	full	300	10.00	0.040	0.350	0.14
NWP Loadout (5 axle - 18 wheels)	empty	300	10.00	0.040	0.350	0.14
NWP Warehouse (5 axle - 18 wheels)	full	300	10.00	0.040	0.350	0.14
NWP Warehouse (5 axle - 18 wheels)	empty	300	10.00	0.040	0.350	0.14
					Total	0.56
PM ₁₀ Emissions Per Hour Over 12 Hours (lb/hr)						0.05
PM ₁₀ Emissions Per 100' Road Segment (g/s/100')						0.0003
PM ₁₀ Emissions Per Year (ton/yr)						0.10

NOTE: The VMT per trip is irrelevant to the emissions per 100' road segment that is put into model.

Type of Truck	Status	Number of trips per month	Number of trips per day	PM ₁₀ (lb/VMT)	VMT per trip (mile)	PM ₁₀ Emission Rate (lb/day)
Portion of R20 (ISC #383-384)						
NWP Loadout (5 axle - 18 wheels)	full	300	10.00	0.040	0.038	0.02
					Total	0.02
PM ₁₀ Emissions Per Hour Over 12 Hours (lb/hr)						0.00
PM ₁₀ Emissions Per 100' Road Segment (g/s/100')						0.00008
PM ₁₀ Emissions Per Year (ton/yr)						0.003

NOTE: The VMT per trip is irrelevant to the emissions per 100' road segment that is put into model.

Type of Truck	Status	Number of trips per month	Number of trips per day	PM ₁₀ (lb/VMT)	VMT per trip (mile)	PM ₁₀ Emission Rate (lb/day)
Portion of R20 (ISC #385-387)						
NWP Loadout (5 axle - 18 wheels)	full	300	10.00	0.040	0.057	0.02

NWP Warehouse (5 axle - 18 wheels)	full	300	10.00	0.040	0.057	0.02
					Total	0.05
PM ₁₀ Emissions Per Hour Over 12 Hours (lb/hr)						0.004
PM ₁₀ Emissions Per 100' Road Segment (g/s/100')						0.0002
PM ₁₀ Emissions Per Year (ton/yr)						0.008

NOTE: The VMT per trip is irrelevant to the emissions per 100' road segment that is put into model.

Type of Truck	Status	Number of trips per month	Number of trips per day	PM ₁₀ (lb/VMT)	VMT per trip (mile)	PM ₁₀ Emission Rate (lb/day)
R27 (ISC #441-442)						
NWP Warehouse (5 axle - 18 wheels)	empty	300	10.00	0.040	0.038	0.02
					Total	0.02
PM ₁₀ Emissions Per Hour Over 12 Hours (lb/hr)						0.001
PM ₁₀ Emissions Per 100' Road Segment (g/s/100')						0.00008
PM ₁₀ Emissions Per Year (ton/yr)						0.003

NOTE: The VMT per trip is irrelevant to the emissions per 100' road segment that is put into model.

Type of Truck	Status	Number of trips per month	Number of trips per day	PM ₁₀ (lb/VMT)	VMT per trip (mile)	PM ₁₀ Emission Rate (lb/day)
R28 (ISC #443-445)						
NWP Warehouse (5 axle - 18 wheels)	full	300	10.00	0.040	0.057	0.02
					Total	0.02
PM ₁₀ Emissions Per Hour Over 12 Hours (lb/hr)						0.002
PM ₁₀ Emissions Per 100' Road Segment (g/s/100')						0.00008
PM ₁₀ Emissions Per Year (ton/yr)						0.004

NOTE: The VMT per trip is irrelevant to the emissions per 100' road segment that is put into model.

Type of Truck	Status	Number of trips per month	Number of trips per day	PM ₁₀ (lb/VMT)	VMT per trip (mile)	PM ₁₀ Emission Rate (lb/day)
R29 (ISC #446-447)						
NWP Loadout (5 axle - 18 wheels)	empty	300	10.00	0.040	0.038	0.02
					Total	0.02
PM ₁₀ Emissions Per Hour Over 12 Hours (lb/hr)						0.001
PM ₁₀ Emissions Per 100' Road Segment (g/s/100')						0.00008
PM ₁₀ Emissions Per Year (ton/yr)						0.003

NOTE: The VMT per trip is irrelevant to the emissions per 100' road segment that is put into model.

Type of Truck	Status	Number of trips per month	Number of trips per day	PM ₁₀ (lb/VMT)	VMT per trip (mile)	PM ₁₀ Emission Rate (lb/day)
R30 (ISC #448-449)						
NWP Loadout (5 axle - 18 wheels)	full	300	10.00	0.040	0.038	0.02
					Total	0.02
PM ₁₀ Emissions Per Hour Over 12 Hours (lb/hr)						0.001
PM ₁₀ Emissions Per 100' Road Segment (g/s/100')						0.00008
PM ₁₀ Emissions Per Year (ton/yr)						0.003

NOTE: The VMT per trip is irrelevant to the emissions per 100' road segment that is put into model.

Predictive equation used: $E = k (sL/2)^{0.65} (W/3)^{1.5}$

Source: AP42, Miscellaneous Sources, Section 13.2.1.2

where:

- E = particulate emission factor (lb/VMT)
- k = multiplier (0.016 for PM10)
- sL = road surface silt loading (g/m²)
- W = average weight of vehicle traveling on road (tons)

Thermal Oxidizer Emissions

Total Firing Capacity: 4.7 MMBTU/hr
 Heating Value: 1,050 BTU/cf

Max Potential Firing Capacity: 4.7 MMBtu/hr
 Annual Maximum Fuel Use: 41,172 MMBtu/yr

Pollutant	Emission Factor * (lb/MMBtu)	Emission Rate (lb/hr)	Potential Emissions (tons/yr)
PM	0.0075	0.04	0.15
PM ₁₀	0.0075	0.04	0.15
NO _x	0.1000	0.47	2.06
SO _x	0.0006	0.00	0.01
CO	BACT limit	13.35	58.47
VOC	BACT limit	0.67	2.93
HAP	**		2.44

* Emission factors from AP-42, Tables 1.4-1, 1.4-2, 1.4-3, and 1.4-4, except CO & VOC

** HAP emission rate is based on a 98% reduction of uncontrolled HAP emissions based on 2007 emissions testing, plus HAP emissions from natural gas combustion using AP-42 emission factors.

$120.1 \text{ tpy} * (1-98\%) + 0.04 \text{ tpy} = 2.44 \text{ tpy}$ (2.40 tpy of which is acetaldehyde)

Fact Sheet Attachment Emission Calculations Summary

Facility Name: NatureWorks LLC - PLA Facility

Facility ID: 69585

Potential Emissions (as permitted)

Process/Emission Unit	PM	PM₁₀	NO_x	SO₂	CO	VOC	HAP
Material Handling	1.44	1.44	--	--	--	--	--
Hot Oil Heaters	13.14	13.14	39.42	0.39	10.51	2.96	1.24
Cooling Tower	13.97	4.19	--	--	--	--	--
Storage Tanks (<i>calculated using TANKS 4.06</i>)	--	--	--	--	--	4.20	--
Thermal Oxidizer (Vacuum Vent & WW Tank)	0.15	0.15	2.06	0.01	58.47	2.93	2.44
Product Finishing Filter (CDP 9) & Purge Containers*					2.89	3.33	0.66
Haul Roads	0.18	0.18	--	--	--	--	--
Potential Emissions	28.89	19.11	41.48	0.41	71.88	13.42	4.34

*Emissions were not previously quantified for these emission units; resulting emissions are from October 2007 performance tests.