

# CAMPUS BOILER REPLACEMENTS

## PROGRAM ANALYSIS / SCHEMATIC DESIGN

### BASIS OF DESIGN



Northern Illinois  
University



DEKALB, IL

CDB PROJECT NO. 822-010-127



OAK BROOK, IL

MIDDOUGH PROJECT NO. ILC1801

Rev	Date	By	Checked	Approved	Description
B	11/08/19		SE MS	SE MS	PA/SD-Issued for Review/Approval
0	01/10/20	KC EM GM JN RK GO	SE MS	SE MS	Final Bridging Documents
1	03/09/21	KC EM GM JN GO	EM	SPC	Revised Bridging Documents

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**Project Design Team**



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## 1. PROJECT OVERVIEW

- 1.1 From a study conducted in 2016, the State of Illinois through the Capital Development Board and Northern Illinois University determined the need for replacement of the Campus' existing gas-powered steam boilers. There are a total 9 existing boilers between the West Heating Plant (WHP) and the East Heating Plant (EHP), all of which have reached their expected life span. The long-term goal of the project is that all steam will be produced from the WHP and that the EHP will simply act as a hub for steam distribution across campus.
- 1.2 As defined in the study, the replacement would occur over multiple phases. The current project will remove 2 existing boilers located in the WHP. The removal of 1 additional existing boiler located in the EHP will be indicated as an Add Alternate. The installation of 2 new steam boilers in a new building addition to the WHP. The layout of the new building addition will be designed to accommodate a total of three new steam boilers. The proposed drawings will include another Add Alternate for a future building addition which would house a cogeneration unit.

As the EHP will ultimately be retired, the new building addition will also house administration and employee support spaces including Offices, Training/Break room, Conference room, Women's Toilet room, Men's Toilet room, All Gender Restroom, Locker/Changing/Shower rooms, IT closet, Storage room, Testing room, Control room and general circulation space.

The building addition is designed to avoid the existing underground steam tunnel system.

The general scope of work for the renovations and new construction will include:

### **Demolition Work**

- Removal of 2 existing steam boilers in the WHP and including associated piping, power and control systems
- Removal of original electrical generator units and associated equipment
- Removal of select building components
- Removal of existing site improvements to accommodate the building addition
- Relocation of various existing underground utilities

### **New Construction Work**

- New staff parking lot with a connection to Stadium Drive
- One-story building addition to the WHP with a total of 13,404 square feet
  - Boiler room building area is 8,116 SF
  - Administration/Office building area is 5,288 SF
- Installation of 2 new steam boilers
- Installation of a new condensate receiver and pumps
- Installation of a new deaerator tank and pumps
- Installation of a new water treatment system to supplement the existing system
- Installation of associated piping, power and control systems
- Installation of a new diesel gas standby generator

- 1.3 The Basis of Design along with the accompanying Project Manual and Drawings constitute a set of Bridging Documents (approximately 25% complete). The Bridging

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Documents will be used by the Capital Development Board and NIU to solicit and procure design-build teams for the final engineering and construction of the project. These documents are not intended to document the final requirements of the project.

## 2. GENERAL DESIGN CRITERIA


### 2.1 Applicable Codes and Standards

- A. International Building Code – IBC 2015 Edition
- B. International Existing Building Code – IEBC 2015 Edition
- C. International Fire Code – IFC 2015 Edition
- D. International Property Maintenance Code – IPMC 2015 Edition
- E. National Electrical Code NFPA 70 – NEC Current Edition
- F. Illinois Plumbing Code – IPC 2014 Edition.
- G. Illinois Environmental Barriers Act - IEBA
- H. Illinois Accessibility Code – IAC
- I. ADA Guidelines – 2010 US ADA Standards for Accessible Design / ANSI 117
- J. Illinois Energy Conservation Code - IECC
- K. Life Safety Code - NFPA 101 -2000 including the current edition of referenced codes and standards
- L. NFPA 45 – Standard on Fire Protection for Laboratories Using Chemicals
- M. Office of the State Fire Marshal Administrative Rules
- N. NIU Design and Construction Standards
- O. Illinois Capital Development Board (CDB) Design and Construction Manual
- P. Illinois Capital Development Board (CDB) Standard Documents for Construction.
- Q. Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction
- R. Illinois Department of Transportation (IDOT): Bureau of Local Roads and Streets Manual

## 3. CIVIL SITE WORK

### 3.1 Scope

This design basis describes the minimum requirements for the design of civil site work of the Northern Illinois University Boiler House addition in DeKalb, IL. The design basis covers the work of the site such as grading, roads, underground sewers, underground utility lines and related facilities, and the work related to finishing the site.

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### 3.2 References

#### A. Industry Codes and Standards

- Illinois Department of Transportation (IDOT): Standard Specifications for Road and Bridge Construction in Illinois, latest edition, including all addenda.
- Illinois Department of Transportation Bureau of Local Roads and Streets Manual, latest edition.
- Standard Specifications for Water & Sewer Main Construction in Illinois, current Edition.

#### B. Government Regulations

- Americans with Disabilities Act (ADA) – EEOC-BK-19 – Americans with Disabilities Act Handbook
- U.S. Environmental Protection Agency (EPA)
- EPA 40 CFR – U.S. Environmental Protection Agency Regulations
- Storm Water Management for Construction Activities Discharge Elimination System (NPDES) – National Pollution Permit for General Construction Activity
- U.S. Department of Labor Occupational Safety and Health Administration (OSHA) – OSHA29 CFR 1926 – Safety and Health Regulations for Construction

### 3.3 Flood Plain Construction Policy

- A. The location of the project site is not located within any 100-year or 500-year floodplain which would satisfy the compliance with CDB's Flood Plain Construction Policy.

### 3.4 Site Preparation and Grading

- A. The site preparation activities including clearing and grubbing, stripping, and general site grading, shall be in accordance with the applicable contractor documents and IDOT Standards.
- B. Excavation, fill, stockpile and disposal areas, and the extent of clearing and grubbing areas shall be defined in the contract documents.
- C. Consideration shall be given to balancing the cut and fill for earthwork.
- D. All demolition shall be defined in the contract documents.
- E. Vehicular traffic detours shall be designed to provide a safe routing and a satisfactory means of controlling traffic.

### 3.5 Excavation and Backfill

- B. The design of excavation and backfill shall be in accordance with contract documents.

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- C. Areas requiring differing levels of compaction shall be noted on the construction drawings and specifications. These areas include structure areas, roadways, paved area subgrades, utility trenches, embankments and dikes, and general graded areas outside of the work areas.

### 3.6 Erosion Control

- A. Because of the condition of the site according to the forecasted construction activities, erosion and sedimentation controls shall be given special consideration in design.
- B. Soil erosion control shall be designed to comply with federal, state, and local regulations and shall be in accordance with the contract documents.
- C. Erosion control permitting documentation shall be submitted to the owner and technical support for the permits will be provided.

### 3.7 Roads, Paving, and Surfacing

- A. Road and paving shall be in accordance with the contract documents and IDOT Standards.
- B. Area paving and roads shall be designed using materials and methods specified in the IDOT Standards and the contract documents.
- C. Roads
- Roads and paving shall be in accordance with the contract documents and IDOT Standards.
  - Area paving and roads shall be designed using materials and methods specified in IDOT Standards and the contract documents.
  - Surfacing for the following areas shall be as shown on the drawings: roads, parking lots, and drives.
  - The maximum grade for roadways shall be 6%. The minimum cross slope for roadways shall be 2%
  - Construction drawings shall show all pavement and road requirements including location, elevations, width, thickness of base course and pavement, pavement type, grades, geometry, joint types and locations, shoulder details, curbs, drainage features, and materials.
- D. Curbs, Gutters, and Walkways
- Walkway subbase shall be in accordance with applicable IDOT Standards.
  - Walkway grades without steps shall not exceed 5%.
  - Finished grades shall be shown on the design drawings.
  - Accessible routes including curbs, gutters, and walkways shall be designed to comply with ADA requirements.

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### 3.8 Sewers

- A. Sewers and drainage systems shall be designed to protect the atmosphere, soil, surface water, and groundwater from contamination and to provide safe, economical collection and flow of all sewage to treatment and/or holding facilities and subsequently to approved disposal.
- B. Existing systems to which new systems will connect shall be reviewed to verify service compatibility and to ensure that sufficient capacity is available to accept the additional flow.
- C. Precast concrete manholes shall be located at a maximum interval of 200' center to center or at every change of direction to facilitate maintenance, inspection, and cleaning.
- D. Manholes or cleanouts shall be provided at changes in horizontal direction, diameter of pipe, or invert elevations.
- E. Sanitary / process sewers shall be designed to cross under potable water lines.
- F. A minimum of 18 inches of vertical clearance and 10 feet horizontal clearance shall be provided if sanitary or process sewers run parallel to a potable water line.
- G. If a potable water line crosses a sanitary or process sewer line, one segment of the potable water line pipe shall be centered over the sanitary or process sewer line such that the joints of the potable water line pipe are equidistant and at least 10 feet horizontally from the sanitary or process sewer line. The potable water line shall cross at least 18 inches above the sanitary or process sewer line. If the specified clearance is unattainable, casing pipe shall be provided or non-pressure sanitary and process sewer shall be constructed of water main material.
- H. Minimum sanitary or process sewer pipe sizes shall be 4 inches for lateral sewers and 8 inches for main sewers.
- I. Storm sewers shall be designed in accordance with applicable IDOT standards.
- J. The minimum design velocity of storm sewers shall be 3 feet per second at design capacity.
- K. The minimum design velocity of sanitary sewers shall be 2 feet per second flowing half full at maximum flow rate.

### 3.9 Underground Pressure Lines

- A. The minimum depth of cover for all underground pressure lines shall be 5 feet, 0 inches, or below the frost penetration, whichever is greater.

- B. Where multiple installations require parallel pipes in a common trench, the minimum distance between outside of pipes shall be as follows:

<u>Pipe Diameter</u>	<u>Straight Pipe Only</u>
1 inch to 22 inches	12 inches
24 inches to 72 inches	½ diameter
78 inches and greater	36 inches
Cooling water lines	18 inches

- C. For spacing pipe of different diameters laid in a trench with a common bottom of pipe elevations, the spacing requirement for the larger pipe shall be used. Where pipe of vastly divergent sizes are laid in a trench and the bottom of the small line is above the centerline of the large pipe, the spacing requirement of the small pipe shall be used.
- D. Thrust blocks will not be used on low pressure welded steel lines or ductile iron and HDPE pipe if the joints are fully restrained. Anchor and thrust blocks shall be provided at changes of direction, branches, and at ends of underground pressure pipe with neoprene-gasketed joints.

3.10 Phase 1 Environmental Site Assessment

- A. Refer to the Phase 1 Environmental Site Assessment in APPENDIX A.

#### 4. ARCHITECTURAL

4.1 Scope

This section covers the building program spaces, building exterior envelope, interior partitions, interior finishes, furniture, casework and miscellaneous components.

The proposed building addition to the WHP is approximately 13,404 square feet. The Boiler Room area is 8,116 square feet and the Administration/Office area is 5,288 square feet. A space program for the WHP expansion is included in APPENDIX B.

The Boiler Room area contains the following rooms and /spaces:

- Boiler units: Space for 3 boilers
- Electrical Substation Room
- Testing Room
- Control Room
- Utility Room: Service Sink/Mop Basin and Domestic Hot Water Heater
- Information Technology/IT Closet
- Stairway Unit: Access to Mezzanine level and Low Roof area above Administration/Office building area.
- Mezzanine level for mechanical equipment
- Circulation space



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The Administration/Office Area contains the following rooms/spaces:

- Offices and Vestibule: Reception space, visitor waiting area, three private offices, storage room and circulation
- Training/Break Room: Seating accommodations for 70 for training and/or seating/tables for 36 for break activities.
- Conference Room: Seating accommodations for 10.
- Women’s Toilet Room: Toilet facilities (2 lavatories and 2 water closets).
- Men’s Toilet Room: Toilet facilities (3 lavatories, 3 water closets and 2 urinals).
- All Gender Toilet Room: Toilet facilities (1 lavatory and 1 water closet).
- Locker Room: 44 lockers
- Changing Rooms: 2 rooms with shower stall and dressing space.
- Storage Room: Space has direct access to exterior of building.
- Circulation Space

The Boiler Room area shall be approximately 32 feet from finish floor level to underside of metal roof deck. Exterior wall height shall be approximately 36 feet. Space shall be exposed construction.



The Administration/Office area shall be approximately 14 feet from finish floor level to underside of metal roof deck. Exterior wall height shall be approximately 18 feet.

#### 4.2 Code Analysis

A. Refer to Code Analysis in APPENDIX C.



#### 4.3 Building Envelope Characteristics

- A. Insulated Metal Wall Panels: The exterior wall shall consist of vertical or horizontal architectural Insulated Metal Panel/IMP system along with aluminum curtain wall systems. IMP design, style, finishes and thickness shall be determined at later date.
- B. Exterior Wall Framing: The exterior wall system shall be applied over a Cold-Formed Steel Framing system supported by the building’s structural steel frame. The steel framing system shall be designed to resist all applicable lateral and gravity loads to comply with the deflection limits appropriate for the applied finishes and the window/curtain wall systems.
- C. Aluminum Curtain Wall: The aluminum curtain wall system shall be provided with 1-inch insulated glass panels. Curtain wall system to be designed to resist all applicable lateral and gravity loads. Nominal overall depth of framing members shall be 10-inch at Boiler Room Building. Boiler Room Building area curtain wall will be classified as hurricane-resistant. Finish shall be “Duramar” coatings containing 70% Kynar 500 or Hylar 5000 fluoropolymer resin.
- D. Exterior Glazing: Exterior storefront, aluminum windows and curtainwall framing will be provided with 1” insulated glass with tinted / tempered exterior lites and clear / tempered interior lites. Boiler Room Building area glazing will be classified as hurricane-resistant.
- E. Exterior Doors and Frames: Pedestrian entry/exit doors and frames shall be aluminum, double strength design. Doors shall be provided with vision panels,

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1-inch insulated glass panels. Doors shall be provided with automatic operators for accessibility. Service doors shall be insulated hollow metal.

- F. Roofing System: Roofing system shall be a single ply Styrene-Butadiene-Styrene (SBS) Modified Bituminous membrane mopped over thermal insulation system. Minimum R-value of roof system design shall meet or exceed International Energy Conservation Code-R-30, Provide walk-way pads at all roof mounted equipment and at roof hatch/scuttle. Provide all parapet wall and equipment curb flashings.
  - G. Roof System at Existing West Heating Plant Building: Provisions for new expansion joint along new building addition length. Existing roof system modification at new construction. Infill of existing roof deck and roof system at abandoned boiler stacks scheduled to be removed.
  - H. Exterior Parapet Wall Coping: Parapet wall coping shall be two piece, coping cap with continuous receiver clip. Provide concealed splice at 10-foot centers. All aluminum shall be 0.040 thickness, pre-finish Kynar. Parapet wall is approximately 12-inches wide and the coping shall have an exterior face height of 8-inches and an interior face height of 4-inches.
  - I. Roof Access: Provide roof hatch/scuttle, 3'-0" wide by 6'-0" long.
- 4.4 Administration/Office Areas: Offices, Training Room, Conference Room, Women's and Men's Toilet Rooms, Locker Room, Changing Rooms, All Gender Toilet Room and Corridors.
- A. Interior Partitions shall be 5 / 8" thick gypsum board panels and 16-gauge metal stud framing, insulate all stud spaces with nominal 3-inch thick fiberglass insulation blankets. All walls shall extend to bottom of metal roof deck which is 14 feet above finish floor/AFF.
  - B. Women's and Men's' Toilet Rooms, All Gender Toilet Room, Changing Rooms shall be provided with water resistant type gypsum board panels and cementitious backer units within the showers.
  - C. Interior Partitions at Storage Room shall be Concrete Masonry Units/CMU.
  - D. All interior partitions to extend to underside of metal roof deck, +/- 14 feet/AFF.
- 4.5 Boiler Room Area:
- A. Interior Partitions shall be nominal 8-inch CMU.
  - B. Walls at Control Room, Testing Room, and Electrical Rooms shall be 16 feet high. Provide finish platform deck above these rooms/spaces. Provide fall protection iron pipe railing system around exposed/open edges. Railing height shall be 48-inches.
- 4.6 Doors and Hardware
- A. All doors shall be provided with architectural hardware appropriate for their function. For door and frame types refer to Door and Frame Schedule on drawings . Include protection plates at all doors. Protection plates shall be

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provided at kick side of doors.

- B. Provide weather-stripping, threshold, door sweep and rain-cap at all exterior doors. Closers on exterior doors to feature integral spring-cushioned stop.
  - C. Fire rated doors shall be code compliant with closers, and latching latchsets/locksets.
  - D. Provide locksets on all doors with a master key system in accordance NIU Construction Standards.
  - E. Provide electrified locksets at doors indicated to receive card-readers as indicated on the electrical plans.
  - F. Provide exit devices on all exterior doors.
  - G. Provide exit devices on interior doors leading to exterior egress exits.
  - H. All interior hollow metal doors and frames to be formed from sheet steel, minimum with welded corners (no knockdown frames), 16-gauge thickness, grouted solid jambs. Provide reinforcement for finish hardware. Doors shall be 1 3/4" thick units.
  - I. All exterior hollow metal doors and frames to be formed from galvanized sheet steel with welded corners (no knockdown frames), minimum 16-gauge thickness, grouted solid jambs. Provide reinforcement for finish hardware. Doors shall be 1 3/4" thick insulated units.
- 4.7 Locker Room:
- A. The locker rooms shall be provided with oversized lockers, 18" wide x 24" deep x 72" high.
  - B. Lockers shall be metal panel material. Material shall be combination of 16-gauge to 14-gauge materials. Finish shall be powder coat enamel. Doors shall be provided with locking mechanism. All lockers shall be installed on a 6-inch base and have a sloped top.
  - C. Locker rooms shall have bench type seating.
- 4.8 Women's and Men's Toilet Rooms:
- A. Toilet compartments shall solid phenolic-core design. Toilet partition style shall be floor mounted overhead braced. Provide stainless steel hardware and mounting brackets.
  - B. Provide stainless steel grab bars at accessible toilet compartments.
  - C. Provide all toilet room accessories such as paper towel dispensers, mirrors, soap dispensers, toilet paper dispensers, etc.
- 4.9 Training Room:
- A. The Training room shall be dual purpose, training space for 60 occupants or break/lunch room for 36 occupants.
- 4.10 Interior Materials of Construction:
- A. Interior Partition Walls: Gypsum board over metal stud framing or concrete

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masonry units as indicated on drawings.

- B. Flooring: Provide finish flooring as follows
- Office area: 24" square carpet tiles
  - Training Room: 12" square vinyl composition tiles
  - Conference Room: 24" square carpet tiles
  - Corridor: Troweled on epoxy resin flooring system
  - Locker room: Troweled on epoxy resin flooring system
  - Toilet rooms: 12" square (minimum) ceramic tile system
  - Boiler Room, Electrical Rooms, Control Room, and Testing Room: Exposed concrete slabs, sealed
- C. Interior glazing to be 1/4-inch thick tempered glass, except in rated partitions, provide fire rated glazing.
- D. Paint: All interior walls shall be painted.
- E. Architectural Casework
- Solid surface countertops over plastic laminate or wood veneer base cabinets and wall cabinets.
  - AWI premium grade, flush overlay
  - High-pressure decorative laminate, NEMA-LD3
  - Particle board core, urea-formaldehyde free.
  - Provide casework hardware and accessories.
- F. Suspended Ceiling Systems: Acoustic tile panels shall be 24" x 24" x 3/4", square edge. Suspension system shall be heavy duty rated.
- G. Signage-Interior and Exterior: Provide room signage and specialty signage.
- H. Exterior vestibules will be provided with 24" x 24" modular walk-off carpet tile.

## 5. STRUCTURAL

### 5.1 Applicable Standards

- A. American Concrete Institute (ACI)
- ACI 318-14 Building Code Requirements for Structural Concrete and Commentary
- B. American Institute of Steel Construction (AISC)
- AISC Steel Construction Manual – 14th Edition
  - ANSI/AISC 360-10 Specification for Structural Steel Buildings

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- AISC Code of Standard Practice for Steel Buildings and Bridges
- C. American Society of Civil Engineers (ASCE)
  - ASCE 7-10 Minimum Design Loads for Buildings and Other Structures
- D. American Welding Society (AWS)
  - AWS D1.1, Structural Welding Code
- E. Occupational Safety and Health Administration (OSHA)
  - 29 CFR Part 1910, Subpart D: Walking-Working Surfaces
  - 29 CFR Part 1926, Subpart R: Steel Erection, Subpart P: Excavation
  - OSHA 3124: Stairways and Ladders
- F. Research Council on Structural Connections (RCSC)
  - Specifications for Structural Joints using high-strength Bolts, December 31, 2009.

## 5.2 Design Criteria

### A. Material Specifications

- Concrete:
  - Minimum 28-Day concrete compressive strength  $f'_c=4500$  psi U.N.
  - Reinforcing bars: ASTM A615, Min. Gr. 60
  - Welded Wire fabric: ASTM A185 (flat sheets)
  - Grout: Non-shrink Type, Min. 7 day compressive strength = 5000 psi
- Steel:
  - W, WT Shapes: ASTM A992 or ASTM A572, Gr. 50
  - C, MC, L, S, ST, M, H Shapes, Plates & Rounds: ASTM A36
  - Structural Shaped HSS Tube: ASTM A500, Grade B,  $F_y = 46$  ksi
  - Structural Round HSS Tube: ASTM A500, Grade B,  $F_y = 42$  ksi
  - Structural Round Pipe: ASTM A501 or A53, Grade B

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- Raised Pattern Floor Plates: ASTM A786 or ASTM A36
- Metal Roof Deck: 1 ½” 18 ga wide rib roof deck, primed.
- Fasteners:
  - High Strength Bolts: ASTM A325, ¾” Diameter U.N.
  - High Strength Nuts: ASTM A563
  - Washers: ASTM F436
  - Threaded Rods: ASTM A36
  - Anchor Rods: ASTM F1554, Grade 36
- Coatings:
  - All steel shapes and plates to be primed and painted.
  - All attachment bolts, nuts, and miscellaneous hardware shall be galvanized.



### 5.3 Design Loads

#### A. Dead Loads

- Weights of Materials as applicable
- Concrete: Use density of 145 lbs/cu. ft.
- Steel: Use density of 490 lbs/cu. ft.
- Storage Rack and Forklift Loads: per data provided by NIU
- MEP Equipment .....per vendor supplied data

#### B. Live Loads (L or Lr)

- Minimum Roof Live Load Lr..... 20 psf
- Slab-on-Grade L.....250 psf uniform or Fork Lift Load
- Offices L.....50 psf or Concentrated Load of 2000 lbs
- Platform L..... 100 psf uniform plus equipment load
- Stairs L ..... 100 psf or Concentrated load of 1000 lbs

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- Ladders L ..... 500 lbs
- Handrails and Guards L:
  - 50 plf applied in any direction at the top rail
  - A concentrated load of 200 lbs applied in any direction at any point along the top
- Wind Load: (ASCE 7-10, IBC 2015)
  - Ultimate design wind speed Vult (3-second gust): 115 mph (ASCE Figure 6-1, IBC Figure 1609.3 (1))
  - Risk Category: II (ASCE Table 1.5-1, IBC 2015 Table 1604.5)
  - Exposure Category: "C", (ASCE 6.5.6.3, IBC 1609.4.3)
  - Ice Importance Factor, Iw (Wind): 1.0 (ASCE Table 1.5-2)
- Seismic Load: (ASCE 7-10)
  - Risk Category: II (ASCE Table 1.5-1, IBC 2015 Table 1604.5)
  - Importance Factor, Ie (Seismic): 1.0 (ASCE Table 1.5-1)
  - Site Class: "D"
  - Seismic Design Category "B"
  - Ss = 0.149g
  - S1 = 0.064g
  - SDS = 0.159g
  - SD1 = 0.102g
  - Systems: Steel System Not Specifically Detailed for Seismic Resistance
  - Base Shear = TBD
  - Analysis Method = Equivalent Lateral Force
- Snow Load: (ASCE 7-10 and CDB Design and Construction Manual)
  - Ground Snow Load pg: 30 psf (CDB Design and Construction Manual)

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- Ce=1.0
- Ct=1.0
- Risk Category: II (ASCE Table 1.5-1, IBC 2015 Table 1604.5)
- Importance Factor Is (Snow): 1.0 (ASCE Table 1.5-2-4)
- Minimum Roof Snow Load = 20 psf
- Soil Data from geotechnical report prepared by TSC Testing Service Corporation, 650 D Peace Road, Dekalb, IL 60115, Report of Soils Exploration, NIU West Boiler House Expansion, L-89,788 dated August 27, 2019. The geotechnical report is included in the project manual.
  - $\gamma = 120$  pcf
  - Recommended conventional spread/continuous wall footing
  - Allowable bearing pressure, 2500 psf
  - Floor Slab Modulus of subgrade reaction = 125 psi/in
  - No Hydrostatic pressure
  - Frost depth 48 inches
- Load Combinations:
  - Where strength design is used:
    - a. *ASCE 7-10, Article 2.3.2, Equations 1 through 7 (IBC Eq. 16-1 through 16-7 (1605.2.1))*
  - Where allowable stress design (working stress design) is used:
    - a. *ASCE 7-10, Article 2.4.1, Equations 1 through 8 (IBC Eq. 16-8 through 16-16 (1605.3.1))*
  - Increases in allowable stress shall not be used with the loads or load combinations given unless it can be demonstrated that such an increase is justified by structural behavior caused by rate or duration of load.
  - Roof member deflection: TBD
  - Building horizontal deflection: TBD
- C. Roof will consist of 1 ½" 18-gauge galvanized type "B" roof deck, supported by secondary steel beams or joists at 5'-0" o.c..



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D. Slab - on - Grade

- Slab on Grade will consist the following:
  - Minimum 6” thick reinforced concrete in the Administration area.
  - Minimum 8” thick reinforced concrete in the Testing/Lab area and in the Boiler area in the planned location for the future boiler or CoGen unit.
  - Minimum 18” thick reinforced concrete at three boiler locations in Boiler area. See drawing S-2 for more details.

Slab on grade will lay over at least 12 to 24 inches of well-graded granular material (IDOT CA-7 or approved equal) in Boiler House and minimum 8” at office area.

E. Foundations

The preferred foundation system for the proposed boiler house building is a conventional spread/continuous wall footing. 3 feet min square spread footing and min 2 feet wide wall footing. Bottom of exterior column footings & wall footings will be at 3'-6" below the finish grade elevation. Bottom of footings along column line adjacent to the existing building on the north side will be at elevation 11'-0" (+-) below the floor of existing building. CMU walls will bear on the thickened slab on grade.

F. Lateral Bracing

The building structural lateral framing shall utilize ordinary steel concentrically X-braced frames to resist wind / seismic loads.

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## 6. HEATING, VENTILATION, AND AIR CONDITIONING (HVAC)

### 6.1 Applicable Standards

- A. ASHRAE Standards
- B. NFPA Standards
- C. SMACNA Standards
- D. NIU Design and Construction Standards

### 6.2 Outdoor Design Conditions

- A. Based on 2017 ASHRAE Fundamentals for DeKalb Taylor Municipal, Illinois
- B. Project Location: intersection of Grant Drive East and Douglas Drive North, DeKalb, IL. Latitude 41.9368692N; Longitude, -88.7761015 W
- C. Summer: 89.7°F dry bulb, 73.7°F mean coincident wet bulb (ASHRAE 0.4%)
- D. Winter: -10°F
- E. Climatic Zone 5A based on International Energy Conservation Code

### 6.3 Indoor Design Conditions for HVAC Design:

- A. Offices, Break Room, Locker room.
  - Design Temperature
    - Summer: 75°F
    - Winter: 70°F

### 6.4 Heat loss and heat gain calculations shall be based on:

- A. Building solar and transmission gains on roof and wall construction – refer to architectural drawings.
- B. Lighting based on 0.8 watts per sq. ft., electrical power based on 0.5 watts per sq. ft., and major equipment for office area.
- C. Outside air for ventilation is based on ASHRAE 62.1, local codes, and make-up air as required. Minimum outdoor air per occupant at maximum occupancy will be provided during occupied periods.

### 6.5 Humidification control not provided.

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- 6.6 Steam and chilled water for heating and cooling will be supplied from existing systems.
- 6.7 Natural gas will be extended from the existing system.
- 6.8 HVAC systems – Boiler Room area

- A. Boiler Room (N-100) – Boiler room area will house two new steam generating boilers (B#5 and B#6) with adequate space for future expansion with additional two boilers (B#X and B#Y) of the same size, or one boiler (B#X) and one gas-fired cogeneration turbine.

Combustion air for the individual boilers will be ducted directly to the boilers through a louvered penthouse on the roof. Provisions shall be made on the roof for installation of louvered penthouse.

Ventilation air for the space will be provided by Air Handling Units (100% outdoor air) located at the mezzanine level.

Thermostatically operated exhaust fan(s) and gravity damper(s) will be provided on the building side opposite from the Air Handling Units for cross ventilation during summer months.

Steam unit heaters will be provided for space heating and as supplemental heat for combustion air in case of make-up air unit failure.

- B. Control Room (N-103) – Boiler control room shall be served by VAV air supply from the Administration / Office air handling system. Space will be positively pressurized with the respect to the boiler room.
- C. Testing Room (N-102) – Similarly, testing room will be provided with VAV air handling unit as described for Control Room.
- D. Electrical Substation Room (N-101) – A thermostatically controlled exhaust fan will serve this space. Air will be delivered via an outside air intake louver. An electric unit heater will provide heat to the room.
- E. Stairway (N-104) - This space will be served by a hot-water unit heater installed at the lower portion of the stairs.
- F. Utility Room (N-121) – Will be served by dedicated exhaust fan.
- G. I.T. Room (N-119) – Will be served by dedicated exhaust fan.

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#### 6.9 HVAC Systems - Administration/Office Area:

This area will be served by a mezzanine mounted air-handling unit (AHU). The AHU will be equipped with pre-heat and re-heat coils, pre and post filter banks, supply and return/exhaust fans equipped with VFD's, and controls. Conditioned air will be delivered to the users via supply and return/exhaust ductwork. Individual spaces temperature will be controlled by variable volume boxes with hot-water reheat coils and individual zone digital temperature controllers.

- A. Reception (N-109), Offices (N-110, 111, & 112), and Storage (N-113) – These spaces will be served by individual VAV boxes. Vestibules (N-108 & 124) will be provided with unit heaters to offset building heat loss.
- B. Training Room (N-117) – The space temperature will be controlled with individual VAV box with reheat coil. CO2 controls will be provided to control amount of outdoor air on unit level.
- C. Women's Restroom (N-114) – Similarly, conditioned air will be controlled at terminal box level. Dedicated exhaust fan will be provided.
- D. Men's Restroom (N-116) – Same as Women's Restroom.
- E. Storage Room (N-123) – A dedicated constant volume supply and continuous exhaust will be provided.
- F. Conference Room (N-118) – This room will be served by a dedicated VAV box.
- G. All-Gender Restroom (N-120) – Will be served by a toilet exhaust fan.
- H. Changing Rooms (N-115A & 115B) and Locker Room (N-115) – Will be served by dedicated exhaust fans.

#### 6.10 Noise criteria

- A. HVAC systems shall be designed to reasonably limit noise level at 85 dbA within 3 ft. of all mechanical equipment.
- B. NC 30-35 for office areas

#### 6.11 Exhaust Systems

- A. Dedicated exhaust shall be provided for the locker rooms, toilets, and utility room with roof mounted exhaust fans.

#### 6.12 Building Automation System (BAS)

- A. Local Controls shall be compatible and capable to be tied into the site control system.

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## 6.13 Materials

### A. Ductwork

- Supply ductwork: galvanized, Class 4" W.C., Seal Class A.
- Return ductwork: galvanized, Class 2" W.C., Seal Class C.
- Exhaust ductwork: galvanized, Class 2" W.C., Seal Class C.

### B. Insulation

- HVAC supply, outside air ductwork: 2" thick board glass fiber insulation with vapor barrier.
- Interior exposed HVAC exhaust ductwork within 10 feet of the building exterior wall penetration: 2" thick board glass fiber insulation with vapor barrier.


## 7. PLUMBING

### 7.1 General Requirements

- Plumbing in this design basis includes sanitary sewer, storm sewer and domestic water systems.
- Plumbing fixtures requiring water supply includes, but not limited to hose bibs and floor drains. Plumbing fixtures requiring drainage includes all of the above, and open site drains.
- Potable hot and/or cold water shall be provided for all plumbing fixtures.
- A floor drain shall be provided in the boiler room, mechanical room, utility room, and in toilets.

### 7.2 Piping Materials

- Sanitary sewer piping, 5 feet from building, shall match civil pipe specification.
- Sanitary sewer piping, underground inside, shall be cast iron soil pipe 3"-15" CISP hub and spigot with neoprene gasket.
- Sanitary sewer and sanitary vent piping above ground inside shall be carbon steel galvanized for sizes 1/2" – 2" screwed NPT. Cast iron soil pipe for sizes 3" – 10" CISP no-hub coupling, neoprene gasket. PVC pipe using solvent joint is a valued engineered alternative to be used.

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- D. Domestic hot and cold water piping shall be copper 1/2" – 2 1/2" with solder joints. Domestic hot and cold water piping 3' and greater shall be galvanized carbon steel.
- E. Storm sewer piping, underground inside, shall be ductile iron, 3"-24" push on joint with rubber gasket.
- F. Storm sewer and storm vent piping above ground inside, shall be carbon steel galvanized for sizes 1/2" - 2" screwed NPT. Cast iron soil pipe for sizes 3"-10" CISP no hub coupling, neoprene gasket.

### 7.3 Piping Insulation

- A. Domestic hot water interior, 1" polyisocyanurate jackets.
- B. Exposed storm piping, 1" polyisocyanurate jackets; horizontal sections.

## 8. EMISSIONS ANALYSIS

- 8.1 O'Shea Environmental Associates, Inc. investigated the requirements and options for obtaining the air permit that will be required to install and operate the new boilers. The details of the investigation and findings are included in APPENDIX E – EMISSIONS DATA / ANALYSIS. The analysis concluded that the best option would be to avoid major source requirements and the need for the IEPA Construction Permit to undergo public notice by purchasing boiler equipment guaranteed to meet emissions limitations required to meet those regulatory criteria without the need for emissions netting (i.e., reviewed Option 1). The following summarize the air permit plan:
  - A. Environmental Summary for Northern Illinois University Project R1 (word doc) - discusses how conclusions were developed.
  - B. 2019-09-04 Updated NIU Boiler Emissions Limits (excel spreadsheet) - summarizes the emission limits associated with the options.
  - C. Monthly Emissions - Using Boiler Daily Logs (excel spreadsheet) - data used to show past actual emissions and how to calculate what is available for netting.
- 8.2 During the investigation of options for obtaining the air permit for the boilers multiple options were considered. The length of time, complexity and cost of getting the permit from the IEPA was investigated. Also, the impact on capital and operating cost of the emission controls that would be required by the boilers to comply with the options were explored. Part of the complexity of the process is IEPA's policy (not a regulator requirement) of requiring additional public hearings and reviews. Therefore, additional time was required to get IEPA's opinion of what strategy we were using and whether they would require additional steps.
- 8.3 It was determined that it would be best to avoid the added time and complexity of public hearings. This is accomplished by keeping the emission below certain thresholds. One option investigated was to use "netting"; this is where a credit from the boilers

being taken out of service can be applied to the new air permit; however, the IEPA stated that they may require public hearings if that option was pursued.

- 8.4 The best option determined by the investigation (reviewed Option 1) provides for emission limits summarized in Table 9.1 for the boilers and Table 9.2 for the generator which were found to be both technically and economically feasible for the boiler equipment and generator, and which eliminate the pre-permitting uncertainty associated with potential variability in Illinois EPA policies such as in the area of emissions netting approvability. Note that this option will consume 80% of the emissions allowed for characterization of a project as non-major (i.e., Significant Emissions Levels). For other emissions projects occurring within a five-year period following the current project, other permitting options will need to be evaluated if the maximum emissions exceed the remaining 20% of the significant emissions levels.

Table 9.1

	Maximum Emissions per Boiler				
	NOx	CO	PM	SO2	VOM
Maximum Emission Rates (lb/hr)	3.57	8.98	1.36	3.65	3.59
Estimated Maximum Emission Rates (ppm)	33	135	-	-	-

Table 9.2

Emissions from Generator based on published manufacturer's data for a 750 kW unit				
	NOx	CO	HC	PM
Nominal Emission Rates (g/hp hr)	5.42	0.22	0.06	0.03

## 9. STEAM AND CONDENSATE FLOW ANALYSIS

- 9.1 General Energy Corp. was retained to analyze the steam and condensate flows to identify potential issues if all the steam generation is shifted from the East Heating Plant to the West Heating Plant. See APPENDIX F – STEAM AND CONDENSATE FLOW ANALYSIS for the analysis and report.
- 9.2 Steam is used to provide heat as well as the motive force to pump the condensate back to boilers. The steam condensate pumps require 90 psig to pump the condensate back to the respective heating plant. GEC's calculations show that the pressure at the furthest point (Barsema Hall) will have the pressure drop to 88 psig on peak days. The small amount of condensate generated at the furthest points on peak days does not justify additional pumps at Barsema.
- 9.3 The existing steam powered condensate pumps at the EHP that send condensate to the WHP have been unable to move the required volume of condensate when steam



is being produced at the WHP with higher steam loads. The existing pumps to be removed and salvaged.

- 9.4 New condensate electric pumps will be installed at the EHP; discussed in Section 12.5. They will address the requirement to move condensate from EHP to WHP.

Table 9.2  
Flows through Tunnels

Node	Steam from WHP		Condensate to WHP	
	lb/h to Node	lb/h Thru Tunnel	lb/h Thru Tunnel	gpm Thru Tunnel
Res Hall	8,000	8,000	8,000	16
WHP		200,000	200,000	402
		192,000	192,000	386
1	48,000	144,000	144,000	289
2	8,000	136,000	136,000	273
3	3,000	133,000	133,000	267
4	12,000	121,000	121,000	243
5		121,000	121,000	243
6	16,000	105,000	105,000	211
7	26,000	79,000	105,000	211
8	34,000	45,000	105,000	211
Altgld	10,000	35,000	105,000	211
EHP		35,000	105,000	211
9	3,000	32,000	32,000	64
10	16,000	16,000	16,000	32
11	7,000	9,000	9,000	18
12	2,000	7,000	7,000	14
13	7,000	0	0	0

## 10. NEW BOILERS

10.1 Two new package boilers will be required.

- A. Gas Fired
- B. 75,000 lb/h each of saturated steam at 140 psig at the steam outlet.
- C. Rated for at least 200 psig.
- D. D Style.
- E. Heat Release (or Liberation) Rate need to be  $\leq 75,000 \text{ btu/h}\cdot\text{ft}^3$ .
- F. Boilers Efficiency (HHV) of  $\geq 83\%$  at  $\geq 50\%$  firing rate.



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- G. Ladders, stairs and platforms included as required.
- H. Boilers will be located inside building addition.
  - Bottom of roof deck approximately 30' above floor.
  - Stacks need to be 45' above floor.
- I. Boilers to meet the emissions requirements outlined in the Emissions Analysis section Table 9.1.
- J. Boilers to be provided with all trim, insulation, forced draft fans with VFD, burners, PLC and controls for boiler and burner.

## **11. UTILITY STREAMS DESCRIPTION, EXISTING FACILITIES**

### 11.1 City Water

- A. Delivered by the City of DeKalb to both EHP and WHP.
  - DeKalb has multiple wells / sources so quality varies.
- B. Hardness ranges from 120 to 200 ppm.
- C. See APPENDIX G – CITY WATER ANALYSIS.

### 11.2 Soft Water


- A. Standard strong acid cation water softener system.
- B. Brine is used to regenerate the softeners.
- C. Spent brine is discharged to sanitary sewer.
- D. Brine return is dilute brine from the rinse cycle, returned to more efficiently use the salt.
- E. Soft Water has 0 ppm of hardness.

### 11.3 Brine

- A. Concentrated salt water (NaCl).
- B. Used to regenerate the water softeners.
- C. The brine is supplied from an underground concrete vault south of WHP.
  - It is divided into two tanks (north & south), each with 2 manhole covers.
  - Trucks deliver salt into the tanks.
- D. Underground pipes move brine from the vault to pumps in basement that send brine to water softeners and brine return goes back to the vault at the WHP.

### 11.4 Blend Water

- A. Blend of soft and city water targeting 60 to 90 ppm of hardness is produced.
  - Primary user of soft water.

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- Manually adjusted globe valve on city water going into soft water reset daily to keep hardness in desired range.
  - B. Used for domestic hot water, make up for circulating heating and cooling.
  - C. Not intended for drinking (assumes people drink cold water).
- 11.5 Reverse Osmosis (RO) Water
- A. Used for boiler feed water makeup.
  - B. Made from soft water.
- 11.6 Condensate
- A. Condensed Steam returned to heating plants to make BFW.
  - B. Low Pressure is from steam/heat users and pumped back.
  - C. High Pressure is from steam traps along the steam distribution pipe
- 11.7 Boiler Feed Water (BFW)
- A. About 80% is returned condensate, remainder is RO makeup water.
  - B. BFW must be deaerated and have chemicals added prior to being pumped to boilers to generate steam.
- 11.8 Water Chemistry Consultant NIU uses is:
- A. Pete Wesley, Essential Water Technologies, 847-226-9992
- 11.9 Steam
- A. Used to provide heat to buildings throughout campus.
  - B. Steam pressure is about 140 psig at the discharge of the boilers.
    - This is to maintain 110psig at the far ends of the system.
    - 90psig is needed to operate the steam driven condensate pumps.
    - There are high and low pressure steam lines.
      - All the steam production and distribution is high pressure.
      - The low pressure steam is from pressure regulators for local users.
        - Deaerators in WHP & EHP.
        - Space heaters in building.
        - etc.
  - C. WHP existing boilers 1, 2, 3 & 4 are rated for 200 psig.
  - D. EHP existing boilers 1 & 2 are rated for 200 psig and boilers 3, 4 & 5 are rated for 250 psig.
  - E. The boilers have a 150psig trip (shutdown) and PSVs are set at 155 to 160psig

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#### 11.10 Compressed Air

- A. Use to operate instruments.
- B. A new air compressor with air dryer and storage tank are required to provide instrument air for the new equipment.

#### 11.11 Natural Gas

- A. Nicor, the local natural gas utility that provide gas, reduces the pressure of natural gas from 60 to 20 psig at their delivery / metering at the WHP.

#### 11.12 Standby Generator

- A. Is fueled by diesel fuel and described in the Electrical section.

## 12. UTILITIES DESCRIPTION, NEW REQUIRED FACILITIES

### 12.1 20,000-gallon Condensate Water Storage Tank (New)

- A. When the boilers trip off line it takes at least 15 minutes to go through a purge cycle before they can restart (a typical cause is a blip in the electrical power from ComEd). In the winter it takes an hour to regain steam pressure in the campus after the occurrence. Since most of the condensate pumps are steam driven, condensate is not returned until the system regains full pressure. During this time the boilers must be fed by non-demineralized water due to the lack of condensate being returned.

- B. Sufficient demineralized BFW makeup water storage is required to feed boilers for an hour.

- During recovery load is as much as 200,000 lb/h (400 gpm).

The RO system will supply 40,000 lb/h (80 gpm).

- 20,000 gal of storage is needed (existing storage in WHP is 2,500 gal).
- The two streams sent to storage are RO water (not deaerated) and condensate (potential as hot as 212°F). Therefore, the tank(s) may need to be stainless steel or carbon steel with appropriate liner.
- For example, two 10,500 gal could be 11' 10" diameter by 14' 9" tall each.

### 12.2 80-gpm RO Water Production (New)

- A. The existing water softener in WHP is an unusual design.

- Initially city water was softened in the 3 larger softeners and then mixed with raw water to make blend water. Part of the blend water was sent to the 2 smaller softeners to make polished water. The polished water pressure was at too low because it had two stages of softeners.
- The system was reconfigured to make it work. Pipe & valves were added to enable city water to go directly to the smaller softeners. Since the water coming out of the softeners has 0ppm of hardness in either configuration, the quality of the water didn't change. Since the soft water



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going to the RO only goes through one stage of softening, the pressure is higher.

- B. The Existing water softener shall be modified to accommodate required additional soft water for the additional boiler feed water makeup.
- The two smaller vessels shall be removed and saved for use elsewhere on campus.
  - A new larger vessel will be added to increase the soft water capacity to meet the needs of the new boiler feed water requirements while maintaining the capacity required for the existing soft water users.
  - A new control system will be added to enable all four of the water softener vessels to function together and enable individual softeners to be taken out of service for maintenance leaving the three remaining softener function to provide soft water.
  - The new 80 gpm RO system will be used to remove dissolved solids from the water to provide BFW makeup. The existing 16 gpm RO unit will be left as partial backup.
  - The existing RO uses Sodium Bisulfite for de-chlorination. To reduce hazardous chemical use this will be eliminated.
  - Charcoal filters will be used for de-chlorination in lieu of Bisulfite for the new RO as well as the existing RO.
  - Betterment No. 2 - Use Sodium Bisulfite in lieu of carbon filters for dechlorination, can be considered as long as there is a truck connection included to reduce personnel exposure to chemical hazards.

### 12.3 BFW Chemical Addition System (New)

- A. The existing system is a less than optimal design.
- Only two mix tanks.
    - Sulfite Only.
    - Phosphate, 3 Amine & Copoly.
  - Each day a series of test on BFW and Condensate are run to see if chemical levels are good or need adjustment.
  - An operator suits up in PPE (the chemicals are hazardous) and adds the appropriate amount of chemicals to the mix tanks and top it off with water to make an 80 gal batch.
- B. The new system will use 4 totes (one for each chemical) with 4 chemical injection pumps which can have a control system adjust the rate as needed.
- Oxygen Scavenger will be injected into the Deaerator.
  - Scale Inhibitor will be injected into BFW going to the Deaerator.
  - BFW pH Control will be injected into BFW going to the Deaerator.

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- Steam pH Control will be injected into the steam header.
- The chemicals will be supplied by totes or drums that will have secondary containment. The containment will be piped to existing sanitary drain that will enable opening valve to drain containment.
- The existing chemical injection pumps (ProMinent gamma/ X) are suitable for this purpose.
- Truck connections either outside or near door to enable delivery of chemicals and reduce operator exposure to hazardous conditions.

#### 12.4 300,000 lb/h Deaerator (New)

- The existing 200,000 lb/h deaerator is in good condition, adequately sized and works fine; however, it would be a single point of failure for all of the steam for the campus when all steam production is shifted to WHP. It also does not account for future demand increase.
- Since it is unacceptable to lose heat to campus in the winter, single points of failure are to be avoided.
- A new deaerator with its own BFW pumps needs to be located near the existing deaerator.
- Existing Boiler #3 in WHP is being taken out of service.
  - It is adjacent to the existing deaerator / BFW Pumps.
  - It should be removed to make room for the new deaerator with new BFW pumps under it.
  - There will be additional room that could be used for new RO & condensate storage with new condensate pumps under it.
- The chemical injection system will be valved-up to switch from one deaerator to the other

#### 12.5 Additional Condensate Pumping (New)

- There is currently a bottleneck at the EHP when sending all the condensate to WHP.
  - Existing steam pumps are undersized.
  - The maximum flow scenario has 105,000lb/h flowing to / past the EHP. Therefore, condensate maximum flow from EHP will be 45,000lb/h (90gpm).
- See Electrical section.
- Refer to APPENDIX H for the Equipment / Line / Tie Point list.


 <p>Northern Illinois University</p>	<p><b>Program Analysis /Schematic Design</b></p> <p><b>Basis of Design</b></p>	<p>CDB PROJECT NO. <b>822-010-127</b></p>		
		<p>DOCUMENT NO. <b>ILC1801-BOD</b></p>		
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### 13. FUTURE STEAM GENERATION

- 13.1 Accommodations are required for future steam generation in addition to the new boilers that are part of this project
- A. BFW capacity.
  - B. Space in building addition.
- 13.2 Two options considered
- A. Two additional boilers similar to the new boilers (75,000 lb/hr each).
  - B. One additional boiler similar the new boilers (75,000 lb/hr) and a gas turbine with fired heat recovery steam generation (75,000 lb/hr).
    - Confirm with Nicor if they can deliver natural gas at 60psig for gas turbine to reduce size of natural gas compressor.
    - Confirm with Nicor how far away higher pressure gas is (gas turbine needs 250 to 300psig to eliminate the compressor).

### 14. ELECTRICAL

- 14.1 Scope
- A. Modify and extend the existing West Heating Plant electrical distribution system, as shown on the drawings and described below. This equipment will serve the new boilers, associated boiler auxiliaries and the building addition. Equipment sizing (such as Kva or ampere rating) shown on the drawings or noted herein are for general reference only. Contractor shall size the equipment, and their interconnecting cable ampacity, based on the actual equipment furnished, NEC sizing requirements and good engineering judgement. Switchboards, panelboards and their associated feeders shall also be sized for at least 25% unspecified future load growth.
  - B. Modify and extend the West Heating Plant's fire alarm, communications and IT network infrastructure to serve the building addition.
  - C. All work and material shall conform to NIU Standards as noted in this document.
- 14.2 Power Distribution
- A. Refer to one line drawing for details on the extension of the existing power distribution to serve the new equipment and building addition. These additions include:
    - New unit substation supplied from the existing 4.16Kv switchgear located in the chiller plant. Unit substation shall consist of a primary terminal cabinet, 13.2Kv/4.16Kv-480Y/277V cast coil type step down transformer and circuit breaker switchboard, as noted on the drawings.
    - New packaged, outdoor, diesel-fueled standby generator, connected to and controlled by, the existing automatic transfer switch. Unit shall be fitted with a sound attenuating, space heated, weather enclosure. Size

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shown on the drawings is for reference only. Contractor shall adjust this size accordingly to serve the existing and new maximum coincident load with a minimum of 25% unspecified future load addition.

- 277/480V and 120/208V distribution, with associated dry-type step down transformers and panelboards, to serve the building addition.
- Motor controls to new motors, as required.
- Power distribution feeders and branch circuits to new equipment and convenience outlets, as required.

### 14.3 Lighting

- A. In general, lighting fixtures shall be commercial/industrial grade high efficiency LED type. Fluorescent fixtures may be used in low occupancy areas, such as storage rooms and utility closets. Fixtures shall be furnished from an established major manufacturer who has been manufacturing commercial/industrial lighting fixtures for at least 20 years. Average lighting levels shall be consistent with IESNA Handbook guidelines and NIU standards. In general, office area lighting shall be designed in the 30-40 foot-candle range while the boiler room and utility areas shall be designed for the 20-30 foot-candle range. 1 foot-candle of lighting shall be provided for building exterior egresses and parking areas. Fixtures shall be selected and their spacing determined to achieve a watt per square foot energy usage no more than 80% of the values in the Illinois Energy Code.
- B. Lighting controls shall be provided in accordance with the Illinois Energy Code. Lighting shall be dimmable in all conference and meeting rooms. Lighting controls, such as occupancy sensors and dimmers, shall be commercial/industrial grade and furnished from an established major lighting controls manufacturer who has been manufacturing similar products for at least 15 years.

### 14.4 Fire Alarm, Security, Information Technology (IT)

- A. The existing fire alarm, communications, security and IT systems shall be extended into the building addition.
- B. IT cable type/category, connectors and quantity/location of IT drops shall be per NIU direction. Cabling, racks, and switches shall be installed by the Contractor and make final terminations at each outlet; NIU will make final terminations at the switches.

### 14.5 Lightning Protection

- A. The Contractor shall determine whether or not lightning protection for the new structure is required per NFPA 780. All lightning protection component and their installation shall comply with UL 96 and UL 96A. Lightning protection shall be provided at the new boiler stacks.

### 14.6 Materials of Construction



- A. In general, all conductors shall be copper with 90 degree C rated Type THHN/THWN insulation for indoor installation and Type XHHW insulation for

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outdoor installation. Conduit shall be galvanized RMC or IMC type with threaded connections in the boiler room areas and all areas outdoors, and electrogalvanized type EMT for all finished interior spaces. In addition to the above, all wire, cable, raceway/conduit, fittings, supports and other materials of construction shall comply with NIU standards.

- B. Electrical equipment, such as switchboards, panelboards, disconnect switches, and motor controllers, shall be heavy duty, commercial/industrial grade.
  - C. Wiring devices, such as receptacles and light switches, shall be heavy duty commercial/industrial grade (versus a residential grade device).
- 14.7 Means and Methods of Construction and Standards of Workmanship
- A. Equipment and associated raceway and wiring shall be installed in full compliance with NIU standards and shall be consistent with the workmanship principles outlined in NECA Standards.



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## 15. PROPOSED PROJECT COST BUDGET

- 15.1 The scope basis for this construction estimate is derived from the “Issued for Final Bridging Documents” package prepared by Middough and dated 03/09/2021. Labor costs are based on current union pay rates and are benchmarked against recent contract “buy data” for Chicagoland projects of similar size and scope. Labor productivities of 77% (compared to “book values” and a percentage that is typical for this type of work) are applied. Material costs are derived from AspenTech and CostWorks data. Budget quotations are utilized for the new boilers, reverse-osmosis water generating system, water softener and tanks, deaerator, carbon filters, and the condensate collection system. Quantities are derived from the design drawings and lists developed by engineering staff members at Middough and its sub-consultants. Due to the preliminary state of the design, some scope and quantities are conceptualized to assure complete and functional building and utility components.
- 15.2 The design-build nature of the CDB’s project delivery approach is factored into the cost. Accordingly, provisions are made for the site-specific and home office general requirements costs borne by installing contractors, the general contractor, as well as the associated designers. Also, included overhead costs consist of contractor personnel costs for design, safety, quality assurance, procurement, scheduling, accounting, along with management. A contractor profit factor is also included.
- 15.3 The Proposed Project Cost Budget has been reduced to meet the CDB’s budget requirements for this project. Add Alternates have been included for specific scope items outlined in APPENDIX I. CDB’s Proposed Project Cost Budget is included in APPENDIX I.
- 15.4 Refer to APPENDIX J for the Preliminary Project / Construction Schedule.
- 15.5 The reader’s attention is called to the following Disclaimer:

### COVID-19 Statement

Due to the outbreak of COVID-19 there are potential economic impacts that could affect the cost and schedule of project installation. Due to the uncertainty in availability of resources to perform project work, overall schedule duration and efficiency of project installation activities may specifically be impacted. This estimate of probable cost assumes that installation will occur as scheduled. This estimate includes a Contingency for unknown cost impacts which may be inadequate to accommodate the impacts of COVID-19.

### This document reflects Middough’s Opinion of Probable Costs.

In providing estimates of probable construction cost *Middough* has no control over the cost or availability of labor, equipment or materials, market conditions or the Contractor’s method of execution or pricing. This *Middough* “Basis of Estimate” and correlating “Estimate of Probable Cost” is made on the basis of *Middough’s* professional judgment and experience. *Middough* makes no warranty, expressed, or implied that the bids or the negotiated cost of the Work will not vary from this *Middough* “Estimate of Probable Cost”.

### Site Familiarity

*Middough* acknowledges that it has visited the site to become generally familiar with the conditions under which the Project is to be performed. *Middough* does not and cannot, however, guarantee that actual dimensions and detailed conditions, and/or subsurface or otherwise concealed or unknown physical or operating conditions at the Project site have been verified for this estimate.

### Environmental issues

*Middough* has no knowledge, disclaims liability for, and has provided no costs for handling or remediation of any hazardous materials, such as, but not limited to, lead paint or asbestos insulation, which may be encountered in the project.

 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
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**APPENDIX A – PHASE 1 ENVIRONMENTAL SITE ASSESSMENT**



**Hygieneering, Inc.**

Environmental, Health & Safety Consulting Services



INDUSTRIAL

COMMERCIAL

ACADEMIC

HEALTHCARE

**PHASE I ENVIRONMENTAL SITE ASSESSMENT  
HYGIENEERING PROJECT #: 2019-6369-EA**

**PREPARED FOR:**

**MIDDOUGH, INC.  
NORTHERN ILLINOIS UNIVERSITY  
1185 DOUGLAS DRIVE NORTH  
DEKALB, ILLINOIS 60115**

**OCTOBER 16, 2019**

**PREPARED BY:**

**HYGIENEERING, INC.  
7575 PLAZA COURT  
WILLOWBROOK, IL 60527**

**DATE SUBMITTED: NOVEMBER 4, 2019**

**Asbestos, Mold & Lead Services**

Asbestos, Mold and Lead Surveys  
Air and Bulk Sampling  
Abatement Project Design  
Bid Solicitation  
Project Management  
Turnkey Services  
Operations & Maintenance Programs

**Indoor Air Quality Services**

IAQ Investigations and Testing  
HVAC System Inspection  
IAQ Training & Management  
Programs for Facilities  
Mold Management Services

**Industrial Hygiene Services**

Worker Exposure Assessments  
Air Sampling for Chemical, Physical  
& Biological Contaminants  
Noise Levels Surveys  
Ventilation Surveys  
PPE Assessments

**Safety Consulting Services**

Safety Program Development  
Safety Program Auditing  
Safety Training for Construction  
& General Industry  
Process Safety Management/ Hazard  
Analysis Development  
Risk Management Planning & PSM  
Compliance Reviews  
Temporary Safety Prof. Staffing

**Environmental Eng. Services**

Phase I & II Env. Site Assessments  
Underground Storage Tanks  
Emergency Response, Testing &  
Remediation  
Subsurface Investigations  
(Soil/Groundwater)  
Hazardous Waste Management  
Environmental Compliance Audits  
Environmental Risk Assessments  
Environmental Permitting and  
Reporting  
Remediation Design  
Remediation Management

**Training Services**

OSHA Safety Topics  
10-Hour Con & Gen Industry  
All EPA & OSHA Topics  
Asbestos/HAZWOPER & Lead

**Emergency Response**

Floods, Fires, Chemical Releases  
Site Hazard Characterization  
Project Management (Turnkey)



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## **APPENDICES**

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APPENDIX C	PHOTOGRAPHS
APPENDIX D	VAPOR ENCROACHMENT SCREENING ASSESSMENT
APPENDIX E	OSFM RECORDS
APPENDIX F	SANBORN FIRE INSURANCE MAPS SEARCH REPORT
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APPENDIX K	USER QUESTIONNAIRE



PHASE I ENVIRONMENTAL SITE ASSESSMENT  
1185 DOUGLAS DRIVE NORTH  
DEKALB, ILLINOIS

**EXECUTIVE SUMMARY**

Middough, Inc. retained Hygieneering, Inc. (Hygieneering) to conduct a Phase I Environmental Site Assessment (ESA) on the property located at Northern Illinois University (NIU) 1185 Douglas Drive North in DeKalb, Illinois (the "Property"). This Phase I Environmental Site Assessment was conducted to meet the minimum requirements of the US Environmental Protection Agency's (EPA) All Appropriate Inquiry (AAI) Rule per 40 CFR Part 312. This Phase I Environmental Site Assessment was conducted in accordance to the American Society for Testing and Materials (ASTM) E 1527-13 Standard. The ASTM E 1527-13 Standard meets the requirements set forth under EPA's AAI and is compliant with the statutory criteria for all appropriate inquiries. Hygieneering conducted the Site Reconnaissance on October 16, 2019.

The AAI under 40 CFR Part 312 and ASTM E 1527-13 Standard are intended to permit a user to satisfy one of the requirements to qualify for three types of landowner liability protection (LLP) under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The three types of landowner liability protection include the innocent landowner defense, bona-fide prospective purchaser, or contiguous property owner. Assessments conducted under ASTM E 1527-13 and per 40 CFR Part 312 constitute all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice. This Phase I Environmental Site Assessment was conducted for environmental due diligence purposes associated with the demolition of the building on the subject property. A glossary of terms and definitions used in accordance to ASTM E 1527-13 and this report is included in Appendix A.

Hygieneering performed the following tasks as part of this Phase I Environmental Site Assessment:

- Inspected accessible areas of the Property for the presence or potential presence of a release or threatened release of hazardous substances and/or petroleum products with the intent of identifying Recognized Environmental Conditions (RECs).
- Visually screened adjoining properties (from public viewpoints) for the presence or potential presence of a release or threatened release of hazardous substances and/or petroleum products with the intent of identifying Recognized Environmental Conditions (RECs).
- Interview persons familiar with the Property, including representatives of the current owner(s), operator(s), and occupant(s)/tenants of the Property regarding current and historical property uses and uses of hazardous substances and/or petroleum products. In addition, a reasonable attempt to interview at least one local or state government official was made.
- Reviewed historical aerial photographs, historical topographic maps, and a city directory in an attempt to identify past uses of the Property. The intent of this review is to identify the first developed use of the Property.
- Conducted a federal and state database review that follows the search requirements of ASTM E 1527-13.
- Reviewed local government records in an attempt to identify past uses of the Property and potential RECs.
- Identified visible/accessible electrical and hydraulic equipment on-site that may contain polychlorinated biphenyls (PCBs).
- Reviewed topographic and geologic maps and publications for the area of the Property.
- Conducted a search for environmental liens, environmental cleanup liens, and deed restrictions filed against the Property.
- Conducted a vapor encroachment screening on the Property.
- Prepared a written Phase I Environmental Site Assessment Report in accordance to ASTM 1527-13.



The Property is improved with a rectangular shaped building. The building is referred to as West Heating Plant. The building is of cinderblock and concrete construction and was built in 1960/1961. The building is a two-story building with a basement. The building is located in the central side of the Property. Grassy vegetative areas surround the building. The total Property size is approximately 1.5 acres.

According to Mr. Scott Mooberry, of NIU, the Property is currently owned by Northern Illinois University and has been owned and operated by NIU since West Heating Plant was constructed in 1960. At the time of this assessment, NIU personnel were operating the boilers to provide high pressure steam to the campus. According to Mr. Justin Vest of NIU, an incinerator operated on the property for approximately a year and has since been removed and replaced with freon based chiller units. Mr. Vest further indicated that previous Property owner(s) are unknown, but the Property was previously utilized for agricultural purposes prior to current building construction.

Dekalb County Assessor provided Hygieneering with supplemental information for the DeKalb Campus. Based on the information provided, West Heating Plant is near two parcels [Parcel Identification Numbers (PINs) 08-21-201-002 and 08-16-451-002]. Based on the information provided, the northern portion of the Property, which corresponds to PIN 08-16-451-002, was acquired by NIU in 1965 from Glendon and Ivan Williams. The southern portion of the Property, which corresponds to PIN 08-21-201-002, was acquired in 1956 from George Baumgartner. Note: the information provided also accounts for other buildings comprising the NIU Campus and is not solely representative of West Heating Plant. The information provided indicates that the Property was acquired by NIU in approximately 1955 or 1956 from the Baumgartner farm.

According to Mr. Vest, various water and boiler treatment chemicals were maintained onsite. There are concrete underground storage tanks charged with 25 tons of salt used for brine solution for water softening, located on the south side of the building. Mr. vest informed Hygieneering that formerly two 25,000-gallon heating oil USTs have since been removed and were formerly located beneath the parking lot at the West Heating Plant. Based on information obtained by the Illinois State Fire Marshal's Office, the above referenced USTs were removed on July 2, 1992. Additional USTs were associated with adjoining properties; however, no petroleum USTs are affiliated with the Property itself.

Hygieneering reviewed aerial photographs, historical topographic maps, DeKalb Fire Department records, city directory; and interviewed persons familiar with the Property in an attempt to determine previous uses of the Property. Aerial photography shows the Property improved with West Heating Plant, since at least 1961; the building is shown in a similar configuration as identified during inspection. Aerial photography show the Property developed as agricultural farmland since at least 1939. The 1937 historic topographic map shows the Property without structural improvements in 1937.

The purpose of a Phase I ESA is to establish an information base for assessing the potential for recognized, historical and controlled environmental conditions at the Property as defined under ASTM. This information can be used to evaluate potential environmental liabilities associated with the Property. The purpose of this Phase I ESA was for environmental due diligence purposes associated with the demolition of the building on the subject property.

ASTM 1527-13 defines the term recognized environmental condition (REC) as the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment. De minimis conditions are not recognized environmental conditions.

ASTM 1527-13 defines a historical recognized environmental condition (HREC) as a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been



addressed to the satisfaction of the applicable regulatory authority, without subjecting the property to any required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls). Before calling the past release a historical recognized environmental condition, the environmental professional must determine whether the past release is a recognized environmental condition at the time the Phase I Environmental Site Assessment is conducted.

ASTM 1527-13 defines a controlled recognized environmental condition (CREC) as a recognized environmental condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls (for example, property use restrictions, activity and use limitations, institutional controls, or engineering controls).

Hygieneering did not identify any RECs, HRECs, or CRECs in relation to the Property as a result of our Phase I Environmental Site Assessment.





## INTRODUCTION

### Purpose

Middough, Inc. retained Hygieneering, Inc. (Hygieneering) to conduct a Phase I Environmental Site Assessment (ESA) on the property located at 1185 Douglas Drive North in DeKalb, Illinois (the “Property”). This Phase I Environmental Site Assessment was conducted to meet the minimum requirements of the US Environmental Protection Agency’s (EPA) All Appropriate Inquiry (AAI) Rule per 40 CFR Part 312. This Phase I Environmental Site Assessment was conducted in accordance to the American Society for Testing and Materials (ASTM) E 1527-13 Standard. The ASTM E 1527-13 Standard meets the requirements set forth under EPA’s AAI and is compliant with the statutory criteria for all appropriate inquiries.

The AAI under 40 CFR Part 312 and ASTM E 1527-13 Standard are intended to permit a user to satisfy one of the requirements to qualify for three types of landowner liability protection (LLP) under Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The three types of landowner liability protection include the innocent landowner defense, bona-fide prospective purchaser, or contiguous property owner. Assessments conducted under ASTM E 1527-13 and per 40 CFR Part 312 constitute all appropriate inquiry into the previous ownership and uses of the property consistent with good commercial or customary practice. This Phase I Environmental Site Assessment was conducted for environmental due diligence purposes associated with the demolition of the building on the subject property. The Site Reconnaissance was conducted on October 16, 2019.

### Hygieneering Scope of Services

Hygieneering performed the following tasks as part of this Phase I Environmental Site Assessment:

- Inspected accessible areas of the Property for the presence or potential presence of a release or threatened release of hazardous substances and/or petroleum products with the intent of identifying Recognized Environmental Conditions (RECs).
- Visually screened adjoining properties (from public viewpoints) for the presence or potential presence of a release or threatened release of hazardous substances and/or petroleum products with the intent of identifying Recognized Environmental Conditions (RECs).
- Made a reasonable attempt to interview persons familiar with the Property, including representatives of the current owner(s), operator(s), and occupant(s)/tenants of the Property regarding current and historical property uses and uses of hazardous substances and/or petroleum products. In addition, a reasonable attempt to interview at least one local or state government official was made.
- Reviewed historical aerial photographs, historical topographic maps, and a city directory in an attempt to identify past uses of the Property. The intent of this review is to identify the first developed use of the Property.
- Conducted a federal and state database review that follows the search requirements of ASTM E 1527-13.
- Reviewed local government records in an attempt to identify past uses of the Property and potential RECs.
- Identified visible/accessible electrical and hydraulic equipment on-site that may contain polychlorinated biphenyls (PCBs).
- Reviewed topographic and geologic maps and publications for the area of the Property.
- Conducted a search for environmental liens, environmental cleanup liens, and deed restrictions filed against the Property.
- Conducted a vapor encroachment screening on the Property.
- Prepared a written Phase I Environmental Site Assessment Report in accordance to ASTM 1527-13.



## User Responsibility Responses

The User of this Phase I Environmental Site Assessment was responsible for the following information in relation to the Property:

- ❑ Disclosed commonly known, reasonably ascertainable information, and information pertaining to the previous and current ownership and uses of the Property and/or surrounding properties to the best of his / her ability.
- ❑ Disclosed specialized knowledge or experience on the Property and/or surrounding properties.
- ❑ Disclosed information pertaining to the purchase price of the Property in relation to its fair market value, assuming the Property was not contaminated.
- ❑ Disclosed the reason for performing this Phase I Environmental Site Assessment.

## Report Applicability

Hygieneering prepared this report for the sole use of Middough, Inc., its successors and assigns. No third party may rely on this information provided in this report without the written consent of Hygieneering and Middough, Inc. Results discussed in this report reflect the conditions observed and evaluated during the on-site investigation.

## Significant Assumptions, Deviations, and Limitations

There were no significant assumptions, deletions or deviations from this Practice while conducting this Phase I Environmental Site Assessment, except for the following: despite records review and interviews with persons familiar with the Property, the exact Property boundary lines for West Heating Plant were unascertainable. Hygieneering estimated the boundary lines of West Heating Plant based on available information and interview remarks by persons familiar with the Property. It should also be noted that Hygieneering encountered data failure as part of this assessment. Hygieneering reviewed all of the standard historical sources that were reasonably ascertainable and likely to be useful and yet the objective of identifying the Property's use dated back to 1940 was undetermined. Refer to the Data Gaps Section of this report for more information. Hygieneering also inspected a few offsite buildings as part of this Phase I ESA. Lastly, Hygieneering reviewed a previous environmental investigation report conducted on the northern adjoining property. Hygieneering only compared the analytical data that was detected above the laboratory's reporting limits to current cleanup objectives as part of this assessment.

### *Assessment Limitations*

This investigation was performed using the degree of care and skill ordinarily exercised under similar circumstances by reputable environmental consultants practicing in this or other localities. Information obtained for this report is deemed reliable but there cannot be a guarantee that all potentially hazardous conditions have been identified. The reasons for this are:

1. Unless noted, our finding and areas of investigation are based on visual observations and review of available records. Materials and conditions that are concealed or are inaccessible may not be discovered during this review, unless specifically indicated.
2. Information on ownership and land use history is diverse and cannot always be verified. Undocumented activities and use by lessees and tenants typically cannot be determined. Only reasonably ascertainable documents have been referenced.
3. The most current available information was reviewed. We cannot guarantee the validity or completeness of government and non-government provided information. Statements regarding regulatory status are subject to written confirmation from appropriate government and non-government agencies.



4. Some conclusions are in part or in whole based on verbal information and independent sources provided to us by others. Inaccurate or misleading statements cannot always be detected.
5. Hygieneering encountered data failure and data gaps during this assessment, which are detailed in the “Data Failure and Data Gaps” section of this report.

## **DISCUSSION**

### Property Description

The Property is bound by Douglas Drive N to the south, Stadium Drive E to the east, Grant Drive E to the west and Lincoln Drive N to the north. The Property is located at the northwest corner of Douglas Drive N and Stadium Drive E. Maps showing the location of the Property are included in Appendix B.

The Property is improved with a rectangular shaped building. The building is referred to as West Heating Plant. The building is of cinderblock and concrete construction and was built in 1960/1961. The building is a two-story building with a basement. The building is located in the central side of the Property. Grassy vegetative areas surround the building. The total Property size is approximately 1.5 acres. Photographs of the Property are included in Appendix C.

The Property building is heated by a total of four (4) natural gas fueled boilers three of which are in use which provides high pressure steam through underground steam tunnels to campus buildings. The East Heating Plant, which is located southeast by considerable distance from the Property, houses five boilers. The Property building was formerly heated by two 25,000-gallon heating oil underground storage tanks (USTs) that were formerly located beneath the concrete drive/parking lot on the West Heating Plant. These USTs were removed in 1992, without a documented release of petroleum product. The Property building is cooled with chillers from inside the West Plant and provides chilled water through underground tunnels to campus buildings. ComEd provides electricity. Nicor supplies natural gas. In addition, an approximate 150-gallon biocide AST, and an approximate 300-gallon AST of acid inhibitor were observed inside the West Plant chemical storage building.

The City of DeKalb provides storm sewer service in the area. Storm water runoff collects in storm sewers observed on vegetated areas of the Property, and it also percolate into the soils. Surface water runoff is anticipated to discharge east/southeast and ultimately discharged to the South Branch of the Kishwaukee River. Wastewater is discharged to the DeKalb Sanitary District for treatment prior to discharge Kishwaukee River.

The City of DeKalb provides treated potable water from six deep groundwater wells and three shallow wells. Groundwater is treated at one of five Water Treatment Plants. Septic systems were not observed or reported on the Property. No private groundwater wells were observed or reported on the Property.

### Current and Historical Property Use

According to Mr. Scott Mooberry, of NIU, the Property is currently owned by Northern Illinois University and has been owned and operated by NIU since West Heating Plant was constructed in 1960. At the time of this assessment, NIU personnel were operating the boilers to provide High pressure steam to the campus. According to Mr. Justin Vest of NIU, an incinerator operated on the property for approximately a year and has since been removed and replace with Freon based chiller units. Mr. Vest further indicated that previous Property owner(s) are unknown, but the Property was previously utilized for agricultural purposes prior to current building construction.

Dekalb County Assessor provided Hygieneering with supplemental information for the DeKalb Campus. Based on the information provided, West Heating Plant is near two parcels [Parcel Identification Numbers



(PINs) 08-21-201-002 and 08-16-451-002]. Based on the information provided, the northern portion of the Property, which corresponds to PIN 08-16-451-002, was acquired by NIU in 1965 from Glendon and Ivan Williams. The southern portion of the Property, which corresponds to PIN 08-21-201-002, was acquired in 1956 from George Baumgartner. Note: the information provided also accounts for other buildings comprising the NIU Campus and is not solely representative of West Heating Plant. The information provided indicates that the Property was acquired by NIU in approximately 1955 or 1956 from the Baumgartner farm.

According to Mr. Vest, various water and boiler treatment chemicals were maintained onsite. There are concrete underground storage tanks charged with 25 tons of salt used for brine solution for water softening, located on the south side of the building. Mr. vest informed Hygieneering that formerly two 25,000-gallon heating oil USTs have since been removed and were formerly located beneath the parking lot at the West Heating Plant. Based on information obtained by the Illinois State Fire Marshal's Office, the above referenced USTs were removed on July 2, 1992. Additional USTs are associated with adjoining properties; however, no petroleum USTs are affiliated with the Property itself.

Hygieneering reviewed aerial photographs, historical topographic maps, DeKalb Fire Department records, city directory; and interviewed persons familiar with the Property in an attempt to determine previous uses of the Property. Aerial photography shows the Property improved with West Heating Plant, since at least 1961; the building is shown in a similar configuration as identified during inspection. Aerial photography show the Property developed as agricultural farmland since at least 1939. The 1937 historic topographic map shows the Property without structural improvements in 1937.

#### Surrounding Area Characteristics

The Property is located at the Northern Illinois University Campus. The adjoining properties are currently improved with residential/dormitory commercial buildings or mechanical buildings associated with the college; green space is also present. The following table lists the current adjoining properties:

Facility Name	Address	Operation	Direction
Grant Towers	NW corner of Douglas Dr. N & Grant Dr. E DeKalb, IL	NIU Residential Dormitory	W
Lincoln Towers	NE corner of Lucinda Avenue & Stadium Dr. E DeKalb, IL	NIU Residential Dormitory	E
Lincoln Hall Student Recreation Center & parking lot	SE corner of Stadium Dr. E & Lucinda Avenue DeKalb, IL	NIU student rec center & parking lot	SE
Greenspace	NIU Campus DeKalb, IL	Former Douglas Hall Dormitory	S
Kenneth & Ellen Chessick Practice Center & Parking Lot	Stadium Dr. N DeKalb, IL	Athletic Center & parking lot	
New Residential Building	NE corner of Grant Dr. E & Grant Dr. E DeKalb, IL	NIU Residential Dormitory	N



## Current and Historical Use of Adjoining Properties

Hygieneering observed the adjoining properties from public viewpoints for the presence of hazardous substances and/or petroleum products and indications of Recognized Environmental Conditions.

Hygieneering reviewed aerial photographs, historic topographic maps, and a City Directory to evaluate previous uses of the adjoining properties. Aerial photographs show the adjoining properties were utilized for Northern Illinois University purposes since approximately 1969. Historic topographic maps show the adjoining properties without structural improvements and most likely used for agricultural purposes since at least 1937.

## **RECORDS REVIEW**

The purpose of the records review is to obtain and review records that will help identify Recognized Environmental Conditions in connection with the Property. Accuracy, completeness, and availability of recorded information vary among information sources, including governmental sources. When performing the assessment, Hygieneering reviewed publicly available and reasonably ascertainable information. These records were reviewed when information was obtainable within a reasonable time and cost constraints. Hygieneering reviewed or attempted to review records obtained from the following sources:

- A topographic map prepared by the United States Geological Survey (USGS) obtained from Environmental Data Resources, Inc. (EDR). In addition, geologic information for area of the Property was obtained from EDR.
- A commercial provider of state and federal databases that provide information on the standard environmental records to be reviewed under this Practice obtained from EDR.
- Sanborn Fire Insurance Maps obtained from EDR.
- Aerial photographs obtained from EDR.
- Historical topographic maps obtained from EDR.
- City Directory obtained from EDR.
- An environmental lien and deed restrictions search report obtained from Advanced Searches.
- An examination of applicable local town or city, county, and state municipal agency records obtained from either EDR and/or local agencies (listed below).

To enhance and supplement the standard environmental record sources listed in Section 8.2.1 of this Practice that were obtained through EDR's database report, Hygieneering reviewed and researched additional available local town or city, county, and state municipal agency records obtained from various offices. A review of the supplemental records was conducted at the discretion of the environmental professional in that the records were reasonably ascertainable, sufficiently useful, and obtained pursuant to local good commercial or customary practice. The list below summarizes the various agencies Hygieneering utilized in an attempt to obtain supplemental information on the Property and/or the surrounding properties.

### **Local City Agencies**

- **DeKalb Building Department (attempted).** Note: NIU is under State of Illinois jurisdiction, so the City of DeKalb maintains no records for the Property.
- **City of DeKalb Fire Department:** Records were not returned in time of issuance of this report; however, based on interview remarks with Fire Department Administrator Natalie Nelson of the City of DeKalb Fire Department, NIU is under State of Illinois jurisdiction, so the City of DeKalb Fire Department only maintains hazardous materials incident reports for the Property. Natalie Nelson informed Hygieneering that no records of incident were on file for the Property nor did Ms. Nelson have specialized knowledge pertaining to releases or underground storage tanks on the Property.



**State Agencies:**

- **Illinois Environmental Protection Agency (IEPA):** Hygieneering reviewed available records online at <http://epadata.epa.state.il.us/land/ust/Search.asp>. In addition, Hygieneering submitted a Freedom of Information Act (FOIA) request to the IEPA OSFM for the Property. No information for the Property was on file with the IEPA.
- **Office of the Illinois State Fire Marshal (OSFM):** Hygieneering reviewed available records online at <http://webapps.sfm.illinois.gov/ustsearch/Search.aspx>. In addition, Hygieneering submitted Freedom of Information Act (FOIA) requests to the OSFM for the Property and select adjoining properties. Detailed information is provided in the “OSFM Records” section of this Report.

Hygieneering reviewed additional State Agency files/information for the Property and/or select adjoining properties, as discussed in this Report. The adjoining properties selected for additional State Agency file review were the properties that, in the professional opinion of Hygieneering, posed most potential environmental risk in relation to the Property. Factors, including but not limited to, the type of environmental database finding, projected groundwater flow, gradient, distances between the adjoining properties in relation to the Property, structures, roads, and/or underground utilities that may redirect the flow of potential contaminants between those sites and the Property were evaluated in the decision making process. In addition, Hygieneering evaluated whether supplemental State Agency files would be reasonably ascertainable, and likely to be relevant/useful in the REC evaluation process in connection with the Property.

Physical Setting Source

Hygieneering reviewed the USGS topographic maps prepared for the area of the Property (DeKalb, IL Quadrangle, 1980) obtained from EDR. The topographic maps and onsite observations indicate the topography of the Property, itself, is relatively flat with gently rolling hills surrounding the Property. The topographic map indicates that the Property is approximately 876 feet above sea level. Information presented in the Geotcheck section of the EDR Report shows a decline in elevation from the northwest to the southeast, infers that local groundwater flow should be generally to the east/southeast. Based on site observations and topographic maps, it is Hygieneering’s opinion that the inferred groundwater flow is east/southeast. Groundwater flow often mirrors surface topography. Subsurface conditions may cause localized variations in the groundwater flow direction. A copy of the topographic maps obtained from EDR is included in Appendix B.

Standard Federal and State Database Review

EDR conducted a regulatory information search for the area of the Property following the requirements of ASTM Standard 1527-13. EDR is a commercial provider of state and federal database information. A copy of the EDR Environmental Site Assessment (EDR Report) is included in Appendix B. The following table summarizes the databases searched and sites found within the stated search radii.

Database	EDR Search Radius (Mile)	Sites Found in EDR Report			
		On Property	0-0.25 miles from Property	0.25-0.5 miles from Property	0.5-1 miles from Property
NPL	1.0 Mile	0	0	0	0
Proposed NPL	1.0 Mile	0	0	0	0
NPL Liens	Property	0	-	-	-
Delisted NPL	1.0 Mile	0	0	0	0
CERCLIS	0.5 Miles	0	0	0	-



Database	EDR Search Radius (Mile)	Sites Found in EDR Report			
		On Property	0-0.25 miles from Property	0.25-0.5 miles from Property	0.5-1 miles from Property
Federal Facility	0.5 Miles	0	0	0	-
CERC-NFRAP	0.5 Miles	0	0	0	-
RCRA CORRACT Facilities	1.0 Mile	0	0	0	0
RCRA Non-CORRACT TSD Facilities	0.5 Miles	0	0	0	-
RCRA Generators	0.25 Miles	0	0	-	-
US ENG CONTROL	0.5 Miles	0	0	0	-
US INST CONTROL	0.5 Miles	0	0	0	-
ERNS	Property	0	-	-	-
SSU	1.0 Mile	0	0	0	0
SWF/LF	0.5 Miles	0	0	1	-
LF Special Waste	0.5 Miles	0	0	0	-
IL NIPC	0.5 Miles	0	0	0	-
CCDD	0.5 Miles	0	0	0	-
LUST	0.5 Miles	0	3	5	-
INDIAN LUST	0.5 Miles	0	0	0	-
UST	0.25 Miles	0	4	-	-
INDIAN UST	0.25 Miles	0	0	-	-
FEMA UST	0.25 Miles	0	0	-	-
ENG CONTROLS	0.5 Miles	0	0	0	-
INST CONTROLS	0.5 Miles	0	0	0	-
SRP	0.5 Miles	0	1	0	-
INDIAN VCP	0.5 Miles	0	0	0	-
BROWNFIELDS	0.5 Miles	0	0	0	-
US BROWNFIELDS	0.5 Miles	0	0	0	-
Debris Region 9	0.5 Miles	0	0	0	-
ODI	0.5 Miles	0	0	0	-
INDIAN ODI	0.5 Miles	0	0	0	-
US CDL	Property	0	-	-	-
CDL	Property	0	-	-	-
US HIST CDL	Property	0	-	-	-
LIENS 2	Property	0	-	-	-
HMRIS	Property	0	-	-	-
SPILLS	Property	0	-	-	-
RCRA-NonGen	0.25 Miles	0	0	-	-
DOT OPS	Property	0	-	-	-
TRIS	Property	0	-	-	-
TSCA	Property	0	-	-	-
SSTS	Property	0	-	-	-
PADS	Property	0	-	-	-
FINDS	Property	0	-	-	-
RAATS	Property	0	-	-	-
HWAR	Property	0	-	-	-
Drycleaners	0.25 Miles	0	0	-	-



Database	EDR Search Radius (Mile)	Sites Found in EDR Report			
		On Property	0-0.25 miles from Property	0.25-0.5 miles from Property	0.5-1 miles from Property
AIRS	Property	0	-	-	-
Tier 2	Property	0	-	-	-
INDIAN RESERV	1.0 Mile	0	0	0	0
SCRD Drycleaners	0.5 Miles	0	0	0	-
PCB Transformer	Property	0	-	-	-
COAL ASH DOE	Property	0	-	-	-
COAL ASH EPA	0.5 Miles	0	0	0	-
PIMW	0.25 Miles	0	0	-	-
Financial Assurance	Property	0	-	-	-
Manufactured Gas Plants	1.0 Mile	0	0	0	0
Historic Auto Stations	0.25 Miles	0	0	-	-
Historical Cleaners	0.25 Miles	0	0	-	-

"X" denotes the database was registered on the Property. Refer to the EDR report for a detailed description.

NPL – National Priority List

Proposed NPL – Proposed National Priority List

NPL Liens – Federal Superfund Liens

Delisted NPL – National Priority List Deletions

CERCLIS – Comprehensive Environmental Response, Compensation, and Liability Information System

CERC-NFRAP – CERCLIS sites with no further remedial action planned

RCRA CORRACT Facilities – RCRA Treatment, Storage, and Disposal Facilities identified for corrective action

RCRA Non-CORRACT TSD Facilities – RCRA Treatment, Storage, and Disposal Facilities not identified for corrective action

RCRA Generators – Resource Conservation and Recovery Act Large, Small, and Conditionally Exempt Small Quantity hazardous waste generators

US ENG CONTROLS – Federal Engineering Controls Sites List

US INST CONTROL – Federal Institutional Controls Site List

ERNS – Emergency Response Notification System

SSU – State Sites Unit Listing

SWF/LF – Illinois permitted solid waste disposal facilities

LF SPECIAL WASTE – Special Waste Site List

IL NIPC – Solid Waste Landfill Inventory

CCDD – Clean Construction and Demolition Debris

LUST – Leaking underground storage tanks

INDIAN LUST – Indian leaking underground storage tanks

UST – Illinois registered underground storage tanks

INDIAN UST – Indian underground storage tanks

FEMA UST – Underground Storage Tank Listing

ENG CONTROLS – Local State Engineering Controls Sites List

INST CONTROL – Local State Institutional Controls Site List

SRP – Site Remediation Program

INDIAN VCP – Indian Voluntary Cleanup Program

BROWNFIELDS - State Brownfield Sites

US BROWNFIELDS - Federal Brownfield Sites

DEBRIS Region 9 – Listing of Illegal Dump Sites, Region 9

ODI – Open Dump Inventory

INDIAN ODI – Open Dumps on Indian land

US CDL – Clandestine Drug Labs

CDL – Meth Drug Lab Site Listing





US HIST CDL – National Cladenstine Laboratory Register  
LIENS 2 – CERLCA Lien Information  
HMRIS – Hazardous Materials Information Reporting System  
SPILLS – State Spills  
RCRA NonGen – Generators of non-hazardous waste  
DOT OPS – Incident and Accident Data  
TRIS – Toxic Chemical Release Inventory System  
TSCA – Toxic Substances Control Act  
SSTS – Section 7 Tracking Systems  
PADS – PCB Activity Database  
FINDS – Facility Index System  
RAATS – RCRA Administrative Action System  
HWAR - Hazardous Waste Annual Report  
DRYCLEANERS – Illinois Licensed Drycleaners  
AIRS – AIRS  
Tier 2 – Tier 2 Information Listing  
INDIAN RESERV – Indian Reservations  
SCRD Drycleaners – State Coalition for Remediation of Drycleaners Listing  
PCB Transformer – PCB Transformer Registration Database  
COAL ASH DOE – Steam-Electric Plan Operation  
COAL ASH EPA – Coal Combustion Residues Surface Impoundments List  
PIMW – Potentially Infectious Medical Waste  
Financial Assurance – Financial Assurance Information Listing  
Manufactured Gas Plants – Manufactured Gas Plants  
Historic Auto Stations – Historic Auto Stations  
Historic Cleaners – Historic Cleaners

### Property Database Records

The Property is not listed in any of the environmental databases searched in the EDR report.

### Surrounding Properties Database Records

Per the ASTM Standard 1527-13, “adjoining” properties are defined as any real property or properties the border of which is contiguous or partially contiguous with that of the Property, or that would be contiguous or partially contiguous with that of the Property but for a street, road, or other public thoroughfare separating them. The following summarizes the adjoining property database findings.

#### *UST Database Findings*

The EDR report lists a site located on the corner of Douglas Drive and Stadium Drive East as a UST site. According to the EDR Report, two 25,000-gallon USTs are listed as removed. The EDR report regarding these USTs; that these tanks were on the West Heating Plant. Mr. Vest informed Hygieneering that the two 25,000 USTs contained heating oil and were formerly utilized for fueling the boilers. Mr. Vest informed Hygieneering that the USTs were formerly located beneath the concrete drive just south of the West Heating Plant and just north of Douglas Drive N, and have since been removed. No LUST Incident is associated with the removal of these USTs. No information regarding soil sampling post tank removal was available during this assessment. Since the USTs have been removed and were removed without LUST Incident, it is Hygieneering’s opinion that potential impact from these former USTs to the Property is unlikely, and is therefore not considered a REC in connection with the Property; however, Hygieneering notes the lack of information regarding post excavation soil sampling through laboratory analysis a significant data gap.

The EDR report lists a site located on Douglas Drive North at Grant Towers as a UST site; this is the western adjoining property. According to the EDR Report and/or the OSFM public information website at <http://webapps.sfm.illinois.gov/ustsearch/Search.aspx>, one 2,000 gallon diesel fuel UST was removed from the site on August 5, 1993, and one 2,500 diesel fuel UST was installed on August 19, 1993. Both USTs were/are utilized for fueling the emergency back-up generator. According to OSFM records, the 2,500-gallon UST is of fiberglass construction, is double-walled, and interstitially monitored. Mr. Vest was unaware of any leaks from the 2,500-gallon system. No LUST Incident is associated with the removed 2,000-gallon UST. Supplemental information obtained from the OSFM via FOIA request does not indicate a release occurred during removal; however, it does not appear that post excavation soil sampling through laboratory analysis



for diesel fuel indicator contaminants occurred. Refer to the “OSFM Records” section of this report for detailed information. Since the 2,000-gallon diesel fuel UST was removed without LUST Incident, and since the current 2,500-gallon UST is of fiberglass construction and is double walled with interstitial monitoring, it is Hygieneering’s opinion that potential impact from these USTs to the Property is unlikely, and is therefore not considered a REC in connection with the Property; however, Hygieneering notes the lack of information regarding post excavation soil sampling through laboratory analysis a significant data gap.

The EDR report lists a site located at Stevenson Towers at NIU as a UST site; this is the western property. According to the EDR Report and/or the OSFM public information website at <http://webapps.sfm.illinois.gov/ustsearch/Search.aspx>, two 2,000 gallon diesel fuel USTs were removed from the site on August 5, 1993, and two 2,500 diesel fuel USTs were installed on August 19, 1993. Both sets of USTs were/are utilized for fueling the emergency back-up generator. According to OSFM records, the 2,500-gallon USTs are of fiberglass construction, are double-walled, and interstitially monitored. Mr. Vest was unaware of any leaks from the 2,500-gallon system. No LUST Incidents are associated with the removed 2,000-gallon USTs. Supplemental information obtained from the OSFM via FOIA request does not indicate releases occurred during removal of either 2,000-gallon UST; however, it does not appear that post excavation soil sampling through laboratory analysis for diesel fuel indicator contaminants occurred. Refer to the “OSFM Records” section of this report for detailed information. Since the 2,000-gallon diesel fuel USTs were removed without LUST Incidents, and since the current 2,500-gallon USTs are of fiberglass construction and are double walled with interstitial monitoring, it is Hygieneering’s opinion that potential impact from these USTs to the Property is unlikely, and is therefore not considered a REC in connection with the Property; however, Hygieneering notes the lack of information regarding post excavation soil sampling through laboratory analysis a significant data gap.

The EDR report lists a site located on at the Stevens Building #034 at NIU as a UST site. Mr. Vest did not have further information as to the specific location of this former UST site; however, based on information provided on Google Maps Chrome, the “Stevens Building” is located approximately north of University Circle Drive and west of Carroll Avenue, which is approximately 0.5 miles southeast of the Property (source: <https://www.google.com/maps/dir/41.9357301,-88.775259/41.9330165,-88.7687881/@41.9346966,-88.7725647,17z/data=!4m3!4m2!1m0!1m0>). According to the EDR Report and/or the OSFM public information website at <http://webapps.sfm.illinois.gov/ustsearch/Search.aspx>, one 10,000 gallon heating oil UST was removed from the site on June 9, 1994. No LUST Incident is associated with the removed 10,000-gallon UST. Supplemental information obtained from the OSFM via FOIA request does not indicate a release occurred during removal; however, it does not appear that post excavation soil sampling through laboratory analysis for heating oil indicator contaminants occurred. Refer to the “OSFM Records” section of this report for detailed information. Since the 10,000-gallon heating oil UST was removed without LUST Incident, and due to the distance between the UST site and the Property, and projected groundwater flow towards the east/southeast (away from the Property), it is Hygieneering’s opinion that potential impact from this UST to the Property is unlikely, and is therefore not considered a REC in connection with the Property; however, Hygieneering notes the lack of information regarding post excavation soil sampling through laboratory analysis a significant data gap.

#### *LUST & SRP Database Findings*

The EDR report lists three LUST sites throughout the NIU campus, including the following locations:

1. NIU Building 1425 (LUST Incident No. 932980) for release of unleaded gasoline.
2. NIU Grounds Building 16B (LUST Incident No. 933221) for release of diesel fuel.
3. NIU NE Corner Stadium Drive & Annie Glidden Road (LUST Incident No. 20021322) for release of fuel oil.
4. SRP site is located at 1005 Stadium Drive, NIU Campus.



The EDR Report details that NFR letters have not been issued for LUST Incident No. 932980 and LUST Incident 933221. According to Mr. Vest, the above referenced LUST Incidents listed in bullets points 1 and 2 above are located near the Transportation Building on the NIU campus. The Transportation Building is located southwest of the Property by a considerable distance. Hygieneering measured the distance from the Property and the Transportation Building utilizing Google Earth mapping application. Based on the presumed southwestern most Property boundary to the northeastern corner of the Transportation Building, the approximate distance is 1,198 feet. Although NFR letters have not been issued for LUST Incidents 932980 and 933221, based on the significant distances from these LUST Incidents in relation to the Property, and projected groundwater flow towards the east/southeast (away from the Property), it is Hygieneering's opinion that potential impact from these LUST Incidents to the Property is unlikely, and is therefore not considered a REC in connection with the Property; however, Hygieneering recommends NIU pursue closure of these LUST Incidents.

The EDR Report details that an NFR letter has been issued for LUST Incident 20021322 on March 8, 2005. It should be noted that LUST Incident No. 20021322 is also the SRP site listed in the EDR report. The closure of the LUST Incident was conducted under the IEPA's Site Remediation Program rather than the Leaking Underground Storage Tank Program. Hygieneering measured the distance from the Property and the above referenced LUST Incident listed in bullet point 3 and SRP site utilizing Google Earth mapping application. Based on the closure of LUST Incident No.20021322, significant distance from this LUST Incident in relation to the Property, and projected groundwater flow towards the east/southeast (away from the Property), it is Hygieneering's opinion that potential impact from this LUST Incident to the Property is unlikely, and is therefore not considered a REC in connection with the Property.

#### Unmapped Sites

In addition, the EDR report compiles a list of sites that were unmapped, due to poor or inadequate address information. The compilation of unmapped sites is referred to as the orphan sites. Hygieneering believes the remaining sites found within the search radius of the databases and the orphan sites would not typically be of environmental concern for the Property based on the distances from the Property and the presence of structures, roads, and underground utilities that may redirect the flow of contaminants between those sites and the Property, and the projected groundwater flow generally towards the east/southeast. Detailed information on each site listed above is included in the EDR Report.

#### Vapor Encroachment Screening Assessment

Hygieneering conducted a vapor encroachment screening assessment, obtained by EDR, as part of this Phase I Environmental Site Assessment. The purpose of the vapor encroachment screening assessment is to further evaluate for the potential of volatile organic vapors migrating or encroaching upon the Property by identifying vapor encroachment conditions (VECs) in relation to the Property, if any.

#### **Property:**

No VECs were identified on the Property.

#### **Surrounding Sites:**

Two of the EDR report database listings were mapped within the designated area of concern (AOC) determined by using the ASTM 2600 method and/or the Buonicore Methodology based on inferred groundwater flow towards the east/southeast. These sites include "Northern Illinois University Bldg. 1425" for LUST Incident #932980, and site "Northern Illinois University Grounds Bldg. 16B" for LUST Incident #933221. The EDR mapped these two sites northwest of the Property, indicating the sites upgradient to the Property. However, according to the Key Site Manager and NIU representative, both these LUST sites are



located near the Transportation Building, which is southwest of the Property making these LUST sites crossgradient in relation to the Property. Based on the information provided to Hygieneering as to the location of these LUST sites, the sources are not within the area of concern, based on its distance, gradient and suspected chemical of concern; therefore, it is Hygieneering's opinion that vapor encroachment to the Property can be ruled out from these LUST sites.

The vapor encroachment screening assessment is provided in Appendix D.

### Supplemental Records Review

To enhance and supplement the standard environmental record sources listed in Section 8.2.1 of this Practice, Hygieneering reviewed and researched additional available local town or city, county, and state municipal agency records obtained from various offices that were reasonably ascertainable, sufficiently useful, and obtained pursuant to local good commercial or customary practice. The following sections summarize Hygieneering's findings of supplemental records reviewed from various municipal agencies.

### Office of the Illinois State Fire Marshal (OSFM) Records

Hygieneering submitted a Freedom of Information Act (FOIA) request to the Office of the Illinois State Fire Marshal's Office for records on file for the Property and select adjoining properties. The adjoining properties selected for records review, included: The Property West Heating Plant (Facility ID1002700) and western adjoining property Grant Towers (Facility ID 1002694); the far western adjoining property Stevenson Towers (Facility ID 1002693). In addition, a FOIA request was submitted for the EDR listing "Stevens Building #034" (Facility ID 1002695) since no information was available at the time of site inspection regarding the location of the documented USTs. Copies of OSFM records are included in Appendix E.

### **Adjoining Properties**

#### *North-Grant Towers (Facility ID 1002694)*

Records returned for this western adjoining property included permits for removal and Notification forms for the removal of one 1,000-gallon and 2,000-gallon diesel USTs; a "Log of Underground Storage Tank Removal" for the 2,000-gallon UST; and permits and a Notification form for the installation of one 2,500-gallon diesel UST. Since only one UST is documented as removed in the OSFM log and the permits for removal for the 1,000-gallon UST and the 2,000-gallon UST are the same (permit #9259-93-REM), it is Hygieneering's opinion that the 1,000-gallon capacity UST is likely the same UST as the 2,000-gallon UST, and the tank capacity was incorrectly documented by the owner. According to the "Log of Underground Storage Tank Removal" dated August 5, 1993 and completed by the onsite OSFM Storage Tank Safety Specialist, whom oversaw tank removal activities, there was no indication of a release to the tank floor, walls, pipe trench, or other areas; no groundwater was impacted during tank removal. The log indicates that penetrations were noted on the top 1/3 area of the tank wall. The log further indicates that field tests conducted on backfill and natural soils did not indicate contamination. No information regarding soil sample collection for laboratory analysis post tank excavation was available. Based on available information, it appears that no release occurred during the removal of the 2,000-diesel fuel UST. Additional information included were permits for the installation of one 2,500-gallon diesel fuel fiberglass, double-walled UST, and audit inspections for compliance of the new 2,500-gallon UST. The new 2,500-gallon diesel fuel UST is documented as installed August 19, 1993. Audits and inspections indicate the tank is in compliance.

#### *Far Western adjoining property-Stevenson Towers (Facility ID 1002693)*

Records returned for this western adjoining property included permits for removal and Notification forms for the removal of one 1,000-gallon and two 2,000-gallon diesel USTs; a "Log of Underground Storage Tank



Removal” for the 2,000-gallon USTs; and permits and a Notification form for the installation of two 2,500-gallon diesel UST. Since only two USTs are documented as removed in the OSFM log and the Notification form for removal of USTs was amended for additional tank (permit #9258-93-REM), it is Hygieneering’s opinion that the 1,000-gallon capacity UST is likely the same UST as one of 2,000-gallon USTs, and the tank capacity was incorrectly documented by the owner. According to the “Log of Underground Storage Tank Removal” dated August 5, 1993 and completed by the onsite OSFM Storage Tank Safety Specialist, whom oversaw tank removal activities, there was no indication of a release to the tank floor, walls, pipe trench, or other areas; no groundwater was impacted during tank removal. The log indicates that penetrations were noted on the top of the tank located on the southeast side of Stevenson Towers; however, no spillage or contamination was observed. The log also details that the tank located on the north side of the Towers showed no penetrations. The log further indicates that field tests conducted on soils at both UST locations did not indicate contamination. No information regarding soil sample collection for laboratory analysis post tank excavation was available. Based on available information, it appears that no release occurred during the removal of the two 2,000-gallon diesel fuel USTs. Additional information included were permits for the installation of two 2,500-gallon diesel fuel fiberglass, double-walled UST, and audit inspections for compliance of the new 2,500-gallon USTs. The new 2,500-gallon diesel fuel USTs are documented as installed August 19, 1993. Audits and inspections indicate the tanks are in compliance.

Records returned for this site included permits for removal and Notification forms for the removal of one 10,000-gallon heating oil UST and one 20,000-gallon diesel UST; and a “Log of Underground Storage Tank Removal” for the 10,000-gallon heating oil UST. Since only one UST is documented as removed in the OSFM log, it is Hygieneering’s opinion that the 20,000-gallon capacity diesel UST is likely the same UST as the 10,000-gallon heating oil UST, and the tank capacity and product was incorrectly documented by the owner. According to the “Log of Underground Storage Tank Removal” dated June 29, 1994 and completed by the onsite OSFM Storage Tank Safety Specialist, whom oversaw tank removal activities, there was no indication of a release to the tank floor, walls, pipe trench, or other areas. The log indicates that no penetrations were observed on the tank and there was no indication for release. The log further indicates that field tests conducted on soils at did not indicate contamination. No information regarding soil sample collection for laboratory analysis post tank excavation was available. Based on available information, it appears that no release occurred during the removal of the 10,000-gallon heating oil UST.

#### *Northern adjoining property-New Residence Hall*

Records returned for this northern adjoining property indicate that there is no UST’s registered for the property.

Mr. Vest also indicated that Lincoln Towers building has been vacant since the end of 2014 with all utilities except electric have been disconnected

Hygieneering notes that solely field screening soils for contamination is not a currently approved method for confirming or denying the presence of contamination from UST systems. Current industry practice requires the collection of soil samples from the tank excavation post UST removal for laboratory analysis. Hygieneering considers the lack of information regarding the collection of soil samples for laboratory analysis for applicable indicator contaminants conducted in accordance to current regulatory requirements, a significant data gap that may affect the findings in this report.



## Environmental Reports

Hygieneering was provided with a previous subsurface investigation report entitled “Site Investigation NIU Cooling Tower Project” prepared by Trans Environmental, Ltd. (Trans) and dated July 10, 2002. The purpose of the investigation was to collect subsurface soils and lab analysis at the NIU cooling tower in preparation of construction activities to the area and to evaluate soil conditions due to the historic hazardous waste storage in the area of the cooling tower. On June 18, 2002, Trans conducted five (5) test pits in the area around the cooling tower and hazardous waste storage area. Soil samples were screened with a photo-ionization detector (PID) for volatile organic compounds (VOCs). One soil sample was collected from two test pits for a total of two soil samples submitted for laboratory analysis for VOCs, base-neutral compounds (BNAs), RCRA metals, and pH. The soil samples selected for analysis were those that exhibited the highest PID reading and/or highest potential for contamination. One soil sample was collected from test pit 1 (sample ID “TD-#1”) and test pit 5 (sample ID “TD-#5”).

The analytical results were compared to the Illinois Environmental Protection Agency’s (IEPA) established soil cleanup objective or soil remediation objectives (SROs) published under the Tiered Approach to Corrective Action Objectives (TACO) cited under 35 IAC Part 742. There are three exposure routes for evaluation under TACO, including: soil inhalation, soil ingestion, and migration of contaminants present in the soil to groundwater referred to as the soil component of the groundwater ingestion exposure route. Since this site is supplied by groundwater wells, Class I groundwater SROs were compared to the laboratory analytical results. Further, TACO has established SROs for exposure routes based on the land use setting, including residential, industrial-commercial, and construction worker. The SROs for residential land use settings are typically most conservative. The land use setting for this site would likely be classified as industrial-commercial; however, the user can compare laboratory analytical results to the most stringent objectives.

Hygieneering compared the analytical results to current soil remediation objectives for the residential land use setting under TACO for outdoor soil inhalation, soil ingestion, and the soil component of the groundwater ingestion route for Class I groundwater. In addition, results were compared to background concentration values presented with in TACO, specifically, concentrations of Inorganic Chemicals in Background Soils for Counties Outside Metropolitan Statistical Areas (TACO Appendix A, Table G) and Concentrations of Polynuclear Aromatic Hydrocarbon Chemicals in Background Soils for Chicago (TACO Appendix A, Table H).

In summary, VOC and BNA constituents that were detected above laboratory reporting limits were below applicable Tier 1 SROs for residential properties in both soil samples. For soil sample TD-#1, all RCRA metals were below background concentrations for counties outside metropolitan statistical areas, except for chromium. For soil sample TD-#5, all RCRA metals were below background concentrations for counties outside metropolitan statistical areas, except for barium and chromium. The above metals that exceeded background concentrations were also compared to Tier 1 SROs for residential properties for the outdoor inhalation and ingestion exposure routes. In summary, both barium and/or chromium, as applicable, were below the Tier 1 SROs for outdoor soil inhalation and soil ingestion exposure routes.

Hygieneering compared the aforementioned metals’ concentrations to the pH-specific levels established for the soil component of the groundwater ingestion exposure route for Class I groundwater. For barium, there is no pH data available in TACO for the pH value obtained in soil sample TD-#5, which was 9.08; however, Hygieneering notes that the pH SROs increase in value with increased pH (e.g. more alkaline values). The pH range listed in TACO that is closest to the pH value in soil sample TD-#5 is 7.75 to 8.24; this pH range has an SRO for barium of 2,100 mg/kg. The barium concentration in TD-#5 was listed as 170 mg/kg. Since there is a direct relationship with SRO values and pH values, which both increase in concentration, it is Hygieneering’s opinion that even though there is no pH specific data available for comparison for the barium



concentration in sample TD-#5, it is likely that barium meets or is below an acceptable cleanup objective. The chromium concentration in soil sample TD-#1 was 28.7 mg/kg with a pH of 8.22. The SRO for hexavalent chromium listed in TACO based on the pH range of 7.75-8.24 is 28. The chromium concentration in soil sample TD-#5 was 80.8 mg/kg with a pH of 9.08. Again, there is no pH range in TACO listed above pH of 9.0; however, Hygieneering utilized the pH range of 8.75 to 9.0 for comparative purposes. The SRO for hexavalent chromium listed in TACO based on the pH range of 8.75 to 9.0 is 21 mg/kg.

After a comparison of the pH-specific remedial objectives, Hygieneering notes that only chromium was present at a level exceeding the most stringent objectives. However, the migration to groundwater SRO for chromium is based on the hexavalent chromium form. The highest concentration of chromium detected was 80.8 mg/kg in soil sample TD-#5. The ratio of hexavalent to trivalent chromium in the environment is 1:6 (U.S. EPA, 2004. Region 9 Preliminary Remediation Goal Tables). Using this ratio, the concentration of hexavalent chromium at TD-#5 is estimated at 13.5 mg/kg, which is below the Tier 1 pH-specific SRO for the soil component of the groundwater ingestion exposure route for Class I groundwater of 21 mg/kg for the pH range of 8.75 to 9.0. When applying the same ratio to the chromium concentration in soil sample TD-#1, the concentration of hexavalent chromium at TD-#1 is estimated at 4.7 mg/kg, which is below the Tier 1 pH-specific SRO for the soil component of the groundwater ingestion exposure route for Class I groundwater of 28 mg/kg for the pH range of 7.75 to 8.24. Therefore, it is Hygieneering's opinion that the results of the Site Investigation conducted at the property is unlikely to impact the Proposed Property Expansion and is therefore not considered a REC in connection with the Property.

#### Historical Sources Review

The objective of historical sources review is to develop a history of the previous uses of the Property and surrounding areas, in order to facilitate in the identification of past uses of the Property and surrounding areas that may have led to environmental concerns in relation to the Property. Hygieneering reviewed various historical sources that were as necessary and both reasonably ascertainable and likely to be useful in identifying potential environmental concerns in relation to the Property. The following sections provide detailed descriptions of Hygieneering's findings of the historical sources reviewed.

#### Historic Sanborn Fire Insurance Maps

Hygieneering attempted to review historical Sanborn Fire Insurance Maps obtained from EDR as a part of this Phase I Environmental Site Assessment. However, the Sanborn Map Search Report indicates coverage is not available for the area of the Property. A copy of the Sanborn Fire Insurance Map Search Report is included in Appendix F.

#### Historic Aerial Photographs

Hygieneering reviewed historic aerial photographs obtained from EDR from the years 1939, 1953, 1969, 1974, 1988, 1994, 2005, 2007, 2011, 2014, and 2017 as part of this Phase I Environmental Site Assessment. Copies of the historic aerial photographs are included in Appendix G.

#### *Property*

Based on historic aerial photographs, the Property was developed as agricultural farmland since at least 1939. The 1939 aerial photograph also appears to show some type of structural improvement, possibly a barn on the Property. The 1969 through 1994 aerial photographs show the Property building in a similar configuration as observed during inspection. In addition, grassy vegetative areas and parking/drives surround the building; however, the south side of the building, a parking lot is present. The 1999 through 2012 aerial



photographs show the Property in a similar configuration as observed during inspection. The Property building, grassy areas, and drives are present.

### *Adjoining Properties*

Based on historic aerial photographs, adjoining properties were developed as agricultural farmland; additionally, a homestead and barn structures are present on the southeast adjoining property. The 1969 through 2012 aerial photographs show the adjoining properties in a fairly similar configuration as observed during inspection: Grant Towers and the Stevenson Towers are shown to the west, Lincoln Towers is shown to the east, and New Residential Building is shown to the north. A few minor changes were noted on the southeastern, southern, and western adjoining properties over the years. Specifically, the 1969 and 1975 aerial photographs show a parking lot and some undeveloped land on the southeastern a property; the rec center identified during inspection is shown on the 1984 through 2012 aerial photographs. The 1969 through 1988 aerial photographs show a running track with undeveloped land to the south; the 2007 aerial photograph shows the practice center building as noted during inspection. Lastly, a parking lot was present to the west near Stevenson Towers from 1969 to 1994; the 1999 aerial photograph shows the green space/quad as noted during inspection. Douglas Hall underwent demolition in the month of November of 2014 and was not replaced with any structure but returned to a grassy area.

### Historic Topographic Maps

Hygieneering reviewed historic topographic maps obtained by EDR from the years 1937, 1971, and 1980 as part of this Phase I Environmental Site Assessment. Hygieneering's observations for the Property and adjoining properties for each aforementioned historic topographic map are summarized below. Copies of the historic topographic maps are included in Appendix H.

### *Property & Adjoining Properties*

The 1937 historic topographic map shows the Property and the adjoining properties without structural improvements. The 1971 and 1980 topographic map shows structural improvements symbols in a similar configuration as identified during inspection and they are labeled as Northern Illinois University.

### City Directory Abstract

Hygieneering reviewed a City Directory Abstract obtained by EDR as part of this Phase I Environmental Site Assessment. The City Directory Abstract includes a search and abstract of available city directory data. The directory lists the name of the corresponding occupants at roughly 5-year intervals from 1957 to 2013. The target property street has information from 1968, 1973, 1979, 1984, 1989, 1994, 2003, and 2008. Cross street information is available from 1979, 1984, 1989, 1994, 2003, and 2013. A copy of the City Directory is included in Appendix I.

Based on Hygieneering's review of the City Directory Abstract, the Property has been used as West Heating Plant and/or part of the NIU campus since at least 1961. The adjoining properties have also been associated with NIU since 1979. It appears that some adjoining properties may have been used for residential purposes as individuals' names are listed.

### Deed Restrictions and Environmental Cleanup Liens

Hygieneering retained Advanced Searches, Inc. to perform a search for deed restrictions, environmental cleanup liens, and environmental liens filed against the Property as part of this Phase I Environmental Site Assessment. No deed restrictions or environmental liens were on file for the Property. The environmental liens search report for the Property is included in Appendix J.





### Relationship of Assessed and Purchase Price Value of the Property

Hygieneering requested information from Mr. Fitzjarrell of Northern Illinois University Architectural and Engineering Services of NIU and User of this Phase I Environmental Site Assessment, pertaining to the purchase price of the Property in relationship to its fair market value, assuming the Property is not contaminated via the User Questionnaire. According to Mr. Fitzjarrell, this information is not applicable for the purpose of this Phase I ESA as there is no property transaction involved. The completed User Questionnaire is included in Appendix K.

### Specialized Knowledge or Experience of the User

Hygieneering requested the submission of any “specialized knowledge or experience” from Mr. Fitzjarrell of this Phase I Environmental Site Assessment regarding potential Recognized Environmental Conditions on the Property or adjoining properties via the User Questionnaire. Mr. Fitzjarrell had no specialized knowledge pertaining to the Property or the adjoining properties. The completed User Questionnaire is included in Appendix K.

### Interviews

Hygieneering interviewed and/or relied on interview remarks from various persons familiar with the Property, as well as, state and/or local government officials regarding information for the Property and information indicating Recognized Environmental Conditions in connection with the Property as part of this Phase I Environmental Site Assessment. The interviewees’ remarks are referenced in the body of this report. The table below lists the persons interviewed as part of this Phase I Environmental Site Assessment:

Interviewee Name	Title & Company of Employment	Role of Phase I ESA	Date Interviewed
Scott Mooberry	Environmental Health & Safety Department, NIU	<ul style="list-style-type: none"><li>• Representative of Owner/Occupant</li><li>• User of Phase I ESA</li></ul>	October 2019
Jim Fitzjarrell	Architectural and Engineering Services NIU	<ul style="list-style-type: none"><li>• Representative of Owner/Occupant</li><li>• User of Phase I ESA</li></ul>	October 2019
Justin Vest	Chief Engineer NIU	<ul style="list-style-type: none"><li>• Representative of Owner/Occupant</li><li>• User of Phase I ESA</li><li>• Key Site Manager</li></ul>	October 2019
Ms. Judy Butler	Dekalb County Recorder’s Office	<ul style="list-style-type: none"><li>• Local Government Official</li></ul>	October 2019
Ms. Natalie Nelson	Fire Administration City of DeKalb Fire Department	<ul style="list-style-type: none"><li>• Local Government Official</li></ul>	October 2019



## SITE RECONNAISSANCE

The objective of the Site Reconnaissance is to obtain information that helps determine the presence of Recognized Environmental Conditions in connection with the Property. During the reconnaissance, Hygieneering visually inspected the Property and any accessible structures located on the Property to the extent not obstructed by bodies of water, adjacent buildings, or other obstacles. Hygieneering visually inspected the exterior of the Property extending to each peripheral border (north, east, south, and west). Hygieneering visually assessed the adjoining properties during and after the exterior visual assessment of the Me. Bob Anderson, Environmental Consultant, of Hygieneering, inspected the Property on October 16, 2019. Mr. Scott Mooberry, Mr. Jim Fitzjarrell and Mr. Justin Vest of Northern Illinois University provided onsite assistance. The following summarizes Hygieneering's observations during the Property site inspection.

### Interior Observations

Hygieneering visually the interior of the buildings in an attempt to note/identify odors, pools of liquid, staining or corrosion within and/or on building structures, and condition of drains and sumps. Floor drains/sumps were randomly evaluated for visual indications of chemical disposal. The following describes Hygieneering's observations:

At the time of this assessment, the Property building was in the process of producing steam and chilled water for the university. The interior of the Property building mainly consisted of natural gas boilers and chiller units.

Hygieneering did not note strong, noxious, or pungent odors during the interior inspection. Hygieneering did not observe pooling liquids. De minimus oil staining was observed on the concrete floor which may be historic and not current.

Hygieneering's opinion is that the current housekeeping in the West plant was in good condition.

### Exterior Observations

Hygieneering visually inspected reasonably accessible areas of the exterior of the Property in an attempt to note/identify odors, pools of liquid, standing surface water, and staining or corrosion on soil, pavement, surface waters, or on building structures. In addition, Hygieneering visually inspected reasonably accessible areas of the exterior of the Property in an attempt to note/identify any pits, ponds, or lagoons, drains/sewers, stressed vegetation, evidence of solid waste disposal (fill piles, mounds, depressions, etc.), wastewater discharge, wells, and septic systems.

Hygieneering did not note odors or pools of liquid on the exterior of the Property. Hygieneering did not observe standing or surface waters on the exterior of the Property. Hygieneering observed de minimus oil staining on the asphalt/ gravel on the south parking area. Hygieneering did not observe staining or corrosion on surface soils or on building structures on the Property. Hygieneering did not observe pits, ponds, or lagoons on the exterior of the Property. Storm sewer were located on grassy areas on the Property. No evidence of stressed vegetation or evidence of solid waste disposal was observed on the Property. Sanitary wastewater is discharged to the DeKalb Sanitary District for treatment prior to discharge into the Kishwaukee River. Storm water runoff discharges to the onsite storm sewers or percolates into soils. No wells or septic systems were noted or reported on the Property.



## Hazardous Materials and Petroleum Products

Hygieneering inspected the Property for the presence of stored chemicals, drums, petroleum products, and potentially hazardous materials during the site assessment.

Hygieneering observed 55-gallon drums of water treatment chemicals, propylene glycol, and oil; a few 1-gallon containers of oil; several compressed gas cylinders; an approximate 30-gallon steel parts washer. In addition, an approximate 150-gallon biocide AST, and an approximate 300-gallon AST of acid inhibitor were observed inside the West Plant chemical storage building. Storage conditions were adequate. Hygieneering observed de minimus stains on the concrete floor of the chemical storage building. In addition, Hygieneering observed lack of spill prevention in the chemical storage building and would suggest the drain be plugged or additional spill prevention be provided.

Mr. Vest informed Hygieneering that no wastewater, other than sanitary waste, is generated onsite. As stated, wastewater is treated at the DeKalb Sanitary District. Waste Management disposes of general municipal waste.

Overall, chemical containers and storage conditions were in good condition. Hygieneering did not observe evidence of a release of hazardous substances or petroleum products during inspection.

## Polychlorinated Biphenyls and Hydraulic Equipment

Hygieneering inspected the Property for the presence of hydraulic or electrical equipment, such as transformers or capacitors, suspected of containing polychlorinated biphenyls (PCBs). Hydraulic equipment and electrical transformers or capacitors have been known to contain PCBs in their dielectric fluids. PCBs were commonly used in electrical, heat transfer, and hydraulic equipment, and were domestically manufactured from 1929 until their manufacture was banned in 1979 (source: <http://www.epa.gov/epawaste/hazard/tsd/pCBS/pubs/about.htm>).

Mr. Vest informed Hygieneering that the NIU Electrician stated the transformers are not oil filled; therefore, the transformers are considered dry and would not contain PCBs. No staining was observed under or around any of these transformers.

## Underground Storage Tanks

Hygieneering inspected the Property for evidence indicating the presence of underground storage tanks (USTs) and above ground storage tanks (ASTs). Hygieneering did not observe evidence of current USTs, such as fill or vent pipes. Hygieneering observed a concrete pad with access to the concrete brine tanks for water treatment in the south parking area.

There are no records with the City of DeKalb Fire Department nor the Office of the Illinois State Fire Marshal (OSFM) indicating the current presence of USTs on the Property. It should be noted, however, that this assessment cannot wholly eliminate the potential presence for USTs, particularly USTs not in operation at any time after January 1, 1974 (commonly referred to “pre-’74 USTs”) and heating oil USTs. Pursuant to 41 Illinois Administrative Code (IAC) Part 176.460(a), pre-’74 USTs are not required to be registered with the OSFM and are, therefore, considered exempt from registration. If a UST is considered exempt from registration, no record of its existence will be maintained with the appropriate regulatory agency (i.e. OSFM for USTs). Additionally, pursuant to 41 IAC Part 176.440(b), USTs containing heating oil for consumptive use on the premises where stored have varying notification requirements, based on tank capacity and the date and year the UST is known to have been in the ground. A majority of the notification requirements for heating oil USTs, which are detailed under 176.440(b), indicate that heating oil USTs require notification with the OSFM if the UST is known to be in the ground by July 11, 1990 or on or after September 6, 1991. Therefore, there is the possibility of ‘pre-1974 USTs’ or heating oil USTs being exempt from registration with



the OSFM and, therefore, having no record of existence with the OSFM. Thus, a records review conducted as part of a Phase I ESA for USTs cannot guarantee a lack of existence of some tank systems, as described above.

## FINDINGS

Hygieneering performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of the US Environmental Protection Agency's All Appropriate Inquiry Rule (AAI) under 40 CFR Part 312 for the property located at 100 Anchor Road in DeKalb, Illinois (the "Property"). Hygieneering conducted this Phase I ESA in accordance to ASTM E 1527-13. This Phase I Environmental Assessment was intended to identify any current suspect or known Recognized Environmental Conditions (RECs), Controlled Recognized Environmental Conditions (CRECs), Historical Recognized Environmental Conditions (HRECs), and de minimus conditions.

A Recognized Environmental Condition (REC) is defined as *"the presence or likely presence of any hazardous substances or petroleum products in, on, or at a property: (1) due to any release to the environment; (2) under conditions indicative of a release to the environment; or (3) under conditions that pose a material threat of a future release to the environment."*

A Controlled Recognized Environmental Condition (CREC) is defined as *"a Recognized Environmental Condition resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority, with hazardous substances or petroleum products allowed to remain in place subject to the implementation of required controls."* Examples of controls are property use restrictions, activity and use limitations, institutional controls, or engineering controls on a property.

A Historical Recognized Environmental Condition (HREC) is defined as *"a past release of any hazardous substances or petroleum products that has occurred in connection with the property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the Property to any required controls."*

A de minimus condition is defined as *"a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be de minimus conditions are not Recognized Environmental Conditions nor Controlled Recognized Environmental Conditions."*

Based on the results of our Phase I Environmental Site Assessment, Hygieneering identified the following environmental findings:

- Minor/de minimus staining was noted on the concrete floor of the Property building.
- Storage of hazardous substances and/or petroleum products on the property.
- As detailed in the "Environmental Reports" section of this Phase I Environmental Site Assessment report, Hygieneering noted suspect conditions on the property, based on soil sample laboratory analytical results; however, as detailed in the appropriate section listed above, Hygieneering has concluded that the potential impact from these conditions on the overall Property is limited.
- As detailed in the "Standard Federal and State Database Review" section of this Phase I Environmental Site Assessment report, Hygieneering noted suspect environmental conditions on select adjoining properties, including the former and current presence of USTs and presence of LUST Incidents; however, as detailed in the appropriate section listed above, Hygieneering has concluded that the potential impact from these conditions on the Property is minimal.



## OPINIONS

Hygieneering identified the aforementioned environmental finding in relation to the Property during this Phase I Environmental Assessment. Hygieneering has prepared the following opinions regarding the identified environmental findings:

- Housekeeping in the Property building was considered good. Minor staining possibly historic was noted on the concrete floors of the Property building, however, the staining noted is considered de minimus. De minimus conditions are not classified as RECs.
- Storage of hazardous substances and/or petroleum products on the property could be of environmental concern due to the potential for spillage and migration of these substances onto the Property; however, Hygieneering did not observe evidence of a release of these substances during inspection, with exception of some de minimus staining as discussed above, and no material threat for impact onto the Property was observed at the time of inspection. Most of the drum storage of materials was on spill pallets to prevent material from spilling on the floor or reaching the drain. The control of a release of water treatment chemicals in the Chemical Storage building should be reviewed to prevent a release of the materials to the drain which then enters the sanitary sewer although no noticeable staining was observed. For these reasons, the presence and storage of hazardous substances and petroleum products on the property, in itself, does not constitute a REC
- As detailed in the “Environmental Reports” section of this Phase I Environmental Site Assessment report, Hygieneering noted suspect conditions on the property, based on soil sample laboratory analytical results for VOCs, BNAs, RCRA metals, and pH. Based on an evaluation of laboratory analytical results in comparison to the IEPA’s soil remediation objectives listed under the Tiered Approach to Corrective Action Objectives, Hygieneering has concluded that the potential impact from these conditions on the overall Property is minimal/unlikely and therefore, does not pose a REC in connection to the Property at this time. Refer to the “Environmental Reports” section of this Report for a detailed description.
- As detailed in the “Standard Federal and State Database Review” section of this Phase I Environmental Site Assessment report, Hygieneering noted suspect environmental conditions on select adjoining properties or surrounding sites which were registered as UST and/or LUST sites. USTs are of environmental concern due to the potential for UST systems and associated piping to leak and/or overflow from spillage associated with operations. LUST Incidents are of environmental concern since LUST Incidents are reported when petroleum product has been released to the environment. Based on the information collected herein, including but not limited to, no documented releases from the USTs that were removed from the properties; the issuance of No Further Remediation Letter(s) NFR(s) for some LUST Incidents; the distances from select adjoining properties to the Property; and the projected groundwater flow towards the east/southeast, Hygieneering has concluded that the potential impact from these conditions on the Property is minimal/unlikely and therefore, do not pose RECs in connection to the Property at this time. Refer to the “Standard Federal and State Database Review” section of this Report for a detailed description. It should be noted that documentation pertaining to removal methodologies; site assessments, which include the collection of soil samples; and conditions of subsurface conditions at the time of UST removal for the adjoining properties with documented USTs is unknown to date. Current industry practice and regulations governing site assessments at the time of UST removal require the collection of soil samples for laboratory analysis for indicator contaminants in comparison to cleanup objectives established by the Illinois Environmental Protection Agency (IEPA). OSFM records returned for select adjoining properties in which USTs were removed do not indicate that soil samples were collected for laboratory analysis. Hygieneering considers a lack of post excavation soil sampling in accordance to current regulatory requirements during UST removals on the properties a significant data gap that may affect the findings in this report.



## DATA FAILURE & DATA GAPS

Per ASTM E 1527-13 Section 8.3.2.3, data failure occurs when all of the standard historical sources that are reasonably ascertainable and likely to be useful have been reviewed and yet the objectives have not been met. If the data failure represents a significant data gap, the report shall comment on the impact of the data gap on the ability of the environmental professional to identify recognized environmental conditions. Per ASTM 1527-13 Section 3.2.20, a data gap is defined as a lack of or inability to obtain information required by this practice despite good faith efforts by the environmental professional to gather such information. The following summarizes the data failure and/or data gaps encountered as part of this Phase I Environmental Site Assessment.

Hygieneering encountered data failure as part of this assessment. Hygieneering reviewed all of the standard historical sources that were reasonably ascertainable and likely to be useful and yet the objective of identifying the Property's use dated back to 1940 was undetermined. Hygieneering reviewed aerial photographs, historical topographic maps, a city directory; and interviewed persons familiar with the Property in an attempt to determine previous uses of the Property and the first developed use of the Property. In addition, Hygieneering attempted to review Sanborn Fire Insurance Maps; however, the Property was unmapped. The earliest aerial photograph obtained by EDR, dated 1939, shows the Property developed as agricultural farmland. The earliest historic topographic map, dated 1937, shows no structural improvement symbols on the Property; however, a lack of structural symbols does not eliminate the possibility of a developed use on the Property, as defined by ASTM. Based on the reported and/or documented long term use of the Property for agricultural purposes, it is Hygieneering's opinion that this data failure would not pose a significant data gap.

Based on review of the above referenced historical sources, Hygieneering encountered data gaps in excess of 5-year intervals from the years 1939-1968 and 1989-1994. Although data gaps in excess of 5-years were encountered, it is Hygieneering 's opinion that these data gaps are not significant enough to affect the findings in this Report as the documented Property uses have remained consist as either agricultural farmland or its current use as NIU.

Hygieneering observed historic incinerator area in the mechanical room; however, the incinerator operation was removed, and information was limited on overall operational use. Hygieneering considers this a data gap that may potentially affect the findings in this report.

It should be noted that documentation pertaining to removal methodologies; site assessments, which include the collection of soil samples; and conditions of subsurface conditions at the time of UST removal for the adjoining properties with documented USTs is unknown to date. Current industry practice and regulations governing site assessments at the time of UST removal are cited under 41 IAC Section 176.330, which involves the collection of soil samples for laboratory analysis at the time of UST removal. In addition, current methodology and industry practice for soil sample collection are cited under 35 IAC 734.210(h)(1) and (2). OSFM records returned for select adjoining properties in which USTs were removed do not indicate that soil samples were collected for laboratory analysis of petroleum product indicator contaminants. Hygieneering considers a lack of post excavation soil sampling in accordance to current regulatory requirements during UST removals on the adjoining properties a significant data gap that may affect the findings in this report.



## CONCLUSIONS

We declare that, to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in § 312.10 of 40 CFR 312. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

We have performed a Phase I Environmental Site Assessment in conformance with the scope and limitations of ASTM Practice E 1527-13 of 1185 Douglas Drive North in DeKalb, Illinois (the "Property"). Any exceptions to, or deletions from, this practice are described in the "Introduction" section of this report. This assessment has revealed no evidence of Recognized Environmental Conditions in connection with the Property.

Other issues identified in the body of the report may also be of environmental significance and interest in a real estate transaction, therefore, this report must be read as a whole.

Respectfully submitted,  
**Hygieneering, Inc.**

Bob Anderson  
Director of Environmental Health and Safety Services



## REFERENCES

- Advanced Searches. Environmental Liens Search, October 8, 2019.
- City of DeKalb Fire Department, October 8, 2019
- Environmental Data Resources. Aerial Photographs. 1939, 1953, 1969, 1974, 1988, 1994, 2005, 2007, 2011, 2014, and 2017.
- Environmental Data Resources. Historical Topographic Maps. 1934, 1937, 1968, 1971, 1975, 1980, and 2012.
- Environmental Data Resources. Sanborn Fire Insurance Map Search Report, October 8, 2019.
- Environmental Data Resources. The EDR-Radius Map Report with Geotool for West Plant: 1185 Douglas Drive North, DeKalb, Illinois, October 8, 2019.
- Environmental Data Resources. Vapor Encroachment Screen for West Plant: 1185 Douglas Drive North, DeKalb, Illinois, October 8, 2019.
- Illinois Environmental Protection Agency, Bureau of Land:  
<http://epadata.epa.state.il.us/land/ust/Search.asp>.
- Office of the Illinois State Fire Marshal (OSFM): <http://webapps.sfm.illinois.gov/ustsearch/Search.aspx>.
- Trans Environmental, Ltd. Site Investigation NIU Cooling Tower Project. July 10, 2002.
- USGS Quadrangle Illinois – DeKalb East 7.5 Minute Series Topographic Map, 1980.

## PERSONS INTERVIEWED

- Mr. Scott Mooberry, Environmental Health & Safety Department, NIU, 815-753-6250.
- Mr. Jim Fitzjarrell, NIU, 815-753-2061
- Mr. Justin Vest, NIU, 815-753-1153.
- Ms. Natalie Nelson, City of DeKalb Fire Department, 815-748-8460.
- Ms. Judy Butler, Dekalb County Recorder's Office, 815-895-7156





## ENVIRONMENTAL PROFESSIONAL QUALIFICATIONS

### **Bob Anderson MS, CSP, CHMM**

Director, Environmental Services

#### **Professional History**

Hygieneering, Inc., 2014- Present

##### *Director*

Manages staff of Environmental Health & Safety Professionals to ensure clients receive environmental assessment, remediation and compliance services that are technically sound and within budget. Mr. Anderson has expertise in the recognition, evaluation and control of environmental, occupational safety and health hazards in a variety of industries particularly in the manufacturing, power generation and facilities services business sectors. His strengths lie in managing people and projects for peak performance to preserve and increase value of client assets.

- Conducts environmental, health, and safety assessments and audits to assist in preventing/reducing risk and liability associated property damage and life safety.
- Develops client specific environmental, health, and safety policies and procedures.
- Conducts media specific (air, water, soil) environmental assessments to preserve and increase asset value for clients.
- Expertise in developing SPCC and other facets of Emergency Response Plans per OSHA & EPA
- Successful in managing site remediation to obtain NFRs via SRP, LUST & TACO Programs
- Expertise in achieving Plant VPP OSHA star certification

General Electric Company Power and Water Business 2008-2014

*Operations & EH&S Manager – Chicago, IL*

General Electric Company Appliance Business, 1985-2008

*Plant & EH&S Manager – Cicero, IL & Louisville, KY*

Exelon Nuclear Group 1981-1985

*Plant Engineer- Chicago, IL*

#### **Formal Education**

MME Masters Degree in Mechanical Engineering, 1988

University of Illinois at Chicago, Chicago, IL

BME Bachelor's Degree in Mechanical & Safety Engineering, 1981

Illinois Institute of Technology Chicago, IL

#### **Professional Certifications/ Association Memberships**

Certified Safety Professional (CSP) in Comprehensive Practice

Certified Hazardous Materials Manager (CHMM)

Certified Firefighter, Engineer, Hazmat Team Leader and EMT

Certified Hazardous Waste Operations and Emergency Response (HAZWOPER)

Six Sigma Certified

American Society for Safety Professionals

National Safety Council



NFPA



## APPENDICES

APPENDIX A	GLOSSARY OF TERMS
APPENDIX B	EDR ENVIRONMENTAL DATA REPORT
APPENDIX C	PHOTOGRAPHS
APPENDIX D	VAPOR ENCROACHMENT SCREENING ASSESSMENT
APPENDIX E	OSFM RECORDS
APPENDIX F	SANBORN FIRE INSURANCE MAPS SEARCH REPORT
APPENDIX G	AERIAL PHOTOGRAPHS
APPENDIX H	HISTORIC TOPOGRAPHIC MAPS
APPENDIX I	CITY DIRECTORY
APPENDIX J	ENVIRONMENTAL LIENS SEARCH REPORT
APPENDIX K	USER QUESTIONNAIRE

**REFER TO ELECTRONIC REPORT FOR ALL APPENDICES (418 PAGES)**

 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-BOD</b>		
		Rev. 1	Date: 03/09/2021	Appendix B

**APPENDIX B – EXPANSION SPACE PROGRAM**



**Campus Boiler Replacements - Expansion Space Program**

**CDB Project No. 822-010-127**

*Interim Program Analysis / Schematic Design - September 13, 2019*

*Program Analysis / Schematic Design - November 8, 2019*

*Final Bridging Documents - January 10, 2020*

*Revised Bridging Documents - March 9, 2021*

**Heating Plant Expansion Needs**

	Space Standard	Qty.	Extension	Comments	
<b>Administration / Support Spaces</b>					
Private Offices	120	s.f.	3	360	
Cubicles	2	s.f.	9	18	Admin / Reception / Copier
Women's Restroom	90	s.f.	1	90	2 WC, 2 Lav
Men's Restroom	580	s.f.	1	580	3 WC, 2 Urinals, 3 Lavs
All Gender Restroom	65	s.f.	1	65	1 WC, 1 Lav
Locker Room	640	s.f.	1	640	44 Lockers, 2 Changing Rooms, 2 Showers
Conference Room	310	s.f.	1	310	Table for 10
Training / Break Room	940	s.f.	1	940	Tables for 36, Seating for 70
Office Supply Closet	25	s.f.	1	25	
Testing Room	350	s.f.	1	350	
Control Room	225	s.f.	1	225	
Utililty Room	30	s.f.	1	30	
I.T. Room	30	s.f.	1	30	
Stairs (roof access)	220	s.f.		0	
Vestibule	120	s.f.		0	Office entry, Corridor Entry
Subtotal				3,663	
Circulation + misc. @ 40%				1,465	
<b>Administration / Support Total</b>				<b>5,128</b>	

<b>Boiler / Utility Spaces</b>					
75,000 pph Gas-Fired Boilers	1,820	s.f.	3	5,460	Includes piping racking space
Storage Room	610	s.f.	1	610	Including chemicals
Electrical Room	380	s.f.	1	380	
Mezzanine	1,745	s.f.	1	1,745	Locate Air Units, Domestic HWH
Subtotal				8,195	
Circulation + misc. MEP @ 25%				2,049	
<b>Boiler / Utility Total</b>				<b>10,244</b>	

<b>Space Needs Total</b>				<b>15,372</b>
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Note: Area required for new / expanded water treatment is not included; this will be in the area of Boiler 3 after removal.

 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-BOD</b>		
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**APPENDIX C – PRELIMINARY CODE ANALYSIS**

 <b>Northern Illinois University</b>	<b>Code Analysis</b>	CDB PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-CA</b>		
		Rev. 1	Date: 03/09/2021	Appendix C-1

### 1. Overall Project Description:

This project consists of a new 13,404 sq. ft. 1-story building addition to the existing West Heating Plant. The new Boiler room area is 8,116 sq. ft. and the new Administration/Office building area is 5,288 sq. ft. The existing West Heating Plant building area is 10,300 sq. ft. and the adjacent existing Equipment building area is 3,026 sq. ft. Total combined building area is 26,730 sq. ft.

The first-floor level of the building addition consists of two new boilers, entry vestibules, office space, conference room, training/break room, storage room, men's and women's locker/toilet rooms, control room, testing room, utility room, electrical room, information technology/IT room, stairway unit and circulation space. The Boiler room area is designed for a future third boiler.

The second-floor level of the new building addition consist of a mezzanine area for heating and ventilating equipment.

### 2. Project Address:


NIU West Heating Plant  
1185 Douglas Drive  
Dekalb, Illinois 60115

### 3. Authority Having Jurisdiction:

- Northern Illinois University
- State of Illinois (Plumbing Code and Fire Marshal)

### 4. Building Codes Adopted:

- National Fire Protection Association/NFPA 101 Life Safety Code- 2018 Edition
- International Building Code -2015 Edition
- International Fire Code-2015 Edition
- International Plumbing Code-2015 Edition
- International Mechanical Code-2015 Edition
- International Fuel Gas Code-2015 Edition
- National Electric Code-2014 Edition
- Illinois Plumbing Code-2014 Edition
- Illinois Energy Conservation Code-2018
- Illinois Accessibility Code-2018 Edition
- 2010 ADA Standards for Accessibility Design (Federal)

 Northern Illinois University	<b>Code Analysis</b>	CDB PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-CA</b>		
		Rev. 1	Date: 03/09/2021	Appendix C-2

### 5. Building Data:

Use and Occupancy	Section 304 - Business Group "B", Administration/Office area 5,288 sq. ft. Section 306 – Factory Group "F-2", Boiler Room area 8,116 sq. ft.
Mixed Use & Occupancy	Required Separation of Occupancies (hours) Table 508.4 Occupancy Group "B" and Group "F-2" 2 hours for Non-sprinklered Buildings
New Building Area	13,404 sq. ft.
Existing Building Area	13,326 sq. ft.
Total Building Area	26,730 sq. ft.
Construction Type	Type II B Section 601 Table 601 Unprotected, non-combustible construction No automatic sprinkler system is included Existing West Heating Plant Building does not have an automatic sprinkler system Existing Equipment Building does not have an automatic sprinkler system
Allowable Area Group "B":	23,000 sq. ft. (Table 506.2) Actual Area: 5,288 sq. ft. <b>5,288 sq. ft. &lt; 23,000 sq. ft.</b> <b>Allowable Area Complies with Code</b>

 Northern Illinois University	<b>Code Analysis</b>	CDB PROJECT NO. <b>822-010-127</b>		
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Allowable Area Group "F-2": 23,000 sq. ft. (Table 506.2)

Actual:

8,116 sq. ft./New Boiler Room Addition

10,300 sq. ft./Existing West Heating Plant

3,026 sq. ft./Existing Equipment Building

Total "F-2" Building Area = 21,442 sq. ft.

21,442 sq. ft. < 23,000 sq. ft.

Refer to Frontage Increase allowed per Code below for Future Building Addition

Frontage Increase: Section 506.3 Area factor increase shall be determined in accordance with Sections 506.3.1 through 506.3.3.

Section 506.3.1 Minimum percentage of perimeter. The existing building and new building perimeter has greater than 25% of its perimeter open to a public way or open space. Therefore, an area increase is allowed.

Business Area:  $5,288 \text{ sq. ft.} \times 75\% = 3,966 \text{ sq. ft.}$

Therefore, Business building area can be increased to 9,254 sq. ft.

Factory Area: Boiler Room with Future Building Addition 11,256 sq. ft. plus Existing West Heating Plant 10,300 sq. ft. plus Equipment Building 3,026 sq. ft. = 24,582 sq. ft.

$24,582 \text{ sq. ft.} \times 75\% = 18,536 \text{ sq. ft.}$

Therefore, Factory building area can be increased to 43,118 sq. ft.


Actual Total Building Area including Future Building Addition: 29,870 sq. ft.

Maximum Allowable Area: 52,374 sq. ft.

$29,870 \text{ sq. ft.} < 52,372 \text{ sq. ft.}$

**Allowable Building Area Complies with Code**



 Northern Illinois University	<b>Code Analysis</b>	CDB PROJECT NO. <b>822-010-127</b>		
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Allowable Building Height Limitations Group "B": 55 feet (Table 504.3),  
 3 Stories above grade plane  
 (Table 504.4)  
 Actual: +/- 18 feet top of parapet coping  
 1 Story

**Building Height Limitation Complies with Code**

Allowable Building Height Limitations Group "F-2": 55 feet (Table 504.3)  
 3 Stories above grade plane  
 (Table 504.4)  
 Actual: 36 feet top of parapet coping  
 1 Story

**Building Height Limitation Complies with Code**



Fire Sprinkler Protection: Automatic Sprinkler protection will **not** be provided

Maximum Travel Distance: Table 1017.2: Group "B"-200 feet/non-sprinklered  
 Table 1017.2: Group "F"-300 feet/non-sprinklered

**Refer to Life Safety Floor Plan for Travel Distances**

Occupant Load (1004.1.2): Means of Egress  
 Business Areas = 100 gross sq. ft./occupant  
 5,288 sq. ft./100 = 53 occupants  
 Factory Areas = 300 gross sq. ft./occupant  
 11,256 sq. ft./300 = 38 occupants  
 Total building occupant load = 91 occupants

Number of Exits from Building: New Boiler Room building: 2

 Northern Illinois University	<b>Code Analysis</b>	CDB PROJECT NO. <b>822-010-127</b>		
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Actual: 2

**Number of Exits Complies with Code**

New Administration/Office building: 2

Actual: 2

**Number of Exits Complies with Code**

Minimum Egress Width: 44-inches (Table 1020.2)

**6. International Plumbing Code Requirements (Section 403.1):**

Required Washroom Fixture count:

Occupant Load based on IBC occupant count for exit requirements:

Total Occupants: 91  
46 Women and 46 Men

Men 46

Water Closets: 2 required  
(1 per 25 for first 50, and 1 per 50 over 50)

Actual: 3

Urinals: May be substituted for up to 50% of the required Water Closets

Actual: 2

Lavatories: 2 required (1 per 40 for the first 80)

Actual: 3

Women 46:

Water Closets: 2 required (1 per 25 for first 50, and 1 per 50 over 50)

Actual: 2

Lavatories: 2 required (1 per 40 for the first 80)

Actual: 2

**7. Accessibility:**

Accessible Entrance

Public Entrance: At least 60 percent of all public entrances shall comply with Section 404. Door openings shall provide a clear width of 32-inches minimum.

 Northern Illinois University	<b>Code Analysis</b>	CDB PROJECT NO. <b>822-010-127</b>		
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**Accessible Entrance Complies with Code**

Accessible Parking

Table 208.2 Parking Spaces

Total number of parking spaces provided in parking facility: 1 to 25

Minimum Number of required accessible parking spaces: 2

Actual: 32 total parking spaces, 2 Accessible parking spaces provided

**Accessible Parking Complies with Code**

**8. Energy Conservation Code Requirements:**

- a. Applicable Code: IECC 2018
- b. Climate Zone: 5A (DeKalb County)
- c. Building Classification per IECC 2018: Commercial
- d. Building Envelope Requirements: Section C402
- e. Building Envelope Requirements (ASHRAE 90.1-2007, Table 5.5-5)
  - ANSI/ASHRAE/IESNA 90.1
  - Roofs: R-30, insulation entirely above roof deck
  - Walls, above grade: Metal framed = R-13 + R-7.5, continuous insulation
  - Walls, below grade: 7.5, continuous insulation
  - Slab-on-grade floors: Unheated slabs = R-10 for 24" below

 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-BOD</b>		
		Rev. 1	Date: 03/09/2021	Appendix E

## APPENDIX E – EMISSIONS DATA / ANALYSIS

# Environmental Summary for Northern Illinois University Project

## BACKGROUND

Northern Illinois University (NIU) is planning the installation of two natural gas-fired boilers with 75,000 lb/hr steam production capacity each. The University currently operates under Illinois EPA Clean Air Act Permit Program (CAAPP) Permit No. 95060027. Under the CAAPP Permit, there are a total of 13 natural gas-fired boilers in operation, including those located in the East Plant, the West Plant, the Convocation Center and the Monsanto Building. The total combined heat input capacity for all boilers is 912.2 mmBtu/hr. As a result of this total heat input capacity, the Prevention of Significant Deterioration (PSD) major source threshold for the University is 100 tons/year of any criteria pollutant (i.e., the boilers are in the category of “Fossil fuel boilers (or combinations thereof) totaling more than 250 million Btu/hr heat input”). The maximum nitrogen oxide (NO<sub>x</sub>) emissions shown in the CAAPP Permit for fee purposes is 144.7 tons/year, and therefore the University is considered to be an existing major emission source. On an actual emissions basis, however, the University has always operated well below 100 tons/year of criteria pollutant emissions.

## PERMITTING OPTIONS

There are several potential permitting options that were identified for purposes of the new boiler evaluation. The permitting options were reviewed with Mr. Robert Smet of the Illinois EPA Bureau of Air. The principal objective in the evaluation was to avoid the complexity, extended schedule and expense of PSD permitting by maintaining the new project as a non-major modification to an existing major source, or by re-characterizing the entire University boiler operations, including the new boilers, as a non-major source. For major modification characterization, the emissions increases are the “net” increases after considering the potential emissions increases for the new project minus any actual emissions decreases for any operations that will be eliminated or which have been eliminated over the past ten year period. For emissions crediting, NIU has identified four boilers (No. 5 East and Nos. 3 and 4 West) that can be decommissioned concurrent with the new project. A review of the actual 2-year rolling total emissions beginning in January 2013 was performed by NIU to find the maximum emissions reduction credits available for this project.

Since the NIU boiler facilities are currently considered to be “major” under the existing CAAPP Permit, the net emissions increase for the new project will need to stay below PSD significant emissions levels to avoid PSD permitting. The significance levels are 100 tons/year for Carbon Monoxide (CO), 40 tons/year for Nitrogen Oxides (NO<sub>x</sub>), 25 tons/year for total Particulate Matter (PM), and 15 tons/year for Particulate Matter below 10 um (PM<sub>10</sub>). Because the boilers will only combust natural gas, the pollutants of particular concern for NIU are NO<sub>x</sub> and CO. In addition to staying below the significant emissions level, the Illinois EPA has a general (i.e., non-regulatory) internal policy that if project emissions are

below 80% of the significance levels, the permit can be issued without undergoing public notice and a potential public hearing. This would save a minimum of 45 days in permit review, and very likely more to allow for final processing of the permit or to respond to any substantive comments received on the draft permit. According to the IEPA, the current policy (which is in a position of continued development) applies to the emissions increases attributable to the new source only. Whether it will also apply to the new source after the application of emissions netting is doubtful but unclear without further Illinois EPA management review of the permit.

Given the above information, the following permitting options were evaluated in this study (See Appendix Table 1 for emissions values):

Option 1: Avoiding PSD Major Modification and Public Notice for the Project Permit Without Emissions Netting

In this option the maximum new boiler emissions are defined for the new boilers alone without netting, and would not exceed 80% of the PSD significance level. This is the easiest permitting pathway because it clearly avoids both PSD review and public notice for the permit, and does not require that the Illinois EPA review and approve emissions credit data. The required new boiler emissions are, however, the lowest in the analysis.

Option 2: Avoiding PSD Major Modification Without Emissions Netting- Public Notice Required

In this option PSD permitting is avoided without emissions netting, but the new boiler emissions will be above the 80% of the PSD significance level so that public notice on the draft permit will be required under the Illinois EPA internal policy. As with Option 1, the Illinois EPA is not required review emissions credit data. The required boiler emissions are higher than in Option 1, but more permitting time is required to allow for the public notice period. Note that the emissions must remain below the PSD significance levels, so the allowable emissions shown for this option have been set to 0.5 tons/year below the significance levels.

Option 3: Avoiding PSD Major Modification With Emissions Netting – Public Notice Required

This option defines the required boiler emissions limit in order to avoid PSD permitting after the application of the maximum emissions credits attributable to the decommissioning of Boilers No. 5 East and Nos. 1, 2 and 3 West. The maximum allowable emissions for the new boilers under this scenario are substantially higher than those required under Options 1 and 2 due to the application of emissions netting credits to the project. Note that the emissions must remain below the PSD significance levels, so the allowable emissions shown for this option have been set to 0.5 tons/year below the significance levels.

#### Other Options Considered:

Several other options were considered in the evaluation but were determined to either have lower potential for successful permitting or be less desirable from the standpoint of limiting the operation of existing boiler equipment at the University. These options are as follows:

Option 4: This option consists of applying netting credits to the project to avoid PSD permitting and Illinois EPA public comment. In discussions with the Illinois EPA it was determined that, while not definite, it is questionable that the use of credits would be approvable for the avoidance of public comment under the current Illinois EPA administration policy. This would need to be evaluated more fully with additional Illinois EPA New Source Review policy specialists and legal representatives if NIU chose to further pursue this option.

Option 5: This option consisted of combining all NIU existing and proposed boilers together under an emissions cap of less than 100 tons/year/pollutant. This option is available because the actual emissions from the existing operations have consistently been well below 100 tons/year/pollutant. Under this scenario the CAAPP Permit would be replaced by a Federally Enforceable State Operating Permit (FESOP). This would place a limit on the existing NIU boilers that currently do not have operating limits and therefore reduce the operating flexibility for the existing boilers. If the proposed emissions cap were below 80 tons/year, public notice may be avoidable.

Option 6: As an extension of Option 5, Option 6 would be to re-permit the existing NIU boiler emission sources as non-major sources below 100 tons/year/pollutant. In a second permitting step the new sources would be permitted as a separate project and have separate limits at less than 100 tons/year/pollutant as a non-major modification to a non-major source. At that point the Campus would become a major source and require a CAAPP Permit. This would also place a 100 tons/year/pollutant limit on the existing NIU boilers, would require approval of the Illinois EPA on the permit structure, and require public notice for permitting.

#### Conclusions:

After review of the above information, and following discussions with Robert Smet of the Illinois EPA, Option 1 was selected as the project permitting pathway of choice, as this option was found to be both technically and economically feasible from an equipment standpoint, and the option which eliminates the pre-permitting uncertainty associated with potential variability in Illinois EPA policies such as in the area of emissions netting approvability. Note that this option will essentially “consume” 80% of the allowable non-major source allowable emissions for a period of five years. Any project following the current

project over a contemporaneous five-year period will, therefore, need to evaluate other permitting options, which may include netting or reorganization of the existing emissions units under separate non-major groupings.



Table 1. Summary of NIU Boiler Project Maximum Allowable Emissions Associated with Evaluated Illinois EPA Permitting Options

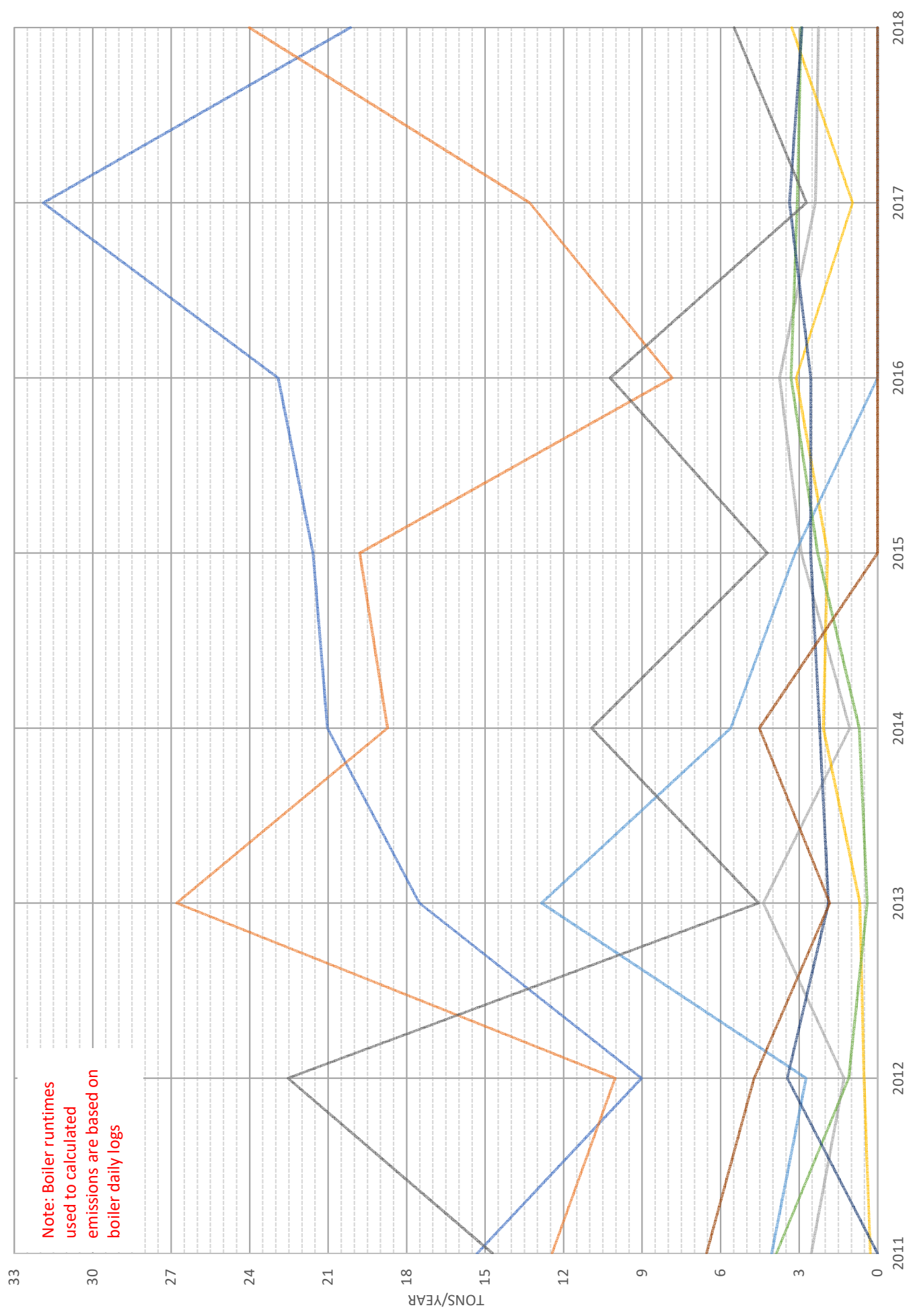
Parameter	Pollutant				
	Nox	CO	PM	SO2	VOM
IEPA Significant Source Emissions Level (tons/yr)	40	100	15	40	40
IEPA Significant Source Emissions Level Avoiding Public Comment for Permit (tons/yr)	32	80	12	32	32
<b>Option 1 (Selected Option): Per-Boiler Emissions Limits for a Two-Boiler Project To Avoid Public Comment Without Emissions Netting<sup>1</sup></b>					
tons/yr	16	40	6	16	16
lb/hr <sup>2</sup>	3.65	9.13	1.36	3.65	3.65
Estimated ppm <sup>3</sup>	34	137	-	-	-
<b>Option 2: Per-Boiler Emissions Limits for a Two-Boiler Project With Public Comment Without Emissions Netting<sup>1</sup></b>					
tons/yr <sup>4</sup>	39.88	99.88	14.88	39.88	39.88
lb/hr <sup>2</sup>	9.10	22.80	3.39	9.10	9.10
Estimated ppm <sup>3</sup>	85	343	-	-	-
<b>Option 3: Per-Boiler Emissions Limits for a Two-Boiler Project With Public Comment Using Emissions Netting<sup>1</sup></b>					
Maximum Reported Actual Emissions Credits for Netting (tons/yr)	27.93	11.41	-	-	-
Allowable Net Emissions Increase (tons/yr) <sup>4</sup>	39.88	99.88	14.88	39.88	39.88
<b>Allowable Per-Boiler Emissions Before Subtraction of Netting Credits</b>					
tons/yr <sup>4</sup>	67.81	111.29	14.88	39.88	39.88
lb/hr <sup>2</sup>	15.48	25.40	3.39	9.10	9.10
Estimated ppm <sup>3</sup>	145	382	-	-	-

1. Avoiding public comment is based on current IEPA policy of 80% of significant modification emissions per Bob Smet of IEPA.
2. Mass emissions in lb/hr are based on 8760 hours /year. Note that these values are rounded down to 2 decimal places to that the annual value is marginally below 80% of the significant modification level.
3. The concentration limits in ppm are based on general conversion factors for Nox and CO in natural gas boilers by Cleaver Brooks, and assuming a HHV of 91 MMBtu/hr boiler.
4. For Options 2 and 3 which approach the major source levels, the allowable emissions are reduced by 0.5 tons/year total as the IEPA generally requires some level of emissions slightly below the absolute limit.



# Annual NOx Emissions (Recalculated)

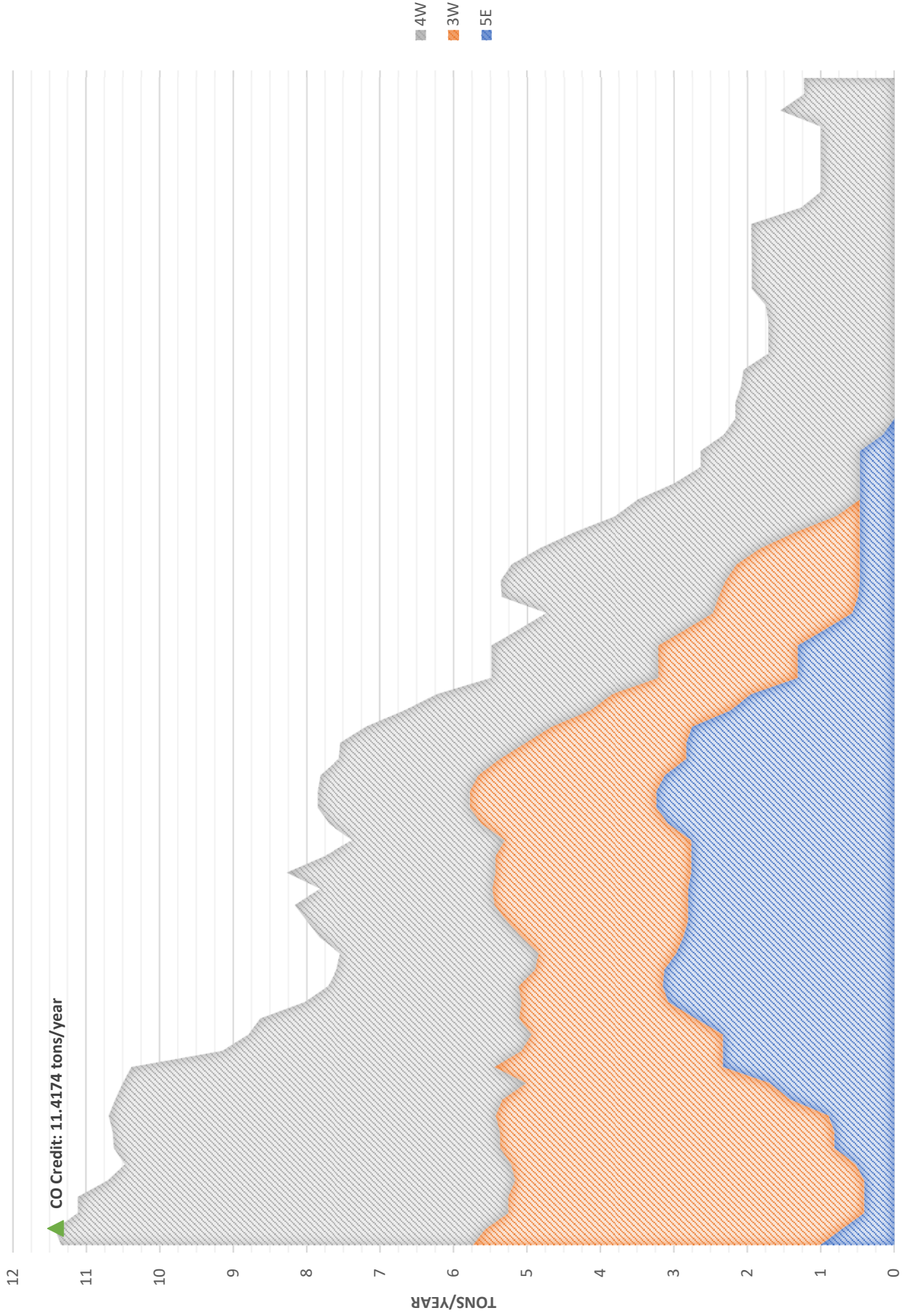
1E 2E 3E 4E 5E 1W 2W 3W 4W





# CO EMISSIONS CREDIT

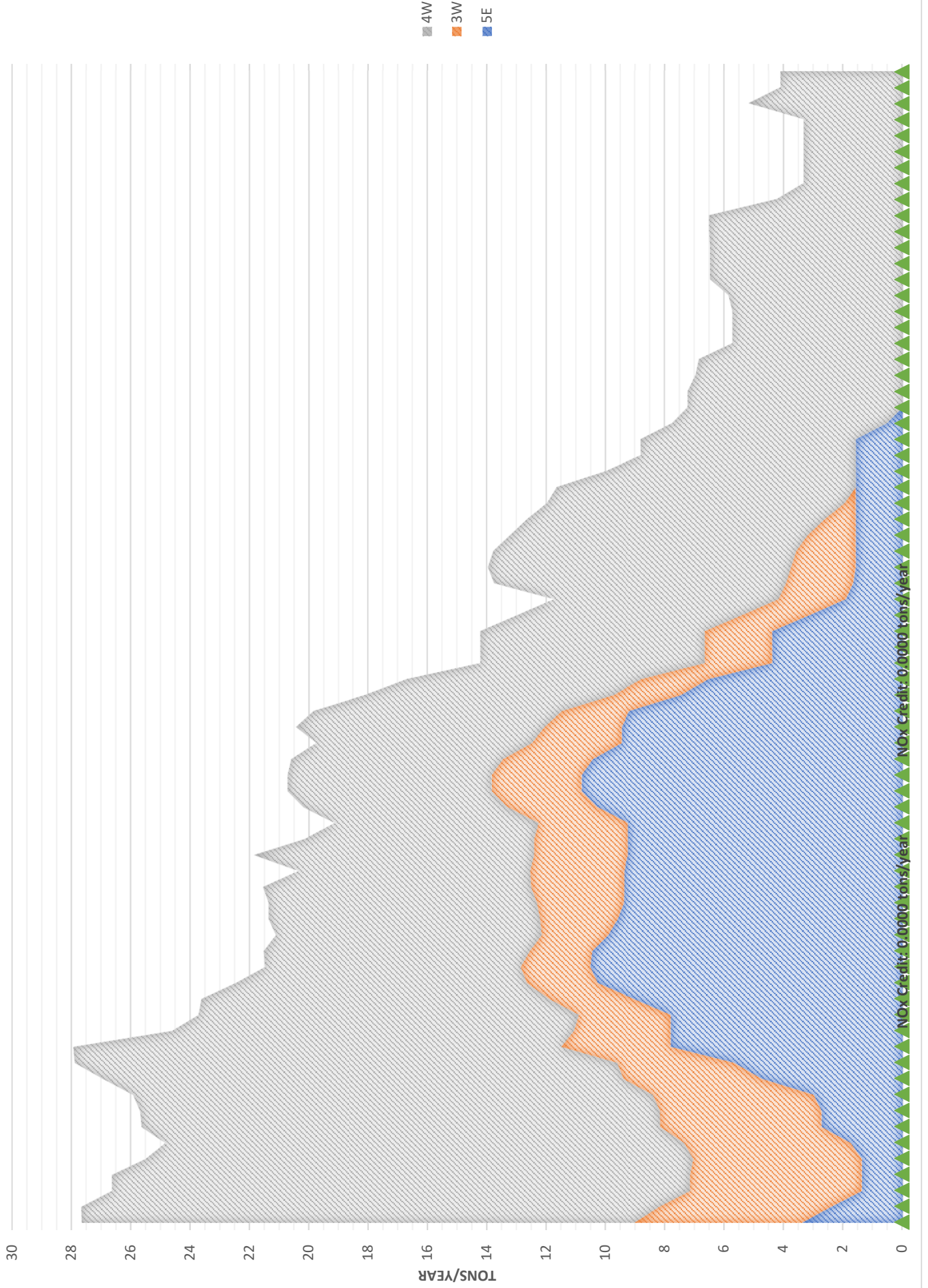
(BASED ON AVERAGE OF 2-YEAR ROLLING TOTAL)





# NOX EMISSIONS CREDIT

(BASED ON AVERAGE OF 2-YEAR ROLLING TOTAL)









2011		January										Total for the Month		E				
Emissions Calculations		East Heating Plant					West Heating Plant					Convocation Center		Monsanto Building		E		
Area	Units	1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	E	
<b>Boiler Information</b>		Boiler Identifier																
		Boiler Runtime	671.0	606.0	4.0	0.0	220.0	0.0	0.0	0.0	0.0	N/A	N/A	N/A	655.0	350.0		
<b>Natural Gas Information</b>		Natural Gas Heating Value	1,008.00															1,008.00
		Total Natural Gas Consumed	967,458.24															807,780.96
			95,978,000.00															80,137,000.00
<b>Burner Information</b>		Gas Burner Maximum Input	120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	
		Gas Burner Fire Rate	119,047.62	119,047.62	74,404.76	74,404.76	119,047.62	49,603.17	49,603.17	74,404.76	119,047.62	12,500.00	12,500.00	3,472.22	3,472.22	119,047.62	119,047.62	
		Emission Factor	0.06401	0.06401	0.04000	0.04000	0.06401	0.00000	0.00000	0.00000	0.00000	N/A	N/A	N/A	0.06040	0.06040	0.06040	
<b>CO</b>		lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	
		lb/hr	5.3766	5.3766	3.3604	3.3604	5.3766	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	5.0737	5.0737	5.0737	
		lb/time	3,607.67	3,258.20	13.44	0.00	1,182.84	0.00	0.00	0.00	0.00	N/A	N/A	N/A	3,323.28	1,775.80	1,775.80	
		tons/time	1.8038	1.6291	0.0067	0.0000	0.5914	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	1.6616	0.8879	0.8879	
<b>CO2</b>		lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	
		lb/hr	7,680.8003	7,680.8003	4,800.5002	4,800.5002	7,680.8003	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	7,248.1673	7,248.1673	7,248.1673	
		lb/time	5,153,816.98	4,654,564.96	19,202.00	0.00	1,689,776.06	0.00	0.00	0.00	0.00	N/A	N/A	N/A	4,747,549.61	2,536,858.57	2,536,858.57	
		tons/time	2,576.9085	2,327.2825	9.6010	0.0000	844.8880	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	2,373.7748	1,268.4293	1,268.4293	
<b>Methane</b>		lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
		lb/hr	0.1472	0.1472	0.0920	0.0920	0.1472	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.1389	0.1389	0.1389	
		lb/time	98.78	89.21	0.37	0.00	32.39	0.00	0.00	0.00	0.00	N/A	N/A	N/A	90.99	48.62	48.62	
		tons/time	0.0494	0.0446	0.0002	0.0000	0.0162	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.0455	0.0243	0.0243	
<b>N2O</b>		lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	
		lb/hr	0.1408	0.1408	0.0880	0.0880	0.1408	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.1329	0.1329	0.1329	
		lb/time	94.49	85.33	0.35	0.00	30.98	0.00	0.00	0.00	0.00	N/A	N/A	N/A	87.04	46.51	46.51	
		tons/time	0.0472	0.0427	0.0002	0.0000	0.0155	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.0435	0.0233	0.0233	
<b>NH3</b>		lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
		lb/hr	0.0314	0.0314	0.0196	0.0196	0.0314	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.0296	0.0296	0.0296	
		lb/time	21.04	19.01	0.08	0.00	6.90	0.00	0.00	0.00	0.00	N/A	N/A	N/A	19.39	10.36	10.36	
		tons/time	0.0105	0.0095	0.0000	0.0000	0.0034	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.0097	0.0052	0.0052	
<b>NOx</b>		lb/mmmscf	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	280.00	
		lb/hr	17,921.9	17,921.9	4,000.4	4,000.4	17,921.9	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	16,912.4	16,912.4	16,912.4	
		lb/time	12,025.57	10,860.65	16.00	0.00	3,942.81	0.00	0.00	0.00	0.00	N/A	N/A	N/A	11,077.62	5,919.34	5,919.34	
		tons/time	6.0128	5.4303	0.0080	0.0000	1.9714	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	5.5388	2.9597	2.9597	
<b>Particulate</b>		lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
		lb/hr	0.4865	0.4865	0.3040	0.3040	0.4865	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.4591	0.4591	0.4591	
		lb/time	326.41	294.79	1.22	0.00	107.02	0.00	0.00	0.00	0.00	N/A	N/A	N/A	300.68	160.67	160.67	
		tons/time	0.1632	0.1474	0.0006	0.0000	0.0535	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.1503	0.0803	0.0803	
<b>PM10</b>		lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
		lb/hr	0.4865	0.4865	0.3040	0.3040	0.4865	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.4591	0.4591	0.4591	
		lb/time	326.41	294.79	1.22	0.00	107.02	0.00	0.00	0.00	0.00	N/A	N/A	N/A	300.68	160.67	160.67	
		tons/time	0.1632	0.1474	0.0006	0.0000	0.0535	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.1503	0.0803	0.0803	
<b>PM2.5</b>		lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
		lb/hr	0.4865	0.4865	0.3040	0.3040	0.4865	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.4591	0.4591	0.4591	
		lb/time	326.41	294.79	1.22	0.00	107.02	0.00	0.00	0.00	0.00	N/A	N/A	N/A	300.68	160.67	160.67	
		tons/time	0.1632	0.1474	0.0006	0.0000	0.0535	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.1503	0.0803	0.0803	
<b>SO2</b>		lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
		lb/hr	0.0384	0.0384	0.0240	0.0240	0.0384	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.0362	0.0362	0.0362	
		lb/time	25.77	23.27	0.10	0.00	8.45	0.00	0.00	0.00	0.00	N/A	N/A	N/A	23.74	12.68	12.68	
		tons/time	0.0129	0.0116	0.0000	0.0000	0.0042	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.0119	0.0063	0.0063	
<b>VOC</b>		lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
		lb/hr	0.3520	0.3520	0.2200	0.2200	0.3520	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.3322	0.3322	0.3322	
		lb/time	236.22	213.33	0.88	0.00	77.45	0.00	0.00	0.00	0.00	N/A	N/A	N/A	217.60	116.27	116.27	
		tons/time	0.1181	0.1067	0.0004	0.0000	0.0387	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	0.1088	0.0581	0.0581	
<b>CO2E</b>		lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	
		lb/hr	7,727.5251	7,727.5251	4,829.7032	4,829.7032	7,727.5251	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	7,292.2604	7,292.2604	7,292.2604	
		lb/time	5,185,169.37	4,682,880.23	19,318.81	0.00	1,700,055.53	0.00	0.00	0.00	0.00	N/A	N/A	N/A	4,776,430.54	2,552,291.13	2,552,291.13	
		tons/time	2,592.5847	2,341.4401	9.6594	0.0000	850.0278	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	2,388.2153	1,276.1456	1,276.1456	

2011		Emissions Calculations										February										Total for the Month		
Boiler Information		Area		West Heating Plant					Convocation Center					Monsanto Building		East Heating Plant								
Boiler Identifier		3E		1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E									
Boiler Runtime		121.0		0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	392.0	352.0	712.0	0.0									
Natural Gas Heating Value		807,710.40		1,008.00										696,628.80										
Total Natural Gas Consumed		80,130,000.00		7,000.00										69,110,000.00										
Burner Maximum Input		75.00		50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00									
Gas Burner Fire Rate		74,404.76		49,603.17	49,603.17	74,404.76	119,047.62	12,500.00	12,500.00	3,472.22	3,472.22	119,047.62	119,047.62	74,404.76	74,404.76									
Emission Factor		0.03775		0.00000	0.00000	0.00000	0.00000	N/A	N/A	N/A	N/A	0.05812	0.05812	0.03633	0.03633									
Emission Rate		84.00		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00									
Emission Rate		3.1711		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	4.8825	4.8825	3.0515	3.0515									
Emission Rate		383.70		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	1,913.92	1,718.62	2,172.69	0.00									
Emission Rate		0.1918		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.9570	0.8593	1.0863	0.0000									
Emission Factor		120,000.00		120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00									
Emission Rate		4,530.1046		4,530.1046	7,248.1673	7,248.1673	0.0000	N/A	N/A	N/A	N/A	6,974.9369	6,974.9369	4,359.3356	4,359.3356									
Emission Rate		548,142.66		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	2,734,175.27	2,455,177.80	3,103,846.93	0.00									
Emission Factor		274,0713		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	1,367,0876	1,227,5889	1,551,9235	0.0000									
Emission Factor		2.30		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30									
Emission Rate		0.0868		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1337	0.1337	0.0836	0.0836									
Emission Rate		10.51		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	52.41	47.06	59.49	0.00									
Emission Rate		0.0053		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0262	0.0235	0.0297	0.0000									
Emission Factor		2.20		2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20									
Emission Rate		0.0831		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1279	0.1279	0.0799	0.0799									
Emission Rate		10.05		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	50.13	45.01	56.90	0.00									
Emission Factor		0.0050		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0251	0.0225	0.0285	0.0000									
Emission Factor		0.49		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49									
Emission Rate		0.0185		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0285	0.0285	0.0178	0.0178									
Emission Rate		2.24		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	11.16	10.03	12.67	0.00									
Emission Factor		0.0011		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0056	0.0050	0.0063	0.0000									
Emission Factor		100.00		100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00									
Emission Rate		3.7751		3.7751	0.00	0.0000	0.0000	N/A	N/A	N/A	N/A	16.2749	16.2749	3.6328	3.6328									
Emission Rate		456.79		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	6,379.74	5,728.75	2,586.54	0.00									
Emission Factor		0.2284		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	3.1899	2.8644	1.2933	0.0000									
Emission Factor		7.60		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60									
Emission Rate		0.2869		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4417	0.4417	0.2761	0.2761									
Emission Rate		34.72		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	173.16	155.49	196.58	0.00									
Emission Rate		0.0174		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0866	0.0777	0.0983	0.0000									
Emission Factor		7.60		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60									
Emission Rate		0.2869		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4417	0.4417	0.2761	0.2761									
Emission Rate		34.72		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	173.16	155.49	196.58	0.00									
Emission Rate		0.0174		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0866	0.0777	0.0983	0.0000									
Emission Factor		7.60		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60									
Emission Rate		0.2869		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4417	0.4417	0.2761	0.2761									
Emission Rate		34.72		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	173.16	155.49	196.58	0.00									
Emission Rate		0.0174		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0866	0.0777	0.0983	0.0000									
Emission Factor		0.60		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60									
Emission Rate		0.0227		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0349	0.0349	0.0218	0.0218									
Emission Rate		2.74		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	13.67	12.28	15.52	0.00									
Emission Rate		0.0014		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0068	0.0061	0.0078	0.0000									
Emission Factor		5.50		5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50									
Emission Rate		0.2076		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.3197	0.3197	0.1998	0.1998									
Emission Rate		25.12		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	125.32	112.53	142.26	0.00									
Emission Rate		0.0126		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0627	0.0563	0.0711	0.0000									
Emission Factor		120,730.00		120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00									
Emission Rate		4,557.6627		4,557.6627	7,292.2604	7,292.2604	0.0000	N/A	N/A	N/A	N/A	7,017.3678	7,017.3678	4,385.8549	4,385.8549									
Emission Rate		551,477.19		0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	2,750,808.17	2,470,113.46	3,122,728.67	0.00									
Emission Factor		275.7386		0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	1,375.4041	1,235.0567	1,561.3643	0.0000									



2011	Emissions Calculations				Units				April										May									
	Area	West Heating Plant		Convocation Center		Monsanto Building		Total for the Month	East Heating Plant					West Heating Plant														
Boiler Information	Boiler Identifier	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W	2W	3W												
	Boiler Runtime	0.0	138.0	280.0	N/A	N/A	N/A	N/A	0.0	0.0	0.0	6.0	0.0	165.0	0.0	104.0												
Natural Gas Information	Natural Gas Heating Value	1,008.00		0.00		0.00		1,009.00	101,727.38										1,009.00									
	Total Natural Gas Consumed	226,336.32		0.00		0.00		299,360.21	10,082,000.00										19,587,000.00									
Burner Information	Gas Burner Maximum Input	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00												
	Gas Burner Fire Rate	49,603.17	74,404.76	119,047.62	12,500.00	12,500.00	3,472.22	3,472.22	118,929.63	118,929.63	74,331.02	74,331.02	118,929.63	49,554.01	49,554.01	74,331.02												
CO	Emission Factor	0.02169	0.03254	0.05207	N/A	N/A	N/A	N/A	0.05010	0.05010	0.03131	0.03131	0.05010	0.01775	0.01775	0.02663												
	Emission Rate	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00												
CO2	Emission Factor	1.8224	2.7335	4.3736	N/A	N/A	N/A	N/A	4.2081	4.2081	2.6301	2.6301	4.2081	1.4911	1.4911	2.2367												
	Emission Rate	0.00	377.23	1,224.62	N/A	N/A	N/A	N/A	0.00	0.00	831.11	15.78	0.00	246.04	0.00	232.62												
Methane	Emission Factor	0.0000	0.1886	0.6123	N/A	N/A	N/A	N/A	0.0000	0.0000	0.4156	0.0079	0.0000	0.1230	0.0000	0.1163												
	Emission Rate	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00												
N2O	Emission Factor	2.603.3623	3,905.0435	6,248.0696	N/A	N/A	N/A	N/A	6,011.6273	6,011.6273	3,757.2671	3,757.2671	6,011.6273	2,130.1794	2,130.1794	3,195.2692												
	Emission Rate	0.00	538,896.00	1,749,459.48	N/A	N/A	N/A	N/A	0.00	0.00	1,187,296.40	22,543.60	0.00	351,479.61	0.00	332,307.99												
NH3	Emission Factor	0.0000	269.4480	874.7297	N/A	N/A	N/A	N/A	0.0000	0.0000	593.6482	11.2718	0.0000	175.7398	0.0000	166.1540												
	Emission Rate	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30												
NOx	Emission Factor	0.0499	0.0748	0.1198	N/A	N/A	N/A	N/A	0.1152	0.1152	0.0720	0.0720	0.1152	0.0408	0.0408	0.0612												
	Emission Rate	0.00	10.33	33.53	N/A	N/A	N/A	N/A	0.00	0.00	22.76	0.43	0.00	6.74	0.00	6.37												
PM10	Emission Factor	0.0000	0.0052	0.0168	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0114	0.0002	0.0000	0.0034	0.0000	0.0032												
	Emission Rate	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20												
PM2.5	Emission Factor	0.0477	0.0716	0.1145	N/A	N/A	N/A	N/A	0.1102	0.1102	0.0689	0.0689	0.1102	0.0391	0.0391	0.0586												
	Emission Rate	0.00	9.88	32.07	N/A	N/A	N/A	N/A	0.00	0.00	21.77	0.41	0.00	6.44	0.00	6.09												
SO2	Emission Factor	0.0000	0.0049	0.0160	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0109	0.0002	0.0000	0.0032	0.0000	0.0030												
	Emission Rate	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49												
VOC	Emission Factor	0.0106	0.0159	0.0255	N/A	N/A	N/A	N/A	0.0245	0.0245	0.0153	0.0153	0.0245	0.0087	0.0087	0.0130												
	Emission Rate	0.00	2.20	7.14	N/A	N/A	N/A	N/A	0.00	0.00	4.85	0.09	0.00	1.44	0.00	1.36												
CO2E	Emission Factor	0.0000	0.0011	0.0036	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0024	0.0000	0.0000	0.0007	0.0000	0.0007												
	Emission Rate	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00												
CO2E	Emission Factor	2.1695	3.2542	14.5788	N/A	N/A	N/A	N/A	14.0271	14.0271	3.1311	3.1311	14.0271	1.7751	1.7751	2.6627												
	Emission Rate	0.00	449.08	4,082.07	N/A	N/A	N/A	N/A	0.00	0.00	989.41	18.79	0.00	292.90	0.00	276.92												
CO2E	Emission Factor	0.0000	0.2245	2.0410	N/A	N/A	N/A	N/A	0.0000	0.0000	0.4947	0.0094	0.0000	0.1464	0.0000	0.1385												
	Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60												
CO2E	Emission Factor	0.1649	0.2473	0.3957	N/A	N/A	N/A	N/A	0.3807	0.3807	0.2380	0.2380	0.3807	0.1349	0.1349	0.2024												
	Emission Rate	0.00	34.13	110.80	N/A	N/A	N/A	N/A	0.00	0.00	75.20	1.43	0.00	22.26	0.00	21.05												
CO2E	Emission Factor	0.0000	0.0171	0.0554	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0376	0.0007	0.0000	0.0111	0.0000	0.0105												
	Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60												
CO2E	Emission Factor	0.1649	0.2473	0.3957	N/A	N/A	N/A	N/A	0.3807	0.3807	0.2380	0.2380	0.3807	0.1349	0.1349	0.2024												
	Emission Rate	0.00	34.13	110.80	N/A	N/A	N/A	N/A	0.00	0.00	75.20	1.43	0.00	22.26	0.00	21.05												
CO2E	Emission Factor	0.0000	0.0171	0.0554	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0376	0.0007	0.0000	0.0111	0.0000	0.0105												
	Emission Rate	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60												
CO2E	Emission Factor	0.0130	0.0195	0.0312	N/A	N/A	N/A	N/A	0.0301	0.0301	0.0188	0.0188	0.0301	0.0107	0.0107	0.0160												
	Emission Rate	0.00	2.69	8.75	N/A	N/A	N/A	N/A	0.00	0.00	5.94	0.11	0.00	1.76	0.00	1.66												
CO2E	Emission Factor	0.0000	0.0013	0.0044	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0030	0.0001	0.0000	0.0009	0.0000	0.0008												
	Emission Rate	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50												
CO2E	Emission Factor	0.1193	0.1790	0.2864	N/A	N/A	N/A	N/A	0.2755	0.2755	0.1722	0.1722	0.2755	0.0976	0.0976	0.1464												
	Emission Rate	0.00	24.70	80.18	N/A	N/A	N/A	N/A	0.00	0.00	54.42	1.03	0.00	16.11	0.00	15.23												
CO2E	Emission Factor	0.0000	0.0123	0.0401	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0272	0.0005	0.0000	0.0081	0.0000	0.0076												
	Emission Rate	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00												
CO2E	Emission Factor	2,619.1994	3,928.7992	6,286.0787	N/A	N/A	N/A	N/A	6,048.1981	6,048.1981	3,780.1238	3,780.1238	6,048.1981	2,143.1380	2,143.1380	3,214.7071												
	Emission Rate	0.00	542,174.28	1,760,102.02	N/A	N/A	N/A	N/A	0.00	0.00	1,194,519.12	22,680.74	0.00	353,617.78	0.00	334,329.53												
CO2E	Emission Factor	0.0000	271.0871	880.0510	N/A	N/A	N/A	N/A	0.0000	0.0000	597.2596	11.3404	0.0000	176.8089	0.0000	167.1648												
	Emission Rate	0.0000	271.0871	880.0510	N/A	N/A	N/A	N/A	0.0000	0.0000	597.2596	11.3404	0.0000	176.8089	0.0000	167.1648												



2011		Emissions Calculations										Units										July									
Boiler Information		Area		Monsanto Building		Ion Center		Monsanto 1		Monsanto 2		Total for the Month		East Heating Plant					West Heating Plant					Convocation Center		Monsanto					
Boiler Identifier		Boiler Runtime		Conv 2		Conv 2		N/A		N/A		N/A		N/A		N/A		N/A		N/A		Conv 1		Conv 2		Monsanto 1					
Boiler Runtime		hrs		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A		N/A			
Natural Gas Heating Value		BTU/scf		0.00		0.00		0.00		0.00		1,009.00		1,009.00					223,685.21					4,974.37		1,78					
Total Natural Gas Consumed		therms		0.00		0.00		0.00		0.00		230,446.38		22,169,000.00					493,000.00					493,000.00		177.0					
Gas Burner Maximum Input		mmBTU/hr		12.60		12.60		3.50		3.50		---		50.00					75.00					12.60		3.50					
Gas Burner Fire Rate		scf		12,487.61		12,487.61		3,468.78		3,468.78		---		49,554.01					74,331.02					12,487.61		3,468.78					
Emission Factor		mmscf/hr		N/A		N/A		N/A		N/A		---		0.02235					0.03352					N/A		N/A					
Emission Rate		lb/mmscf		84.00		84.00		84.00		84.00		84.00		84.00					84.00					84.00		84.00					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		1.8772					2.8158					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		1,918.48		465.55					1,396.65					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		0.9592		0.0000					0.6983					N/A		N/A					
Emission Factor		lb/mmscf		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00					120,000.00					120,000.00		120,000.00					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		2,681.7339					4,022.6008					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		2,740,690.35		665,070.00					1,995,210.00					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		1,370.3452		332.5350					997.6050					N/A		N/A					
Emission Factor		lb/mmscf		2.30		2.30		2.30		2.30		2.30		2.30					2.30					2.30		2.30					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		0.0514					0.0771					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		52.53		12.75					38.24					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		0.0263		0.0064					0.0191					N/A		N/A					
Emission Factor		lb/mmscf		2.20		2.20		2.20		2.20		2.20		2.20					2.20					2.20		2.20					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		0.0492					0.0737					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		50.25		12.19					36.58					N/A		N/A					
Emission Factor		tons/time		N/A		N/A		N/A		N/A		0.0251		0.0000					0.0183					N/A		N/A					
Emission Rate		lb/mmscf		0.49		0.49		0.49		0.49		0.49		0.49					0.49					0.49		0.49					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		0.0110					0.0164					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		11.19		2.72					8.15					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		0.0056		0.0000					0.0041					N/A		N/A					
Emission Factor		lb/mmscf		100.00		100.00		100.00		100.00		280.00		100.00					100.00					100.00		100.00					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		2.2348					3.3522					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		2,216.90		554.23					1,662.68					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		1.1085		0.0000					0.8313					N/A		N/A					
Emission Factor		lb/mmscf		7.60		7.60		7.60		7.60		7.60		7.60					7.60					7.60		7.60					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		0.1698					0.2548					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		173.58		42.12					126.36					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		0.0868		0.0211					0.0632					N/A		N/A					
Emission Factor		lb/mmscf		7.60		7.60		7.60		7.60		7.60		7.60					7.60					7.60		7.60					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		0.1698					0.2548					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		173.58		42.12					126.36					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		0.0868		0.0211					0.0632					N/A		N/A					
Emission Factor		lb/mmscf		0.60		0.60		0.60		0.60		0.60		0.60					0.60					0.60		0.60					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		0.0134					0.0201					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		13.70		3.33					9.98					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		0.0069		0.0017					0.0050					N/A		N/A					
Emission Factor		lb/mmscf		5.50		5.50		5.50		5.50		5.50		5.50					5.50					5.50		5.50					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		0.1229					0.1844					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		125.61		30.48					91.45					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		0.0628		0.0152					0.0457					N/A		N/A					
Emission Factor		lb/mmscf		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00					120,730.00					120,730.00		120,730.00					
Emission Rate		lb/hr		N/A		N/A		N/A		N/A		---		2,698.0478					4,047.0716					N/A		N/A					
Emission Rate		lb/time		N/A		N/A		N/A		N/A		2,757,362.88		669,115.84					2,007,347.53					N/A		N/A					
Emission Rate		tons/time		N/A		N/A		N/A		N/A		1,378.6814		334.5579					1,003.6738					N/A		N/A					

2011	Emissions Calculations			August												Total for the Month	
	Area	Units	Building	East Heating Plant			West Heating Plant			Convocation Center		Monsanto Building					
Boiler Information	Boiler Identifier	---	Monsanto 2	1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	Total for the Month
Natural Gas Information	Natural Gas Heating Value	BTU/scf	N/A	0.0	0.0	0.0	0.0	0.0	389.0	0.0	355.0	0.0	N/A	N/A	N/A	N/A	1,010.00
	Total Natural Gas Consumed	therms	6.80	1,949.30	193,000.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	6,433.70	2,424.00	240,000.00	2,424.00	305,509.85
Burner Information	Gas Burner Maximum Input	mmBTU/hr	86.22	120.00	120.00	74,257.43	74,257.43	118,811.88	49,504.95	49,504.95	74,257.43	118,811.88	12,475.25	12,475.25	3,465.35	3,465.35	---
	Gas Burner Fire Rate	scf	3,468.78	0.00000	0.00000	0.00000	0.00000	0.00000	0.02623	0.02623	0.03935	0.06296	N/A	N/A	N/A	N/A	---
CO	Emission Factor	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
	Emission Rate	lb/hr	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	2.2037	2.2037	3.3055	5.2889	N/A	N/A	N/A	N/A	---
CO2	Emission Rate	lb/time	N/A	0.00	0.00	0.00	0.00	0.00	857.24	1,173.46	0.0000	0.0000	N/A	N/A	N/A	N/A	2,540.87
	Emission Factor	tons/time	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.4286	0.5867	0.0000	0.0000	N/A	N/A	N/A	N/A	1.2704
Methane	Emission Rate	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	3,148.1281	3,148.1281	4,722.1921	7,555.5073	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00
	Emission Factor	lb/hr	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	1,224.621.81	1,224.621.81	1,676.378.19	0.00	N/A	N/A	N/A	N/A	---
N2O	Emission Rate	lb/time	N/A	0.00	0.00	0.00	0.00	0.00	22.45	30.73	0.0866	0.1385	N/A	N/A	N/A	N/A	66.55
	Emission Factor	tons/time	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.0112	0.0154	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0333
NH3	Emission Factor	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
	Emission Rate	lb/hr	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.0129	0.0129	0.0193	0.0309	N/A	N/A	N/A	N/A	---
NOx	Emission Rate	lb/time	N/A	0.00	0.00	0.00	0.00	0.00	5.00	6.85	0.0000	0.0000	N/A	N/A	N/A	N/A	14.82
	Emission Factor	tons/time	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.0025	0.0034	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0074
Particulate	Emission Rate	lb/mmmscf	280.00	280.00	280.00	280.00	280.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00
	Emission Factor	lb/hr	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	2.6234	3.9352	17.6295	0.0000	N/A	N/A	N/A	N/A	---
PM10	Emission Rate	lb/time	N/A	0.00	0.00	0.00	0.00	0.00	1,020.52	1,396.98	0.0000	0.0000	N/A	N/A	N/A	N/A	2,935.20
	Emission Factor	tons/time	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.5103	0.6985	0.0000	0.0000	N/A	N/A	N/A	N/A	1.4676
PM2.5	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
	Emission Factor	lb/hr	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.1994	0.1994	0.2991	0.4785	N/A	N/A	N/A	N/A	---
SO2	Emission Rate	lb/time	N/A	0.00	0.00	0.00	0.00	0.00	77.56	106.17	0.0000	0.0000	N/A	N/A	N/A	N/A	229.89
	Emission Factor	tons/time	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.0388	0.0531	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1149
VOC	Emission Rate	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	Emission Factor	lb/hr	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.0157	0.0236	0.0378	0.0378	N/A	N/A	N/A	N/A	---
CO2E	Emission Rate	lb/time	N/A	0.00	0.00	0.00	0.00	0.00	6.12	8.38	0.0000	0.0000	N/A	N/A	N/A	N/A	18.15
	Emission Factor	tons/time	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.0031	0.0042	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0091
CO2E	Emission Rate	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	3,167.2792	3,167.2792	4,750.9187	7,601.4700	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00
	Emission Factor	lb/hr	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	1,232.071.59	1,686.576.16	0.0000	0.0000	N/A	N/A	N/A	N/A	---
CO2E	Emission Rate	lb/time	N/A	0.00	0.00	0.00	0.00	0.00	616.0358	843.2881	0.0000	0.0000	N/A	N/A	N/A	N/A	3,651,901.41
	Emission Factor	tons/time	N/A	0.0000	0.0000	0.0000	0.0000	0.0000	0.2823	0.3881	0.0000	0.0000	N/A	N/A	N/A	N/A	1,825.9507



2011	Emissions Calculations				Units	September											Total for the Month		
	Area	East Heating Plant				West Heating Plant			Convocation Center		Monsanto Building		Monsanto 1	Monsanto 2	1E	2E			
		1E	2E	3E		4E	5E	1W	2W	3W	4W	Conv 1					Conv 2	Month	
Boiler Information	Boiler Identifier	---											1E	2E					
	Boiler Runtime	hrs											0.0	0.0	0.0	0.0			
	Natural Gas Heating Value	1,010.00											1,011.00						
Natural Gas Information	Total Natural Gas Consumed	0.00											432,046.68						
		0.00											42,734,587.54						
Burner Information	Gas Burner Maximum Input	120.00	120.00	75.00	75.00	120.00	120.00	75.00	75.00	120.00	120.00	50.00	50.00	75.00	120.00	120.00	120.00	120.00	
	Gas Burner Fire Rate	118,811.88	118,811.88	74,257.43	74,257.43	118,811.88	118,811.88	74,257.43	74,257.43	118,811.88	118,811.88	49,504.95	49,504.95	74,257.43	120,000.00	120,000.00	118,694.36	118,694.36	
	Emission Factor	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.02713	0.02713	0.04069	0.06511	0.06511	0.00000	0.00000	
CO	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
CO2	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.56	4.56	2,461.01	0.0000	0.0000	0.0000	0.0000	0.0000	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0023	0.0023	1.2305	0.0000	0.0000	0.0000	0.0000	0.0000	
Methane	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3,255.3050	3,255.3050	4,882.9575	7,812.7320	7,812.7320	0.0000	0.0000	0.0000	
N2O	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,510.61	0.00	3,515,729.39	0.0000	0.0000	0.0000	0.0000	0.0000	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.2553	0.0000	1,757.8647	0.0000	0.0000	0.0000	0.0000	0.0000	
NH3	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0624	0.0624	0.0936	0.1497	0.1497	0.0000	0.0000	0.0000	
NOx	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	67.38	0.00	0.00	0.00	0.00	0.00	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0337	0.0000	0.0000	0.0000	0.0000	0.0000	
Particulate	lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0597	0.0597	0.0895	0.1432	0.1432	0.0000	0.0000	0.0000	
PM10	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	64.46	0.0000	0.0000	0.0000	0.0000	0.0000	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0322	0.0000	0.0000	0.0000	0.0000	0.0000	
SO2	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0133	0.0133	0.0199	0.0319	0.0319	0.0000	0.0000	0.0000	
VOC	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	14.36	0.00	0.00	0.00	0.00	0.00	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0072	0.0000	0.0000	0.0000	0.0000	0.0000	
CO2E	lb/mmmscf	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.7128	2.7128	4.0691	18.2297	18.2297	0.0000	0.0000	0.0000	
Emissions Data	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	5.43	0.00	2,929.77	0.00	0.00	0.00	0.00	0.00	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0027	0.0000	1.4649	0.0000	0.0000	0.0000	0.0000	0.0000	
PM2.5	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2062	0.2062	0.3093	0.4948	0.4948	0.0000	0.0000	0.0000	
SO2	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.41	0.00	222.66	0.00	0.00	0.00	0.00	0.00	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.1113	0.0000	0.0000	0.0000	0.0000	0.0000	
VOC	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.2062	0.2062	0.3093	0.4948	0.4948	0.0000	0.0000	0.0000	
CO2E	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	17.58	0.00	0.00	0.00	0.00	0.00	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0088	0.0000	0.0000	0.0000	0.0000	0.0000	
CO2E	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1492	0.1492	0.2238	0.3581	0.3581	0.0000	0.0000	0.0000	
CO2E	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.30	0.00	161.14	0.00	0.00	0.00	0.00	0.00	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000	0.0806	0.0000	0.0000	0.0000	0.0000	0.0000	
CO2E	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	
	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3,275.1081	3,275.1081	4,912.6621	7,860.2594	7,860.2594	0.0000	0.0000	0.0000	
CO2E	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	6,550.22	0.00	3,537,116.74	0.00	0.00	0.00	0.00	0.00	
	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.2751	0.0000	1,768.5584	0.0000	0.0000	0.0000	0.0000	0.0000	







2012	Emissions Calculations							Units		Yearly Total (Summation)												Total for the Month
	Boiler Information	Area	East Heating Plant				West Heating Plant				Convocation Center		Monsanto Building		Monsanto 1	Monsanto 2	Total for the Month					
			1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2									
			1,939,591.65				3,505,020.50				120,580.44		84,075.74									
	Boiler Runtime	1,158.0	1,188.0	714.0	268.0	637.0	851.0	3,038.0	2,811.0	2,660.0	525.0	525.0	1,200.0	1,200.0								
Natural Gas Information	Natural Gas Heating Value																1,011.58					
	Total Natural Gas Consumed	1,158.0	1,188.0	714.0	268.0	637.0	851.0	3,038.0	2,811.0	2,660.0	525.0	525.0	1,200.0	1,200.0			84,075.74					
Burner Information	Gas Burner Maximum Input	118,625.92	118,625.92	74,141.20	75.00	120.00	50.00	49,427.47	74,141.20	118,625.92	12.60	12.60	3,459.92	3,459.92			85,640,886.25					
	Gas Burner Fire Rate	0.05332	0.05332	0.03333	0.03333	0.05332	0.02391	0.02391	0.03332	0.02391	0.01135	0.01135	0.00346	0.00346								
CO	Emission Factor	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00			84.00					
	Emission Rate	4,675.0	5,069.0	3,021.6	3,267.5	0.0000	1,909.2	5,083.5	0.0000	1,909.2	5,083.5	0.9534	0.9534	0.2909	0.2909		---					
	Emission Factor	5,413.62	6,021.98	2,157.39	875.68	1,640.84	1,852.88	7,922.40	13,522.01	0.0000	1,909.2	5,083.5	0.9534	0.9534	0.2909	0.2909		---				
CO2	Emission Rate	2,706.8	3,011.0	1,078.7	0.4378	0.8204	0.9264	3,961.2	6,761.0	0.2503	0.2503	0.1745	0.1745	0.1745	0.1745		3,596.9					
	Emission Factor	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00			120,000.00					
	Emission Rate	6,678.5380	7,241.4379	4,316.5132	4,667.8209	0.0000	3,110.4228	7,272.4700	0.0000	3,110.4228	7,272.4700	1,362.0571	1,362.0571	415.5416	415.5416		---					
Methane	Emission Rate	7,733,746.98	8,602,828.26	3,081,990.41	1,250,976.01	2,344,058.34	2,646,969.81	8,286,053.81	11,317,712.75	19,317,154.19	715,080.00	715,080.00	498,649.95	498,649.95			10,276,906.35					
	Emission Factor	3,866.8735	4,301.4141	1,540.9952	625.4880	1,172.0292	1,323.4849	4,143.0269	5,658.8564	9,658.5771	357.5400	357.5400	249.3250	249.3250			5,138.4532					
	Emission Rate	0.1280	0.1388	0.0827	0.0895	0.0000	0.0596	0.0523	0.0000	0.0523	0.1392	0.0261	0.0261	0.0080	0.0080		2.30					
N2O	Emission Rate	148.23	164.89	59.07	23.98	44.93	50.73	158.82	216.92	370.25	13.71	13.71	9.56	9.56			196.97					
	Emission Factor	0.0741	0.0824	0.0295	0.0120	0.0225	0.0254	0.0794	0.1085	0.1851	0.0069	0.0069	0.0048	0.0048			0.0985					
	Emission Rate	0.1224	0.1328	0.0791	0.0856	0.0000	0.0570	0.0500	0.0000	0.1331	0.0250	0.0250	0.0076	0.0076			2.20					
NH3	Emission Rate	141.79	157.72	56.50	22.93	42.97	48.53	151.91	207.49	354.15	13.11	13.11	9.14	9.14			188.41					
	Emission Factor	0.0709	0.0789	0.0283	0.0115	0.0215	0.0243	0.0760	0.1037	0.1771	0.0066	0.0066	0.0046	0.0046			0.0942					
	Emission Rate	0.0273	0.0296	0.0176	0.0191	0.0000	0.0127	0.0111	0.0000	0.0297	0.0056	0.0056	0.0017	0.0017			0.49					
NOx	Emission Rate	31.58	35.13	12.58	5.11	9.57	10.81	33.83	46.21	78.88	2.92	2.92	2.04	2.04			41.96					
	Emission Factor	0.0158	0.0176	0.0063	0.0026	0.0048	0.0054	0.0169	0.0231	0.0394	0.0015	0.0015	0.0010	0.0010			0.0210					
	Emission Rate	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00			280.00					
Particulate	Emission Rate	15.5833	16.8967	3.5971	3.8899	0.0000	2.5920	2.2729	0.0000	16.9449	1.1350	1.1350	0.3463	0.3463			---					
	Emission Factor	18,045.41	20,073.27	2,568.33	1,042.48	5,469.47	2,205.81	6,905.04	9,431.43	45,073.36	595.90	595.90	415.54	415.54			17,068.64					
	Emission Rate	9.0227	10.0366	1.2842	0.5212	2.7347	1.1029	3.4525	4.7157	22.5367	0.2980	0.2980	0.2078	0.2078			8.5343					
PM10	Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			7.60					
	Emission Factor	0.4230	0.4586	0.2734	0.2956	0.0000	0.1970	0.1727	0.0000	0.4599	0.0863	0.0863	0.0263	0.0263			---					
	Emission Rate	489.80	544.85	195.19	79.23	148.46	167.64	524.78	716.79	1,223.42	45.29	45.29	31.58	31.58			650.87					
PM2.5	Emission Rate	0.2449	0.2724	0.0976	0.0396	0.0742	0.0838	0.2624	0.3584	0.6117	0.0226	0.0226	0.0158	0.0158			0.3254					
	Emission Factor	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			7.60					
	Emission Rate	423.0	458.6	273.4	295.6	0.0000	197.0	172.7	0.0000	459.9	86.3	86.3	26.3	26.3			650.87					
SO2	Emission Rate	489.80	544.85	195.19	79.23	148.46	167.64	524.78	716.79	1,223.42	45.29	45.29	31.58	31.58			650.87					
	Emission Factor	0.2449	0.2724	0.0976	0.0396	0.0742	0.0838	0.2624	0.3584	0.6117	0.0226	0.0226	0.0158	0.0158			0.3254					
	Emission Rate	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60			0.60					
VOC	Emission Rate	38.67	43.01	15.41	6.25	11.72	13.23	41.43	56.59	96.59	3.58	3.58	2.49	2.49			51.38					
	Emission Factor	0.0193	0.0215	0.0077	0.0031	0.0059	0.0066	0.0207	0.0283	0.0483	0.0018	0.0018	0.0012	0.0012			0.0257					
	Emission Rate	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50			5.50					
CO2E	Emission Rate	3,071.24	3,544.6	1,412.6	573.4	1,074.4	1,213.2	3,797.8	5,187.3	8,853.7	327.7	327.7	228.5	228.5			471.02					
	Emission Factor	0.1772	0.1971	0.0706	0.0287	0.0537	0.0607	0.1899	0.2594	0.4427	0.0164	0.0164	0.0114	0.0114			0.2355					
	Emission Rate	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00			120,730.00					
Total	Emission Rate	67,416,588.24	7,780,793.94	8,655,162.13	3,100,739.19	1,258,586.11	2,358,318.03	2,663,072.21	8,336,460.64	11,386,562.17	19,434,666.88	719,430.07	719,430.07	501,683.40	501,683.40			10,339,424.20				
	Emission Factor	33,708.2941	4,327.5811	1,550.3696	629.2931	1,179.1590	1,331.5361	4,168.2303	5,693.2811	9,717.3334	359.7150	359.7150	250.8417	250.8417			5,169.7121					
	Emission Rate	3,890.3970	4,327.5811	1,550.3696	629.2931	1,179.1590	1,331.5361	4,168.2303	5,693.2811	9,717.3334	359.7150	359.7150	250.8417	250.8417			5,169.7121					



2012		Emissions Calculations		Units	February														Total for the Month				
Boiler Information	Area	West Heating Plant												Convocation Center		Monsanto Building		East Heating Plant					
		Last Heating Plant		3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E					
Boiler Runtime	Boiler Identifier	hrs	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	N/A	N/A	216.0	N/A	N/A	N/A	0.0	0.0	0.0	0.0		
Natural Gas Information		BTU/scf	1,011.00														1,011.00						
Total Natural Gas Consumed		therms	277,741.92														487,032.96						
Burner Information		scf	27,472,000.00														48,173,388.72						
CO	Gas Burner Maximum Input	mmBTU/hr	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00	118,694.36	118,694.36	0.00000	0.00000		
	Gas Burner Fire Rate	scf	0.03501	0.03501	0.05602	0.03053	0.03053	0.04579	0.07327	N/A	N/A	N/A	N/A	84.00	84.00	84.00	84.00	0.00000	0.00000	0.00000	0.00000		
CO2	Emission Factor	lb/mmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00		
	Emission Rate	lb/hr	2.9412	2.9412	4.7059	2.5643	2.5643	3.8465	6.1544	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		
Methane	Emission Factor	lb/mmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			
N2O	Emission Factor	lb/mmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20			
	Emission Rate	lb/hr	0.0770	0.0770	0.1233	0.0672	0.0672	0.1007	0.1612	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			
NH3	Emission Factor	lb/mmscf	0.0000	0.0000	0.0000	0.0020	0.0000	0.0000	0.0174	N/A	N/A	N/A	N/A	0.49	0.49	0.49	0.49	0.49	0.49				
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000				
NOx	Emission Factor	lb/mmscf	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	280.00	280.00	280.00	280.00				
	Emission Rate	lb/hr	3.5014	3.5014	15.6864	3.0528	3.0528	4.5792	20.5147	N/A	N/A	N/A	N/A	20.5147	20.5147	20.5147	20.5147	20.5147	20.5147				
Particulate	Emission Factor	lb/mmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4923	N/A	N/A	N/A	N/A	2.2156	2.2156	2.2156	2.2156	2.2156	2.2156				
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.4923	N/A	N/A	N/A	N/A	0.4923	0.4923	0.4923	0.4923	0.4923	0.4923				
PM10	Emission Factor	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60				
	Emission Rate	lb/hr	0.2661	0.2661	0.4258	0.2320	0.2320	0.3480	0.5568	N/A	N/A	N/A	N/A	0.5568	0.5568	0.5568	0.5568	0.5568	0.5568				
PM2.5	Emission Factor	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60				
	Emission Rate	lb/hr	0.2661	0.2661	0.4258	0.2320	0.2320	0.3480	0.5568	N/A	N/A	N/A	N/A	0.5568	0.5568	0.5568	0.5568	0.5568	0.5568				
SO2	Emission Factor	lb/mmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60				
	Emission Rate	lb/hr	0.0210	0.0210	0.0336	0.0183	0.0183	0.0275	0.0440	N/A	N/A	N/A	N/A	0.0440	0.0440	0.0440	0.0440	0.0440	0.0440				
VOC	Emission Factor	lb/mmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50				
	Emission Rate	lb/hr	0.1926	0.1926	0.3081	0.1679	0.1679	0.2519	0.4030	N/A	N/A	N/A	N/A	0.4030	0.4030	0.4030	0.4030	0.4030	0.4030				
CO2E	Emission Factor	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00					
	Emission Rate	lb/hr	4,227.2649	4,227.2649	6,763.6239	3,685.6257	3,685.6257	5,528.4385	8,845.5017	N/A	N/A	N/A	N/A	8,845.5017	8,845.5017	8,845.5017	8,845.5017	8,845.5017					
		lb/time	0.00	0.00	0.00	217,451.92	0.00	0.00	1,188,614.29	1,910,628.36	N/A	N/A	N/A	1,910,628.36	1,910,628.36	1,910,628.36	1,910,628.36	1,910,628.36					
		tons/time	0.0000	0.0000	0.0000	108.7260	0.0000	0.0000	594.3071	955.3142	N/A	N/A	N/A	955.3142	955.3142	955.3142	955.3142	955.3142					

2012				March																				Total for the Month	East Heating Plant					AJ				
Emissions Calculations				Units				West Heating Plant												Convocation Center				Monsanto Building				Total for the Month	East Heating Plant					AJ
Boiler Information				Area	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W															
Boiler Identifier				---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---											
Boiler Runtime				hrs	0.0	18.0	508.0	458.0	N/A	N/A	N/A	N/A	N/A	361.0	0.0	0.0	0.0	0.0	0.0	1W	23.0													
Natural Gas Heating Value				BTU/scf	1,011.00																				1,011.00									
Total Natural Gas Consumed				therms	8,836.14																				8,836.14									
				scf	46,525,000.00																				46,525,000.00									
Gas Burner Maximum Input				mmBTU/hr	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	120.00	75.00	120.00	120.00	50.00														
Gas Burner Fire Rate				scf	118,694.36	49,455.98	49,455.98	74,183.98	118,694.36	12,462.91	12,462.91	3,461.92	3,461.92	118,694.36	118,694.36	118,694.36	74,183.98	118,694.36	118,694.36	49,455.98														
Emission Factor				mmscf/hr	0.00000	0.02476	0.02476	0.03714	0.05942	N/A	N/A	N/A	N/A	0.06087	0.06087	0.06087	0.03805	0.06087	0.06087	0.02486														
Emission Rate				lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00														
Emission Rate				lb/hr	0.0000	2.0797	2.0797	3.1195	4.9912	N/A	N/A	N/A	N/A	N/A	5.1133	5.1133	5.1133	3.1958	5.1133	5.1133														
Emission Rate				lb/time	0.00	0.00	37.43	1,584.70	2,285.96	N/A	N/A	N/A	N/A	N/A	1,845.90	1,845.90	1,845.90	0.00	1,845.90	1,845.90														
Emission Rate				tons/time	0.0000	0.0000	0.0187	0.7924	1.1430	N/A	N/A	N/A	N/A	N/A	0.9230	0.9230	0.9230	0.0000	0.9230	0.9230														
Emission Rate				lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00														
Emission Rate				lb/hr	2,970.9451	2,970.9451	4,456.4176	7,130.2682	N/A	N/A	N/A	N/A	N/A	N/A	7,304.7091	7,304.7091	7,304.7091	4,565.4432	7,304.7091	7,304.7091														
Emission Rate				lb/time	0.00	53,477.01	2,263,860.15	3,265,662.84	N/A	N/A	N/A	N/A	N/A	N/A	2,637,000.00	2,637,000.00	2,637,000.00	0.00	2,637,000.00	2,637,000.00														
Emission Rate				tons/time	0.0000	26.7385	1,131.9301	1,632.8314	N/A	N/A	N/A	N/A	N/A	N/A	1,318.5000	1,318.5000	1,318.5000	0.0000	1,318.5000	1,318.5000														
Emission Rate				lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30														
Emission Rate				lb/hr	0.0000	0.0569	0.0569	0.0854	0.1367	N/A	N/A	N/A	N/A	N/A	0.1400	0.1400	0.1400	0.0875	0.1400	0.1400														
Emission Rate				lb/time	0.00	0.00	1.02	43.39	62.59	N/A	N/A	N/A	N/A	N/A	50.54	50.54	50.54	0.00	50.54	50.54														
Emission Rate				tons/time	0.0000	0.0000	0.0005	0.0217	0.0313	N/A	N/A	N/A	N/A	N/A	0.0253	0.0253	0.0253	0.0000	0.0253	0.0253														
Emission Rate				lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20														
Emission Rate				lb/hr	0.0000	0.0545	0.0545	0.0817	0.1307	N/A	N/A	N/A	N/A	N/A	0.1339	0.1339	0.1339	0.0837	0.1339	0.1339														
Emission Rate				lb/time	0.00	0.98	41.50	59.87	N/A	N/A	N/A	N/A	N/A	N/A	48.35	48.35	48.35	0.00	48.35	48.35														
Emission Rate				tons/time	0.0000	0.0005	0.0208	0.0299	N/A	N/A	N/A	N/A	N/A	N/A	0.0242	0.0242	0.0242	0.0000	0.0242	0.0242														
Emission Rate				lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49														
Emission Rate				lb/hr	0.0000	0.0121	0.0121	0.0182	0.0291	N/A	N/A	N/A	N/A	N/A	0.0298	0.0298	0.0298	0.0186	0.0298	0.0298														
Emission Rate				lb/time	0.00	0.00	0.22	9.24	13.33	N/A	N/A	N/A	N/A	N/A	10.77	10.77	10.77	0.00	10.77	10.77														
Emission Rate				tons/time	0.0000	0.0001	0.0046	0.0067	N/A	N/A	N/A	N/A	N/A	N/A	0.0054	0.0054	0.0054	0.0000	0.0054	0.0054														
Emission Rate				lb/mmmscf	280.00	100.00	100.00	280.00	280.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	280.00	100.00	280.00	280.00														
Emission Rate				lb/hr	0.0000	2.4758	2.4758	3.7137	16.6373	N/A	N/A	N/A	N/A	N/A	17.0443	17.0443	17.0443	3.8045	17.0443	17.0443														
Emission Rate				lb/time	0.00	44.56	1,886.55	7,619.88	N/A	N/A	N/A	N/A	N/A	N/A	6,153.00	6,153.00	6,153.00	0.00	6,153.00	6,153.00														
Emission Rate				tons/time	0.0000	0.0223	0.9433	3.8099	N/A	N/A	N/A	N/A	N/A	N/A	3.0765	3.0765	3.0765	0.0000	3.0765	3.0765														
Emission Rate				lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60														
Emission Rate				lb/hr	0.0000	0.1882	0.1882	0.2822	0.4516	N/A	N/A	N/A	N/A	N/A	0.4626	0.4626	0.4626	0.2891	0.4626	0.4626														
Emission Rate				lb/time	0.00	3.39	143.38	206.83	206.83	N/A	N/A	N/A	N/A	N/A	167.01	167.01	167.01	0.00	167.01	167.01														
Emission Rate				tons/time	0.0000	0.0017	0.0717	0.1034	0.1034	N/A	N/A	N/A	N/A	N/A	0.0835	0.0835	0.0835	0.0000	0.0835	0.0835														
Emission Rate				lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60														
Emission Rate				lb/hr	0.0000	0.1882	0.1882	0.2822	0.4516	N/A	N/A	N/A	N/A	N/A	0.4626	0.4626	0.4626	0.2891	0.4626	0.4626														
Emission Rate				lb/time	0.00	3.39	143.38	206.83	206.83	N/A	N/A	N/A	N/A	N/A	167.01	167.01	167.01	0.00	167.01	167.01														
Emission Rate				tons/time	0.0000	0.0017	0.0717	0.1034	0.1034	N/A	N/A	N/A	N/A	N/A	0.0835	0.0835	0.0835	0.0000	0.0835	0.0835														
Emission Rate				lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60														
Emission Rate				lb/hr	0.0000	0.1882	0.1882	0.2822	0.4516	N/A	N/A	N/A	N/A	N/A	0.4626	0.4626	0.4626	0.2891	0.4626	0.4626														
Emission Rate				lb/time	0.00	3.39	143.38	206.83	206.83	N/A	N/A	N/A	N/A	N/A	167.01	167.01	167.01	0.00	167.01	167.01														
Emission Rate				tons/time	0.0000	0.0017	0.0717	0.1034	0.1034	N/A	N/A	N/A	N/A	N/A	0.0835	0.0835	0.0835	0.0000	0.0835	0.0835														
Emission Rate				lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60														
Emission Rate				lb/hr	0.0000	0.0149	0.0149	0.0223	0.0357	N/A	N/A	N/A	N/A	N/A	0.0365	0.0365	0.0365	0.0228	0.0365	0.0365														
Emission Rate				lb/time	0.00	0.27	11.32	16.33	16.33	N/A	N/A	N/A	N/A	N/A	13.19	13.19	13.19	0.00	13.19	13.19														
Emission Rate				tons/time	0.0000	0.0001	0.0057	0.0082	0.0082	N/A	N/A	N/A	N/A	N/A	0.0066	0.0066	0.0066	0.0000	0.0066	0.0066														
Emission Rate				lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50														
Emission Rate				lb/hr	0.0000	0.1362	0.1362	0.2043	0.3268	N/A	N/A	N/A	N/A	N/A	0.3348	0.3348	0.3348	0.2092	0.3348	0.3348														
Emission Rate				lb/time	0.00	0.00	2.45	103.76	149.68	N/A	N/A	N/A	N/A	N/A	120.86	120.86	120.86	0.00	120.86	120.86														
Emission Rate				tons/time	0.0000	0.0000	0.0012	0.0519	0.0748	N/A	N/A	N/A	N/A	N/A	0.0604	0.0604	0.0604	0.0000	0.0604	0.0604														
Emission Rate				lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00														
Emission Rate				lb/hr	0.0000	2,989.0183	2,989.0183	4,483.5275	7,173.6440	N/A	N/A	N/A	N/A	N/A	7,349.1461	7,349.1461	7,349.1461	4,593.2163	7,349.1461	7,349.1461														
Emission Rate				lb/time	0.00	53,802.33	2,277.631.97	3,285,528.95	N/A	N/A	N/A	N/A	N/A	N/A	2,653,041.75	2,653,041.75	2,653,041.75	0.00	2,653,041.75	2,653,041.75														
Emission Rate				tons/time	0.0000	0.0000	1.138.8160	1,642.7645	N/A	N/A	N/A	N/A	N/A	N/A	1,326.5209	1,326.5209	1,326.5209	0.0000	1,326.5209	1,326.5209														



2012		Emissions Calculations					April	Units					Total for the Month	May																			
		Area		West Heating Plant			Convocation Center		Monsanto Building		Monsanto 1		Monsanto 2				East Heating Plant			West Heating Plant													
Boiler Information		Boiler Identifier		2W		3W		4W		Convo 1		Convo 2		Monsanto 1		Monsanto 2		1E		2E		3E		4E		5E		1W		2W		3W	
		Boiler Runtime		73.0		51.0		285.0		N/A		N/A		N/A		N/A		156.0		0.0		63.0		0.0		51.0		0.0		52.0		377.0	
Natural Gas Information		Natural Gas Heating Value		1,011.00		215,252.01		8,694.60		6,981.82				1,011.00				104,658.72		170,960.99		16,910,088.03											
		Total Natural Gas Consumed		21,291,000.00		860,000.00		690,585.56		285,801.32		28,269,171.12						10,352,000.00															
Burner Information		Gas Burner Maximum Input		50.00		75.00		120.00		12.60		12.60		3.50		3.50		120.00		75.00		120.00		75.00		120.00		50.00		50.00			
		Gas Burner Fire Rate		49,455.98		74,183.98		118,694.36		12,462.91		12,462.91		3,461.92		3,461.92		118,694.36		74,183.98		118,694.36		74,183.98		118,694.36		49,455.98		49,455.98			
		Emission Factor		0.02486		0.03729		0.05966		N/A		N/A		N/A		N/A		0.04202		0.02626		0.04202		0.02300		0.04202		0.02300		0.03451			
CO		Emission Factor		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00			
		Emission Rate		2,088.1		3,132.1		5,011.4		N/A		N/A		N/A		N/A		N/A		3,529.4		2,205.9		3,529.4		2,205.9		3,529.4		1,932.3		2,898.5	
		Emission Rate		152.43		159.74		1,428.25		N/A		N/A		N/A		N/A		N/A		138.97		0.00		180.00		0.00		100.48		1,092.73			
		Emission Factor		0.0762		0.0799		0.7141		N/A		N/A		N/A		N/A		N/A		0.0695		0.0000		0.0900		0.0000		0.0502		0.5464			
CO2		Emission Factor		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00			
		Emission Rate		2,982.9772		4,474.4658		7,159.1454		N/A		N/A		N/A		N/A		N/A		5,042.0700		3,151.2938		5,042.0700		3,151.2938		5,042.0700		2,760.4551		4,140.6827	
		Emission Factor		217,757.34		228,197.76		2,040,356.43		N/A		N/A		N/A		N/A		N/A		786,562.92		198,531.51		257,145.57		0.00		143,543.67		1,561,037.37			
		Emission Rate		108.8787		114.0989		1,020.1782		N/A		N/A		N/A		N/A		N/A		393.2815		99.2658		128.5728		0.0000		71.7718		780.5187			
Methane		Emission Factor		2.30		2.30		2.30		2.30		2.30		2.30		2.30		2.30		2.30		2.30		2.30		2.30		2.30		2.30			
		Emission Rate		0.0572		0.0858		0.1372		N/A		N/A		N/A		N/A		N/A		0.0966		0.0604		0.0966		0.0529		0.0529		0.0794			
		Emission Rate		4.17		4.37		39.11		N/A		N/A		N/A		N/A		N/A		15.08		0.00		4.93		0.00		2.75		29.92			
		Emission Factor		0.0021		0.0022		0.0196		N/A		N/A		N/A		N/A		N/A		0.0075		0.0000		0.0025		0.0000		0.0014		0.0150			
N2O		Emission Factor		2.20		2.20		2.20		2.20		2.20		2.20		2.20		2.20		2.20		2.20		2.20		2.20		2.20		2.20			
		Emission Rate		0.0547		0.0820		0.1313		N/A		N/A		N/A		N/A		N/A		0.0924		0.0578		0.0924		0.0506		0.0506		0.0759			
		Emission Rate		3.99		4.18		37.41		N/A		N/A		N/A		N/A		N/A		14.42		0.00		4.71		0.00		2.63		28.62			
		Emission Factor		0.0020		0.0021		0.0187		N/A		N/A		N/A		N/A		N/A		0.0072		0.0000		0.0024		0.0000		0.0013		0.0143			
NH3		Emission Factor		0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49			
		Emission Rate		0.0122		0.0183		0.0292		N/A		N/A		N/A		N/A		N/A		0.0206		0.0129		0.0206		0.0113		0.0113		0.0169			
		Emission Rate		0.89		0.93		8.33		N/A		N/A		N/A		N/A		N/A		3.21		0.00		1.05		0.00		0.59		6.37			
		Emission Factor		0.0004		0.0005		0.0042		N/A		N/A		N/A		N/A		N/A		0.0016		0.0000		0.0005		0.0000		0.0003		0.0032			
NOx		Emission Factor		100.00		100.00		100.00		100.00		100.00		100.00		100.00		100.00		280.00		280.00		280.00		280.00		100.00		100.00			
		Emission Rate		2.4858		3.7287		16.7047		N/A		N/A		N/A		N/A		N/A		11.7648		2.6261		11.7648		2.3004		2.3004		3.4506			
		Emission Rate		181.46		190.16		4,760.83		N/A		N/A		N/A		N/A		N/A		1,835.31		165.44		600.01		0.00		119.62		1,300.86			
		Emission Factor		0.0907		0.0951		2.3804		N/A		N/A		N/A		N/A		N/A		0.9177		0.0827		0.3000		0.0000		0.0598		0.6504			
Emissions Data		Emission Factor		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60			
		Emission Rate		0.1889		0.2834		0.4534		N/A		N/A		N/A		N/A		N/A		0.3193		0.1996		0.3193		0.1748		0.1748		0.2622			
		Emission Rate		13.79		14.45		129.22		N/A		N/A		N/A		N/A		N/A		49.82		12.57		16.29		0.00		9.09		98.87			
		Emission Factor		0.0069		0.0072		0.0646		N/A		N/A		N/A		N/A		N/A		0.0249		0.0063		0.0081		0.0000		0.0045		0.0494			
PM10		Emission Factor		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60			
		Emission Rate		0.1889		0.2834		0.4534		N/A		N/A		N/A		N/A		N/A		0.3193		0.1996		0.3193		0.1748		0.1748		0.2622			
		Emission Rate		13.79		14.45		129.22		N/A		N/A		N/A		N/A		N/A		49.82		12.57		16.29		0.00		9.09		98.87			
		Emission Factor		0.0069		0.0072		0.0646		N/A		N/A		N/A		N/A		N/A		0.0249		0.0063		0.0081		0.0000		0.0045		0.0494			
PM2.5		Emission Factor		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60			
		Emission Rate		0.1889		0.2834		0.4534		N/A		N/A		N/A		N/A		N/A		0.3193		0.1996		0.3193		0.1748		0.1748		0.2622			
		Emission Rate		13.79		14.45		129.22		N/A		N/A		N/A		N/A		N/A		49.82		12.57		16.29		0.00		9.09		98.87			
		Emission Factor		0.0069		0.0072		0.0646		N/A		N/A		N/A		N/A		N/A		0.0249		0.0063		0.0081		0.0000		0.0045		0.0494			
SO2		Emission Factor		0.60		0.60		0.60		0.60		0.60		0.60		0.60		0.60		0.60		0.60		0.60		0.60		0.60					
		Emission Rate		0.0149		0.0224		0.0358		N/A		N/A		N/A		N/A		N/A		0.0252		0.0158		0.0252		0.0138		0.0207					
		Emission Rate		1.09		1.14		10.20		N/A		N/A		N/A		N/A		N/A		3.93		0.99		1.29		0.00		0.72		7.81			
		Emission Factor		0.0005		0.0006		0.0051		N/A		N/A		N/A		N/A		N/A		0.0020		0.0005		0.0006		0.0000		0.0004		0.0039			
VOC		Emission Factor		5.50		5.50		5.50		5.50		5.50		5.50		5.50		5.50		5.50		5.50		5.50		5.50		5.50					
		Emission Rate		0.1367		0.2051		0.3281		N/A		N/A		N/A		N/A		N/A		0.2311		0.1444		0.2311		0.1265		0.1265					
		Emission Rate		9.98		10.46		93.52		N/A		N/A		N/A		N/A		N/A		36.05		9.10		11.79		0.00		6.58					
		Emission Factor		0.0050		0.0052		0.0468		N/A		N/A		N/A		N/A		N/A		0.0180		0.0045		0.0059		0.0000		0.0033		0.0358			
CO2e		Emission Factor		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00					
		Emission Rate		3,001.1237		4,501.6855		7,202.6968		N/A		N/A		N/A		N/A		N/A		5,072.7426		3,170.4641		5,072.7426		2,777.2479		2,777.2479					
		Emission Rate		219,082.03		229,585.96		2,052,768.60		N/A		N/A		N/A		N/A		N/A		791,347.85		199,739.24		258,709.87		0.00		144,416.89		1,570,533.68			
		Emission Factor		109.5410		114.7930		1,026.3843		N/A		N/A		N/A		N/A		N/A		395.6739		99.8696		129.3549		0							



2012	Emissions Calculations				Units		July											
	Area	Monsanto Building		Ion Center	Total for the Month		East Heating Plant			West Heating Plant			Convocation Center		Monsanto			
Boiler Information	Boiler Identifier	Monsanto 1	Monsanto 2	Convo 2	Month	Month	1E	2E	3E	4E	5E	1W	2W	3W	4W	Convo 1	Convo 2	Monsanto 1
	Boiler Runtime	N/A	N/A	N/A	hrs	---	0.0	0.0	0.0	0.0	219.0	360.0	165.0	0.0	0.0	N/A	N/A	N/A
Natural Gas Information	Natural Gas Heating Value	2,652.69		2.82	BTU/scf	1,011.00	1,011.00											
	Total Natural Gas Consumed	262,382.79		00.00	therms	193,396.09	139,396.68											
Burner Information	Gas Burner Maximum Input	3.50	3.50	12.60	mmBTU/hr	---	120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50
	Gas Burner Fire Rate	3,461.92	3,461.92	12,462.91	scf	---	118,694.36	118,694.36	74,183.98	74,183.98	118,694.36	49,455.98	49,455.98	74,183.98	118,694.36	12,462.91	12,462.91	3,461.92
CO	Emission Factor	84.00	84.00	84.00	mmscf/hr	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
	Emission Rate	N/A	N/A	N/A	lb/hr	---	1,787.0	1,787.0	1,116.9	1,116.9	1,787.0	2,206.1	2,206.1	3,309.1	3,309.1	5,294.6	5,294.6	N/A
CO2	Emission Factor	120,000.00	120,000.00	120,000.00	tons/time	0.8034	0.0000	0.0000	0.0000	0.0000	0.1957	0.3971	0.1820	0.0000	0.0000	0.0000	0.0000	N/A
	Emission Rate	N/A	N/A	N/A	lb/hr	---	2,552.8767	2,552.8767	1,595.5479	1,595.5479	2,552.8767	3,151.5429	3,151.5429	4,727.3143	4,727.3143	7,563.7029	7,563.7029	N/A
Methane	Emission Factor	2.30	2.30	2.30	lb/mmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
	Emission Rate	N/A	N/A	N/A	lb/hr	42.08	0.0000	0.0000	0.0000	0.0000	0.0468	0.0578	0.0578	0.0578	0.0867	0.1387	0.1387	N/A
NH3	Emission Factor	0.49	0.49	0.49	tons/time	0.0210	0.0000	0.0000	0.0000	0.0051	0.0051	0.0104	0.0048	0.0000	0.0000	0.0000	0.0000	N/A
	Emission Rate	N/A	N/A	N/A	lb/hr	---	0.0104	0.0104	0.0065	0.0065	0.0104	0.0129	0.0129	0.0129	0.0193	0.0309	0.0309	N/A
NOx	Emission Factor	100.00	100.00	100.00	tons/time	0.0047	0.0000	0.0000	0.0000	0.0011	0.0011	0.0023	0.0011	0.0000	0.0000	0.0000	0.0000	N/A
	Emission Rate	N/A	N/A	N/A	lb/hr	---	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	100.00	100.00
Particulate	Emission Factor	7.60	7.60	7.60	lb/hr	2,683.32	0.0000	0.0000	0.0000	1.3296	1.3296	2.6263	2.6263	3.9394	17.6486	17.6486	17.6486	N/A
	Emission Rate	N/A	N/A	N/A	tons/time	1.3417	0.0000	0.0000	0.0000	0.0000	0.6523	0.4727	0.4727	0.2167	0.0000	0.0000	0.0000	N/A
PM10	Emission Factor	7.60	7.60	7.60	lb/hr	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
	Emission Rate	N/A	N/A	N/A	tons/time	145.38	0.0000	0.0000	0.0000	0.0000	0.1617	0.1996	0.1996	0.1996	0.2994	0.4790	0.4790	N/A
PM2.5	Emission Factor	7.60	7.60	7.60	lb/hr	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
	Emission Rate	N/A	N/A	N/A	tons/time	0.0727	0.0000	0.0000	0.0000	0.0000	0.0177	0.0359	0.0359	0.0165	0.0000	0.0000	0.0000	N/A
SO2	Emission Factor	0.60	0.60	0.60	lb/mmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	Emission Rate	N/A	N/A	N/A	lb/hr	---	0.0128	0.0128	0.0080	0.0080	0.0128	0.0158	0.0158	0.0158	0.0236	0.0378	0.0378	N/A
VOC	Emission Factor	5.50	5.50	5.50	lb/mmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	Emission Rate	N/A	N/A	N/A	lb/hr	105.21	0.0000	0.0000	0.0000	0.0000	0.0731	0.1444	0.1444	0.1444	0.2167	0.3467	0.3467	N/A
CO2E	Emission Factor	120,730.00	120,730.00	120,730.00	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00
	Emission Rate	N/A	N/A	N/A	lb/hr	2,309,466.86	2,568.4067	2,568.4067	1,605.2542	1,605.2542	2,568.4067	3,170.7147	3,170.7147	3,170.7147	4,756.0721	7,609.7154	7,609.7154	N/A
		N/A	N/A	N/A	tons/time	1,154.7334	0.0000	0.0000	0.0000	0.0000	281.2405	570.7287	261.5840	0.0000	0.0000	N/A	N/A	N/A



2012	Emissions Calculations			Units	September										Total for the Month		E
	Area	East Heating Plant					West Heating Plant					Convocation Center		Monsanto Building			
Boiler Information	Boiler Identifier	1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	
	Boiler Runtime	0.0	0.0	0.0	0.0	3.0	0.0	559.0	679.0	0.0	N/A	N/A	N/A	N/A	0.0	0.0	
Natural Gas Information	Natural Gas Heating Value	1,012.00															
	Total Natural Gas Consumed	2,034.12															
		289,998.72															
Burner Information	Gas Burner Maximum Input	28,656,000.00															
	Gas Burner Fire Rate	118,577.08	118,577.08	74,110.67	74,110.67	118,577.08	49,407.11	49,407.11	74,110.67	118,577.08	12.60	12.60	3.50	3.50	118,577.08	120.00	
CO	Emission Factor	0.06700	0.06700	0.04188	0.04188	0.06700	0.01817	0.01817	0.02725	0.04360	N/A	N/A	N/A	N/A	0.00000	0.00000	
	Emission Rate	84.00	84.00	3.5175	3.5175	84.00	84.00	84.00	2.8888	3.6622	84.00	84.00	84.00	84.00	84.00	84.00	
CO2	Emission Rate	0.00	0.00	0.00	0.00	16.88	0.00	852.98	1,554.13	0.00	N/A	N/A	N/A	N/A	0.00	0.00	
	Emission Factor	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	
Methane	Emission Rate	8,040.0000	8,040.0000	5,025.0000	5,025.0000	8,040.0000	2,179.8542	2,179.8542	3,269.7813	5,231.6501	N/A	N/A	N/A	N/A	0.0000	0.0000	
	Emission Factor	0.00	0.00	0.00	0.00	24,120.00	0.00	1,218,538.50	2,220,181.50	0.00	N/A	N/A	N/A	N/A	0.00	0.00	
N2O	Emission Rate	0.0000	0.0000	0.0000	0.0000	12.0600	0.0000	609.2692	1,110.0908	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000	
	Emission Factor	2.30	2.30	0.0963	0.0963	0.1541	0.0418	0.0418	0.0627	0.1003	2.30	2.30	2.30	2.30	2.30	2.30	
NH3	Emission Rate	0.00	0.00	0.00	0.00	0.46	0.00	23.36	42.55	0.00	N/A	N/A	N/A	N/A	0.00	0.00	
	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0117	0.0213	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000	
NOx	Emission Rate	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	
	Emission Factor	0.1474	0.1474	0.0921	0.0921	0.1474	0.0400	0.0400	0.0599	0.0959	N/A	N/A	N/A	N/A	0.0000	0.0000	
PM10	Emission Rate	0.00	0.00	0.00	0.00	0.44	0.00	22.34	40.70	0.00	N/A	N/A	N/A	N/A	0.00	0.00	
	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0002	0.0000	0.0112	0.0204	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000	
PM2.5	Emission Rate	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
	Emission Factor	0.0328	0.0328	0.0205	0.0205	0.0328	0.0089	0.0089	0.0134	0.0214	N/A	N/A	N/A	N/A	0.0000	0.0000	
SO2	Emission Rate	0.00	0.00	0.00	0.00	1.53	0.00	77.17	140.61	0.00	N/A	N/A	N/A	N/A	0.00	0.00	
	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0008	0.0000	0.0386	0.0703	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000	
VOC	Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
	Emission Factor	0.5092	0.5092	0.3183	0.3183	0.5092	0.1381	0.1381	0.2071	0.3313	N/A	N/A	N/A	N/A	0.0000	0.0000	
CO2E	Emission Rate	0.00	0.00	0.00	0.00	1.11	0.00	55.85	101.76	0.00	N/A	N/A	N/A	N/A	0.00	0.00	
	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0006	0.0000	0.0279	0.0509	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000	
Emissions Data	Emission Rate	8,088.9100	8,088.9100	5,055.5688	5,055.5688	8,088.9100	2,193.1150	2,193.1150	3,289.6725	5,263.4760	N/A	N/A	N/A	N/A	0.0000	0.0000	
	Emission Factor	0.00	0.00	0.00	0.00	24,266.73	0.00	1,225,951.27	2,233,687.61	0.00	N/A	N/A	N/A	N/A	0.0000	0.0000	
September																	
Total for the Month																	
46,543,885.38																	
1,012.00																	
2,917.46																	
288,286.56																	
3,458.50																	
3,458.50																	
84.00																	
3,909.69																	
1,9548																	
120,000.00																	
5,585,266.25																	
2,792.6331																	
2.30																	
107.05																	
0.0535																	
2.20																	
0.0000																	
102.40																	
0.0512																	
0.49																	
0.0000																	
0.0000																	
22.81																	
0.0114																	
280.00																	
0.0000																	
0.00																	
8,089.47																	
4.0447																	
7.60																	
0.0000																	
0.0000																	
353.73																	
0.00																	
0.1769																	
7.60																	
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0.1769																	
7.60																	
0.0000																	
0.0000																	
27.93																	
0.00																	
0.0140																	
5.50																	
0.0000																	
0.0000																	
255.99																	
0.00																	
0.1280																	
120,730.00																	
120,730.00																	
5,619,243.28																	
2,809.6216																	





2012	Emissions Calculations				Units				mber	
	Area	West Heating Plant						Monsanto Building		
Boiler Information	Boiler Identifier	---	2W	3W	4W	Convoc 1	Convoc 2	Monsanto 1	Monsanto 2	
	Boiler Runtime	hrs	584.0	0.0	616.0	N/A	N/A	N/A	N/A	
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,013.00			21,789.63			12,321.97	
	Total Natural Gas Consumed	therms	658,500.65			2,151,000.00			1,216,384.01	
Burner Information	Gas Burner Maximum Input	mmBTU/hr	50.00			12.60	12.60	3.50	3.50	
	Gas Burner Fire Rate	scf	49,358.34	74,037.51	118,460.02	12,438.30	12,438.30	3,455.08	3,455.08	
CO	Emission Factor	mmscf/hr	0.02795	0.04193	0.06709	N/A	N/A	N/A	N/A	
	Emission Rate	lb/hr	84.00	84.00	84.00	84.00	84.00	84.00	84.00	
	Emission Rate	lb/time	2.3482	3.5222	5.6356	N/A	N/A	N/A	N/A	
CO2	Emission Factor	tons/time	0.6857	0.0000	1.7358	N/A	N/A	N/A	N/A	
	Emission Rate	lb/mmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	
	Emission Rate	lb/hr	3,354.5197	5,031.7795	8,050.8472	N/A	N/A	N/A	N/A	
Methane	Emission Factor	lb/time	1,959,039.48	0.00	4,959,321.85	N/A	N/A	N/A	N/A	
	Emission Rate	tons/time	979.5197	0.0000	2,479.6609	N/A	N/A	N/A	N/A	
	Emission Rate	lb/mmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
N2O	Emission Factor	lb/hr	0.0643	0.0964	0.1543	N/A	N/A	N/A	N/A	
	Emission Rate	lb/time	37.55	0.00	95.05	N/A	N/A	N/A	N/A	
	Emission Rate	tons/time	0.0188	0.0000	0.0475	N/A	N/A	N/A	N/A	
NH3	Emission Factor	lb/mmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	
	Emission Rate	lb/hr	0.0615	0.0922	0.1476	N/A	N/A	N/A	N/A	
	Emission Rate	lb/time	35.92	0.00	90.92	N/A	N/A	N/A	N/A	
NOx	Emission Factor	tons/time	0.0180	0.0000	0.0455	N/A	N/A	N/A	N/A	
	Emission Rate	lb/mmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
	Emission Rate	lb/hr	0.0137	0.0205	0.0329	N/A	N/A	N/A	N/A	
Particulate	Emission Factor	lb/time	8.00	0.00	20.25	N/A	N/A	N/A	N/A	
	Emission Rate	tons/time	0.0040	0.0000	0.0101	N/A	N/A	N/A	N/A	
	Emission Rate	lb/mmscf	100.00	100.00	280.00	100.00	100.00	100.00	100.00	
PM10	Emission Factor	lb/hr	2.7954	4.1931	18.7853	N/A	N/A	N/A	N/A	
	Emission Rate	lb/time	1,632.53	0.00	11,571.75	N/A	N/A	N/A	N/A	
	Emission Rate	tons/time	0.8163	0.0000	5.7859	N/A	N/A	N/A	N/A	
PM2.5	Emission Factor	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
	Emission Rate	lb/hr	0.2125	0.3187	0.5099	N/A	N/A	N/A	N/A	
	Emission Rate	lb/time	124.07	0.00	314.09	N/A	N/A	N/A	N/A	
SO2	Emission Factor	tons/time	0.0620	0.0000	0.1570	N/A	N/A	N/A	N/A	
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
	Emission Rate	lb/hr	0.2125	0.3187	0.5099	N/A	N/A	N/A	N/A	
VOC	Emission Factor	lb/time	0.0620	0.0000	0.1570	N/A	N/A	N/A	N/A	
	Emission Rate	lb/mmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
	Emission Rate	lb/hr	0.0168	0.0252	0.0403	N/A	N/A	N/A	N/A	
CO2E	Emission Factor	tons/time	0.0049	0.0000	0.0124	N/A	N/A	N/A	N/A	
	Emission Rate	lb/mmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
	Emission Rate	lb/hr	0.1537	0.2306	0.3690	N/A	N/A	N/A	N/A	
	Emission Factor	lb/time	89.79	0.00	227.30	N/A	N/A	N/A	N/A	
	Emission Rate	tons/time	0.0449	0.0000	0.1137	N/A	N/A	N/A	N/A	
	Emission Rate	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	
	Emission Rate	lb/hr	3,374.9263	5,062.3895	8,099.8232	N/A	N/A	N/A	N/A	
	Emission Rate	lb/time	1,970,956.97	0.00	4,989,491.06	N/A	N/A	N/A	N/A	
	Emission Rate	tons/time	985.4785	0.0000	2,494.7455	N/A	N/A	N/A	N/A	



2013		Emissions Calculations				Units				Yearly Total (Summation)														Total for the Month	
Boiler Information	Area	Emissions Calculations				Units				East Heating Plant				West Heating Plant				Convocation Center		Monsanto Building		Total for the Month			
		Boiler Identifier	Boiler Runtime	Natural Gas Heating Value	Total Natural Gas Consumed	1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2							
Natural Gas Information	Natural Gas Heating Value	1,016.50	BTU/scf	1,016.50	---	2,120.0	3,068.0	2,320.0	590.0	2,050.0	277.0	1,449.0	1,033.0	517.0	850.0	850.0	1,250.0	1,250.0	1,013.00						
Natural Gas Information	Total Natural Gas Consumed	6,569,352.43	therms	6,569,352.43	---	118,052.14	118,052.14	73,782.59	73,782.59	118,052.14	49,188.39	49,188.39	73,782.59	118,052.14	12,395.47	12,395.47	3,443.19	3,443.19	9,867,971.30	9,867,971.30					
		646,345,187.07	scf	646,345,187.07	---	0.05621	0.05621	0.03513	0.03513	0.05621	0.02538	0.02538	0.03806	0.06090	0.00755	0.00755	0.00395	0.00395	88,853,986.18	88,853,986.18					
Burner Information	Gas Burner Maximum Input	84.00	mmBTU/hr	84.00	---	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00					
	Gas Burner Fire Rate	54,290.73	mmscf/hr	54,290.73	---	5.2396	5.2396	3.1621	3.1621	5.2396	2.4032	2.4032	3.07059	5.2765	0.6338	0.6338	0.3316	0.3316	---	---					
CO	Emission Factor	27,145.4	lb/mmcsf	27,145.4	---	8.0375	8.0375	3.6680	3.6680	8.0375	0.3328	0.3328	1.5353	2,727.97	0.2694	0.2694	414.45	414.45	3,731.9	3,731.9					
	Emission Rate	120,000.00	lb/time	120,000.00	---	10,508.69	10,508.69	7,336.05	7,336.05	10,508.69	665.69	665.69	3,070.59	2,727.97	538.74	538.74	11.35	11.35	7,463.73	7,463.73					
CO2	Emission Factor	120,000.00	lb/mmcsf	120,000.00	---	7,081.3304	7,081.3304	2,741.5936	2,741.5936	7,081.3304	3,433.1445	3,433.1445	0.0000	7,537.9077	905.4506	905.4506	473.6626	473.6626	120,000.00	120,000.00					
	Emission Rate	77,558,182.45	lb/hr	77,558,182.45	---	22,964,337.66	22,964,337.66	10,480,076.23	10,480,076.23	22,964,337.66	950,981.03	950,981.03	4,386,555.42	3,897,098.29	769,633.00	769,633.00	592,078.28	592,078.28	10,662,478.34	10,662,478.34					
Methane	Emission Factor	38,779.0912	lb/mmcsf	38,779.0912	---	11,482.1688	11,482.1688	5,240.0381	5,240.0381	11,482.1688	475.4905	475.4905	2,193.2777	1,948.5491	384.8165	384.8165	296.0391	296.0391	5,331.2392	5,331.2392					
	Emission Rate	2.30	lb/hr	2.30	---	0.1357	0.1357	0.0866	0.0866	0.1357	0.0658	0.0658	0.0000	0.1445	0.0174	0.0174	0.0091	0.0091	2.30	2.30					
N2O	Emission Factor	1,486.53	lb/hr	1,486.53	---	440.15	440.15	200.87	200.87	440.15	18.23	18.23	86.54	74.69	14.75	14.75	11.35	11.35	204.36	204.36					
	Emission Rate	0.7433	lb/time	0.7433	---	0.1439	0.1439	0.1004	0.1004	0.1439	0.0091	0.0091	0.0433	0.0373	0.0074	0.0074	0.0057	0.0057	0.1022	0.1022					
NH3	Emission Factor	2.20	lb/mmcsf	2.20	---	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20					
	Emission Rate	1,421.90	lb/hr	1,421.90	---	275.23	275.23	192.13	192.13	275.23	17.43	17.43	80.42	71.45	14.11	14.11	10.85	10.85	195.48	195.48					
NOx	Emission Factor	0.7110	lb/mmcsf	0.7110	---	0.1376	0.1376	0.0961	0.0961	0.1376	0.0087	0.0087	0.0414	0.0357	0.0071	0.0071	0.0054	0.0054	0.0977	0.0977					
	Emission Rate	0.49	lb/hr	0.49	---	0.0289	0.0289	0.0184	0.0184	0.0289	0.0140	0.0140	0.0127	0.0308	0.0037	0.0037	0.0019	0.0019	0.49	0.49					
PM10	Emission Factor	316.70	lb/hr	316.70	---	93.77	93.77	42.79	42.79	93.77	3.88	3.88	18.44	15.91	3.14	3.14	2.42	2.42	43.54	43.54					
	Emission Rate	0.1583	lb/time	0.1583	---	0.0307	0.0307	0.0214	0.0214	0.0307	0.0019	0.0019	0.0092	0.0080	0.0016	0.0016	0.0012	0.0012	0.0218	0.0218					
PM2.5	Emission Factor	280.00	lb/mmcsf	280.00	---	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00					
	Emission Rate	143,958.60	lb/hr	143,958.60	---	16,5231	16,5231	3,7644	3,7644	16,5231	2,8610	2,8610	2,5967	17,5885	0.7545	0.7545	0.3947	0.3947	21,176.35	21,176.35					
SO2	Emission Factor	71,979.3	lb/mmcsf	71,979.3	---	35,028.98	35,028.98	8,733.40	8,733.40	35,028.98	792.48	792.48	3,655.46	9,093.23	641.36	641.36	493.40	493.40	10,588.2	10,588.2					
	Emission Rate	7.60	lb/hr	7.60	---	26,7917	26,7917	4,3667	4,3667	26,7917	0.3962	0.3962	1.8277	4.5466	0.3207	0.3207	0.2467	0.2467	7.60	7.60					
VOC	Emission Factor	4,912.02	lb/hr	4,912.02	---	0.4485	0.4485	0.2861	0.2861	0.4485	0.2174	0.2174	0.1973	0.4774	0.0573	0.0573	0.0300	0.0300	---	---					
	Emission Rate	2,456.0	lb/time	2,456.0	---	1,454.41	1,454.41	663.74	663.74	1,454.41	60.23	60.23	285.96	246.82	48.74	48.74	37.50	37.50	675.29	675.29					
CO2e	Emission Factor	7.60	lb/mmcsf	7.60	---	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	0.3376	0.3376					
	Emission Rate	4,912.02	lb/hr	4,912.02	---	0.4485	0.4485	0.2861	0.2861	0.4485	0.2174	0.2174	0.1973	0.4774	0.0573	0.0573	0.0300	0.0300	---	---					

2013			January																					Total for the Month	
Emissions Calculations		Units	East Heating Plant			West Heating Plant				Convocation Center			Monsanto Building			1E	2E								
Area			1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E								
<b>Boiler Information</b>	Boiler Identifier	---																							
	Boiler Runtime	hrs	506.0	480.0	0.0	0.0	0.0	161.0	121.0	133.0	170.0	N/A	N/A	N/A	N/A	315.0	550.0								
<b>Natural Gas Information</b>	Natural Gas Heating Value	BTU/scf	1,013.00															1,014.00							
	Total Natural Gas Consumed	therms	590,730.95															15,194.86							
		scf	58,315,000.00															1,499,986.18							
<b>Burner Information</b>	Gas Burner Maximum Input	mmBTU/hr	120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00								
	Gas Burner Fire Rate	scf	118,460.02	118,460.02	74,037.51	74,037.51	118,460.02	49,358.34	49,358.34	74,037.51	118,460.02	12,438.30	12,438.30	3,455.08	3,455.08	118,343.20	118,343.20								
	Emission Factor	mmscf/hr	0.05914	0.05914	0.03696	0.03696	0.05914	0.02985	0.02985	0.04478	0.07165	N/A	N/A	N/A	N/A	0.06596	0.06596								
<b>CO</b>	Emission Factor	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00								
	Emission Rate	lb/hr	4.9680	4.9680	3.1050	3.1050	4.9680	2.5078	2.5078	3.7617	6.0188	N/A	N/A	N/A	N/A	5.5409	5.5409								
<b>CO2</b>	Emission Rate	lb/time	2,513.81	2,384.65	0.00	0.00	0.00	403.76	303.45	500.31	1,023.19	N/A	N/A	N/A	N/A	1,745.40	3,047.52								
	Emission Factor	tons/time	1.2569	1.1923	0.0000	0.0000	0.0000	0.2019	0.1517	0.2502	0.5116	N/A	N/A	N/A	N/A	0.8727	1.5238								
	Emission Rate	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00								
	Emission Rate	lb/hr	7,097.1602	7,097.1602	4,435.7252	4,435.7252	7,097.1602	3,582.5970	3,582.5970	5,373.8954	8,598.2327	N/A	N/A	N/A	N/A	7,915.6268	7,915.6268								
	Emission Rate	lb/time	3,591.163.08	3,406,636.92	0.00	0.00	0.00	576,798.11	433,494.23	714,728.09	1,461,699.56	N/A	N/A	N/A	N/A	2,493,422.44	4,353,594.73								
	Emission Rate	tons/time	1,795.5815	1,703.3185	0.0000	0.0000	0.0000	288.3991	216.7471	357.3640	730.8498	N/A	N/A	N/A	N/A	1,246.7112	2,176.7974								
<b>Methane</b>	Emission Factor	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30								
	Emission Rate	lb/hr	0.1360	0.1360	0.0850	0.0850	0.1360	0.0687	0.0687	0.1030	0.1648	N/A	N/A	N/A	N/A	0.1517	0.1517								
	Emission Rate	lb/time	68.83	65.29	0.00	0.00	0.00	11.06	8.31	13.70	28.02	N/A	N/A	N/A	N/A	47.79	83.44								
	Emission Factor	tons/time	0.0344	0.0326	0.0000	0.0000	0.0000	0.0055	0.0042	0.0068	0.0140	N/A	N/A	N/A	N/A	0.0239	0.0417								
	Emission Rate	lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20								
<b>N2O</b>	Emission Factor	lb/hr	0.1301	0.1301	0.0813	0.0813	0.1301	0.0657	0.0657	0.0985	0.1576	N/A	N/A	N/A	N/A	0.1451	0.1451								
	Emission Rate	lb/time	65.84	62.46	0.00	0.00	0.00	10.57	7.95	13.10	26.80	N/A	N/A	N/A	N/A	45.71	79.82								
	Emission Factor	tons/time	0.0329	0.0312	0.0000	0.0000	0.0000	0.0053	0.0040	0.0066	0.0134	N/A	N/A	N/A	N/A	0.0229	0.0399								
	Emission Rate	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49								
<b>NH3</b>	Emission Factor	lb/hr	0.0290	0.0290	0.0181	0.0181	0.0290	0.0146	0.0146	0.0219	0.0351	N/A	N/A	N/A	N/A	0.0323	0.0323								
	Emission Rate	lb/time	14.66	13.91	0.00	0.00	0.00	2.36	1.77	2.92	5.97	N/A	N/A	N/A	N/A	10.18	17.78								
	Emission Factor	tons/time	0.0073	0.0070	0.0000	0.0000	0.0000	0.0012	0.0009	0.0015	0.0030	N/A	N/A	N/A	N/A	0.0051	0.0089								
	Emission Rate	lb/mmmscf	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00								
	Emission Rate	lb/hr	16.5600	16.5600	3.6964	3.6964	16.5600	2.9855	2.9855	4.4782	20.0625	N/A	N/A	N/A	N/A	18.4698	18.4698								
	Emission Rate	lb/time	8,379.38	7,948.82	0.00	0.00	0.00	480.67	361.25	595.61	3,410.63	N/A	N/A	N/A	N/A	5,817.99	10,158.39								
	Emission Rate	tons/time	4.1897	3.9744	0.0000	0.0000	0.0000	0.2403	0.1806	0.2978	1.7053	N/A	N/A	N/A	N/A	2.9090	5.0792								
<b>Particulate</b>	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60								
	Emission Rate	lb/hr	0.4495	0.4495	0.2809	0.2809	0.4495	0.2269	0.2269	0.3403	0.5446	N/A	N/A	N/A	N/A	0.5013	0.5013								
	Emission Rate	lb/time	227.44	215.75	0.00	0.00	0.00	36.53	27.45	45.27	92.57	N/A	N/A	N/A	N/A	157.92	275.73								
	Emission Factor	tons/time	0.1137	0.1079	0.0000	0.0000	0.0000	0.0183	0.0137	0.0226	0.0463	N/A	N/A	N/A	N/A	0.0790	0.1379								
<b>PM10</b>	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60								
	Emission Rate	lb/hr	0.4495	0.4495	0.2809	0.2809	0.4495	0.2269	0.2269	0.3403	0.5446	N/A	N/A	N/A	N/A	0.5013	0.5013								
	Emission Rate	lb/time	227.44	215.75	0.00	0.00	0.00	36.53	27.45	45.27	92.57	N/A	N/A	N/A	N/A	157.92	275.73								
	Emission Factor	tons/time	0.1137	0.1079	0.0000	0.0000	0.0000	0.0183	0.0137	0.0226	0.0463	N/A	N/A	N/A	N/A	0.0790	0.1379								
<b>PM2.5</b>	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60								
	Emission Rate	lb/hr	0.4495	0.4495	0.2809	0.2809	0.4495	0.2269	0.2269	0.3403	0.5446	N/A	N/A	N/A	N/A	0.5013	0.5013								
	Emission Rate	lb/time	227.44	215.75	0.00	0.00	0.00	36.53	27.45	45.27	92.57	N/A	N/A	N/A	N/A	157.92	275.73								
	Emission Factor	tons/time	0.1137	0.1079	0.0000	0.0000	0.0000	0.0183	0.0137	0.0226	0.0463	N/A	N/A	N/A	N/A	0.0790	0.1379								
<b>SO2</b>	Emission Factor	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60								
	Emission Rate	lb/hr	0.0355	0.0355	0.0222	0.0222	0.0355	0.0179	0.0179	0.0269	0.0430	N/A	N/A	N/A	N/A	0.0396	0.0396								
	Emission Rate	lb/time	17.96	17.03	0.00	0.00	0.00	2.88	2.17	3.57	7.31	N/A	N/A	N/A	N/A	12.47	21.77								
	Emission Factor	tons/time	0.0090	0.0085	0.0000	0.0000	0.0000	0.0014	0.0011	0.0018	0.0037	N/A	N/A	N/A	N/A	0.0062	0.0109								
	Emission Rate	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50								
	Emission Rate	lb/hr	0.3253	0.3253	0.2033	0.2033	0.3253	0.1642	0.1642	0.2463	0.3941	N/A	N/A	N/A	N/A	0.3628	0.3628								
	Emission Rate	lb/time	164.59	156.14	0.00	0.00	0.00	26.44	19.87	32.76	66.99	N/A	N/A	N/A	N/A	114.28	199.54								
	Emission Factor	tons/time	0.0823	0.0781	0.0000	0.0000	0.0000	0.0132	0.0099	0.0164	0.0335	N/A	N/A	N/A	N/A	0.0571	0.0998								
	Emission Rate	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00								
	Emission Rate	lb/hr	7,140.3346	7,140.3346	4,462.7091	4,462.7091	7,140.3346	3,604.3911	3,604.3911	5,406.5866	8,650.5386	N/A	N/A	N/A	N/A	7,963.7802	7,963.7802								
	Emission Rate	lb/time	3,613,009.33	3,427,360.62	0.00	0.00	0.00	580,306.97	436,131.32	719,076.02	1,470,591.57	N/A	N/A	N/A	N/A	2,508,590.76	4,380,079.10								
	Emission Rate	tons/time	1,806.5047	1,713.6803	0.0000	0.0000	0.0000	290.1535	218.0657	359.5380	735.2958	N/A	N/A	N/A	N/A	1,254.2954	2,190.0395								

2013		Emissions Calculations				Units				February											
Boiler Information	Area	West Heating Plant				Convocation Center				Monsanto Building		East Heating Plant									
	Boiler Identifier	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E					
Boiler Runtime	hrs	438.0	0.0	0.0	10.0	29.0	24.0	27.0	N/A	N/A	N/A	N/A	125.0	619.0	724.0	0.0					
Natural Gas Information		Natural Gas Heating Value	1,014.00																		
Natural Gas Consumed		Total Natural Gas Consumed	496.86				22,176.18				14,145.20		783,955.55								
Burner Information		Gas Burner Maximum Input	49,000.00				2,187,000.00				1,394,990.14		77,237,000.00								
CO	Gas Burner Fire Rate	mmscf/hr	0.04123	0.04123	0.06596	0.00035	0.00035	0.00084	N/A	N/A	3.50	3,451.68	0.06455	0.06455	0.04035	0.04035					
	Emission Factor	lb/mmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00					
CO2	Emission Rate	lb/hr	3.4631	0.0000	5.5409	0.0294	0.0294	0.0707	N/A	N/A	N/A	N/A	5.4224	3.3890	3.3890	3.3890					
	Emission Factor	tons/time	1.516.83	0.0000	0.0000	0.029	1.06	1.91	N/A	N/A	N/A	N/A	6.625.86	2.453.64	2.453.64	2.453.64					
Methane	Emission Factor	lb/mmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00					
	Emission Rate	lb/hr	4,947.2667	4,947.2667	7,915.6268	42,060.1	42,060.1	100,944.2	100,944.2	100,944.2	100,944.2	100,944.2	7,746.2934	7,746.2934	4,841.4333	4,841.4333					
N2O	Emission Factor	lb/hr	2,166.902.83	0.0000	0.0000	420.60	1,219.74	2,725.49	N/A	N/A	N/A	N/A	968,286.67	4,794,955.59	3,505,197.74	0.0000					
	Emission Rate	tons/time	1,083.4514	0.0000	0.0000	0.2103	0.6099	1.3627	N/A	N/A	N/A	N/A	484.1433	2,397.4778	1,752.5989	0.0000					
NH3	Emission Factor	lb/mmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30					
	Emission Rate	lb/hr	0.0948	0.0948	0.1517	0.0008	0.0008	0.0019	N/A	N/A	N/A	N/A	0.1485	0.1485	0.0928	0.0928					
NOx	Emission Factor	lb/mmscf	41.53	0.0000	0.0000	0.01	0.03	0.05	N/A	N/A	N/A	N/A	18.56	91.90	67.18	0.0000					
	Emission Rate	tons/time	0.0208	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0093	0.0460	0.0336	0.0000					
Particulate	Emission Factor	lb/mmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20					
	Emission Rate	lb/hr	0.0907	0.0907	0.1451	0.0008	0.0008	0.0019	N/A	N/A	N/A	N/A	0.1420	0.1420	0.0888	0.0888					
PM10	Emission Factor	lb/mmscf	39.73	0.0000	0.0000	0.01	0.03	0.05	N/A	N/A	N/A	N/A	17.75	87.91	64.26	0.0000					
	Emission Rate	tons/time	0.0199	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0089	0.0440	0.0321	0.0000					
PM2.5	Emission Factor	lb/mmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49					
	Emission Rate	lb/hr	0.0202	0.0202	0.0323	0.0002	0.0002	0.0004	N/A	N/A	N/A	N/A	0.0316	0.0316	0.0198	0.0198					
SO2	Emission Factor	lb/mmscf	8.85	0.0000	0.0000	0.00	0.01	0.01	N/A	N/A	N/A	N/A	3.95	19.58	14.31	0.0000					
	Emission Rate	tons/time	0.0044	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0020	0.0098	0.0072	0.0000					
VOC	Emission Factor	lb/mmscf	100.00	100.00	280.00	100.00	280.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00					
	Emission Rate	lb/hr	4,122.7	4,122.7	18,469.8	0.0351	0.0351	0.2355	N/A	N/A	N/A	N/A	18,074.7	18,074.7	4,034.5	4,034.5					
CO2e	Emission Factor	lb/mmscf	1,805.75	0.0000	0.0000	0.35	1.02	6.36	N/A	N/A	N/A	N/A	2,259.34	11,188.23	2,921.00	0.0000					
	Emission Rate	tons/time	0.9029	0.0000	0.0000	0.0002	0.0005	0.0032	N/A	N/A	N/A	N/A	1.1297	5.5941	1.4605	0.0000					
Total for the Month	Emission Factor	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60					
	Emission Rate	lb/hr	0.3133	0.3133	0.5013	0.0027	0.0027	0.0064	N/A	N/A	N/A	N/A	0.4906	0.4906	0.3066	0.3066					
Total for the Month	Emission Factor	lb/mmscf	137.24	0.0000	0.0000	0.03	0.08	0.17	N/A	N/A	N/A	N/A	61.32	303.68	222.00	0.0000					
	Emission Rate	tons/time	0.0686	0.0000	0.0000	0.0000	0.0001	0.0001	N/A	N/A	N/A	N/A	0.0307	0.1518	0.1110	0.0000					
Total for the Month	Emission Factor	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60					
	Emission Rate	lb/hr	0.3133	0.3133	0.5013	0.0027	0.0027	0.0064	N/A	N/A	N/A	N/A	0.4906	0.4906	0.3066	0.3066					
Total for the Month	Emission Factor	lb/mmscf	137.24	0.0000	0.0000	0.03	0.08	0.17	N/A	N/A	N/A	N/A	61.32	303.68	222.00	0.0000					
	Emission Rate	tons/time	0.0686	0.0000	0.0000	0.0000	0.0001	0.0001	N/A	N/A	N/A	N/A	0.0307	0.1518	0.1110	0.0000					
Total for the Month	Emission Factor	lb/mmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60					
	Emission Rate	lb/hr	0.0247	0.0247	0.0396	0.0002	0.0002	0.0005	N/A	N/A	N/A	N/A	0.0387	0.0387	0.0242	0.0242					
Total for the Month	Emission Factor	lb/mmscf	10.83	0.0000	0.0000	0.00	0.01	0.01	N/A	N/A	N/A	N/A	4.84	23.97	17.53	0.0000					
	Emission Rate	tons/time	0.0054	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0024	0.0120	0.0088	0.0000					
Total for the Month	Emission Factor	lb/mmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50					
	Emission Rate	lb/hr	0.2267	0.2267	0.3628	0.0019	0.0019	0.0046	N/A	N/A	N/A	N/A	0.3550	0.3550	0.2219	0.2219					
Total for the Month	Emission Factor	lb/mmscf	99.32	0.0000	0.0000	0.02	0.06	0.12	N/A	N/A	N/A	N/A	44.38	219.77	160.65	0.0000					
	Emission Rate	tons/time	0.0497	0.0000	0.0000	0.0000	0.0001	0.0001	N/A	N/A	N/A	N/A	0.0222	0.1099	0.0803	0.0000					
Total for the Month	Emission Factor	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00					
	Emission Rate	lb/hr	4,977.3626	4,977.3626	7,963.7802	42,316.0	42,316.0	101,558.3	N/A	N/A	N/A	N/A	7,793.4166	7,793.4166	4,870.8854	4,870.8854					
Total for the Month	Emission Factor	lb/mmscf	2,180,084.82	0.0000	0.0000	423.16	1,227.16	2,742.07	N/A	N/A	N/A	N/A	974,177.08	4,824,124.90	3,526,521.03	0.0000					
	Emission Rate	tons/time	1,090,042.4	0.0000	0.0000	0.2116	0.6136	1.3710	N/A	N/A	N/A	N/A	487.0885	2,412.0625	1,763.2605	0.0000					



2013	Emissions Calculations	Units	April			May										Total for the Month						
			West Heating Plant			East Heating Plant					West Heating Plant											
			2W	3W	4W	Convoc 1	Convoc 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W		2W	3W				
Boiler Information	Area	---	---																			
	Boiler Identifier	---	---																			
	Boiler Runtime	hrs	0.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A	N/A	N/A	288.0	53.0	243.0	0.0	185.0	0.0	0.0	0.0	1,016.00	
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,015.00													1,016.00						
	Total Natural Gas Consumed	therms	20.30													202,997.81						
		scf	2,000.00													19,980,099.41						
Burner Information	Gas Burner Maximum Input	mmBTU/hr	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	120.00	118,110.24	118,110.24	73,818.90	75.00	120.00	118,110.24	49,212.60	49,212.60	73,818.90	182.88
	Gas Burner Fire Rate	scf	49,261.08	73,891.63	118,226.60	12,413.79	12,413.79	3,448.28	3,448.28	0.00000	0.00000	0.00000	0.02947	0.02947	0.01842	0.01842	0.02947	0.02947	0.00000	0.00000	0.00000	18,000.00
	Emission Factor	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
CO	Emission Rate	lb/hr	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	2.4759	2.4759	1.5474	1.5474	2.4759	2.4759	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/time	0.00	0.00	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	713.05	131.22	376.02	0.00	458.04	0.00	0.00	0.00	0.00	0.00
	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.3565	0.0656	0.1880	0.0000	0.2290	0.0000	0.0000	0.0000	0.0000	0.0000
CO2	Emission Factor	lb/mmmscf	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3,536.9529	3,536.9529	2,210.5955	2,210.5955	3,536.9529	3,536.9529	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/time	0.00	0.00	0.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1,018,642.43	187,458.50	537,174.72	0.00	654,336.28	0.00	0.00	0.00	0.00	0.00
Methane	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	509.3212	93.7293	268.5874	0.0000	327.1681	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0678	0.0678	0.0424	0.0424	0.0678	0.0678	0.0000	0.0000	0.0000	0.0000
N2O	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0098	0.0018	0.0051	0.0000	0.0063	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0648	0.0648	0.0405	0.0405	0.0648	0.0648	0.0000	0.0000	0.0000	0.0000
NH3	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0093	0.0017	0.0049	0.0000	0.0060	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0144	0.0144	0.0090	0.0090	0.0144	0.0144	0.0000	0.0000	0.0000	0.0000
NOx	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0021	0.0004	0.0011	0.0000	0.0013	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	280.00	280.00	100.00	100.00	100.00	100.00
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	8.2529	8.2529	1.8422	1.8422	8.2529	8.2529	0.0000	0.0000	0.0000	0.0000
Emissions Data	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	1.1884	0.2187	0.2238	0.0000	0.7634	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2240	0.2240	0.1400	0.1400	0.2240	0.2240	0.0000	0.0000	0.0000	0.0000
Particulate	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0323	0.0059	0.0170	0.0000	0.0207	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2240	0.2240	0.1400	0.1400	0.2240	0.2240	0.0000	0.0000	0.0000	0.0000
PM10	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0323	0.0059	0.0170	0.0000	0.0207	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2240	0.2240	0.1400	0.1400	0.2240	0.2240	0.0000	0.0000	0.0000	0.0000
PM2.5	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0323	0.0059	0.0170	0.0000	0.0207	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.2240	0.2240	0.1400	0.1400	0.2240	0.2240	0.0000	0.0000	0.0000	0.0000
SO2	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0323	0.0059	0.0170	0.0000	0.0207	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0177	0.0177	0.0111	0.0111	0.0177	0.0177	0.0000	0.0000	0.0000	0.0000
VOC	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0025	0.0005	0.0013	0.0000	0.0016	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.1621	0.1621	0.1013	0.1013	0.1621	0.1621	0.0000	0.0000	0.0000	0.0000
CO2E	Emission Factor	tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.0233	0.0043	0.0123	0.0000	0.0150	0.0000	0.0000	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00
	Emission Rate	lb/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3,558.4693	3,558.4693	2,224.0433	2,224.0433	3,558.4693	3,558.4693	0.0000	0.0000	0.0000	0.0000
		tons/time	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	N/A	N/A	512.4196	94.2994	270.2213	0.0000	329.1584	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
																1,268.2074						
																2,536.414.79						
																658,316.83						

2013		Emissions Calculations				Units				June											
Boiler Information	Area	Convocation Center		Monsanto Building		Total for the Month	East Heating Plant				West Heating Plant				Convocati Convo 1						
	Boiler Identifier	Convoco 1	Convoco 2	Monsanto 1	Monsanto 2		1E	2E	3E	4E	5E	1W	2W	3W		4W					
Boiler Runtime	hrs	N/A	N/A	N/A	N/A	---	0.0	0.0	0.0	0.0	92.0	474.0	0.0	0.0							
Natural Gas Information	Natural Gas Heating Value	5,750.56				BTU/scf	1,016.00														
	Total Natural Gas Consumed	566,000.00				therms	168,391.84														
Burner Information	Gas Burner Maximum Input	12.60	12.60	3.50	3.50	---	120.00	120.00	75.00	75.00	50.00	50.00	75.00	120.00							
	Gas Burner Fire Rate	118,110.24	12,401.57	3,444.88	3,444.88	---	118,110.24	118,110.24	73,818.90	73,818.90	49,212.60	49,212.60	73,818.90	118,110.24							
CO	Emission Factor	0.00000	N/A	N/A	N/A	---	0.05654	0.05654	0.03534	0.03534	0.02928	0.02928	0.04392	0.07028							
	Emission Rate	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00							
CO2	Emission Factor	0.0000	N/A	N/A	N/A	2,617.22	0.00	0.00	0.0000	0.0000	2.26	2.45	0.00	0.00							
	Emission Rate	0.0000	N/A	N/A	N/A	1,3086	0.0000	0.0000	0.0000	0.0000	1,168.26	2,459.7	1,165.92	0.0000							
Methane	Emission Factor	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00								
	Emission Rate	0.0000	N/A	N/A	N/A	---	6,784.3413	6,784.3413	4,240.2133	4,240.2133	3,513.9223	3,513.9223	5,270.8834	8,433.4134							
N2O	Emission Factor	0.0000	N/A	N/A	N/A	3,738,886.42	0.00	0.00	0.00	0.00	323,280.85	1,668,947.95	0.00	0.00							
	Emission Rate	0.0000	N/A	N/A	N/A	1,869,443.2	0.0000	0.0000	0.0000	0.0000	161,640.4	832,799.6	0.0000	0.0000							
NH3	Emission Factor	2.30	2.30	2.30	2.30	2.30	0.1300	0.1300	0.0813	0.0813	0.0674	0.0674	0.1010								
	Emission Rate	0.0000	N/A	N/A	N/A	---	0.00	0.00	0.00	0.00	6.20	31.92	0.00								
NOx	Emission Factor	100.00	100.00	100.00	100.00	280.00	0.0000	0.0000	0.0000	0.0000	0.0034	0.0034	0.0000								
	Emission Rate	0.0000	N/A	N/A	N/A	---	15,830.1	15,830.1	3,533.5	3,533.5	2,928.3	2,928.3	4,392.4								
Particulate	Emission Factor	7.60	7.60	7.60	7.60	7.60	0.4297	0.4297	0.2685	0.2685	0.4297	0.4297	0.3338								
	Emission Rate	0.0000	N/A	N/A	N/A	236.80	0.00	0.00	0.00	0.00	105.70	105.49	0.00								
PM10	Emission Factor	7.60	7.60	7.60	7.60	7.60	0.4297	0.4297	0.2685	0.2685	0.4297	0.4297	0.3338								
	Emission Rate	0.0000	N/A	N/A	N/A	0.1184	0.0000	0.0000	0.0000	0.0000	0.0529	0.0527	0.0000								
PM2.5	Emission Factor	7.60	7.60	7.60	7.60	7.60	0.4297	0.4297	0.2685	0.2685	0.4297	0.4297	0.3338								
	Emission Rate	0.0000	N/A	N/A	N/A	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60								
SO2	Emission Factor	0.0000	N/A	N/A	N/A	18.69	0.0339	0.0339	0.0212	0.0212	0.0176	0.0176	0.0264								
	Emission Rate	0.0000	N/A	N/A	N/A	0.0093	0.0000	0.0000	0.0000	0.0000	0.0042	0.0042	0.0000								
VOC	Emission Factor	5.50	5.50	5.50	5.50	5.50	0.3109	0.3109	0.1943	0.1943	0.3109	0.3109	0.2416								
	Emission Rate	0.0000	N/A	N/A	N/A	171.37	0.00	0.00	0.00	0.00	14.82	76.34	0.00								
CO2E	Emission Factor	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	6,825.6127	6,825.6127	4,266.0079	4,266.0079	3,535.2986	3,535.2986	5,302.9479								
	Emission Rate	0.0000	N/A	N/A	N/A	3,761,631.31	0.00	0.00	0.00	0.00	1,679,100.72	1,675,731.55	0.00								
		0.0000	N/A	N/A	N/A	1,880,815.7	0.0000	0.0000	0.0000	0.0000	837,865.8	837,865.8	0.0000								



2013	Emissions Calculations			Units		August														Total for the Month
	Area	Building	Boiler Identifier	Boiler Runtime	Boiler	East Heating Plant				West Heating Plant				Convocation Center		Monsanto Building				
Boiler Information		Monsanto 2			1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2			
Natural Gas Information	Natural Gas Heating Value	N/A			0.0	0.0	0.0	0.0	89.0	0.0	0.0	362.0	0.0	N/A	N/A	N/A	N/A	1,018.00		
	Total Natural Gas Consumed	0.35			38,279.88					1,017.00				4,423.95		2,461.02		275,779.11		
Burner Information	Gas Burner Maximum Input	87.12			3,764,000.00					20,502,000.00				435,000.00		241,988.20		27,090,285.85		
	Gas Burner Fire Rate	3.50			120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	---		
CO	Emission Factor	N/A			0.04229	0.04229	0.02643	0.02643	0.04229	0.02373	0.02373	0.03559	0.05695	N/A	N/A	N/A	N/A	---		
	Emission Rate	84.00			84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00		
CO2	Emission Factor	N/A			3.5525	3.5525	2.2203	2.2203	3.5525	1.9933	1.9933	2.9899	4.7838	N/A	N/A	N/A	N/A	---		
	Emission Rate	N/A			0.0000	0.0000	0.0000	0.0000	0.1581	0.0000	0.0000	0.5412	0.0000	N/A	N/A	N/A	N/A	2,275.58		
Methane	Emission Factor	N/A			120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000	120.0000		
	Emission Rate	N/A			5,075.0562	5,075.0562	3,171.9101	3,171.9101	5,075.0562	2,847.5000	2,847.5000	4,271.2500	6,834.0000	N/A	N/A	N/A	N/A	1,137.8		
N2O	Emission Factor	N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	---		
	Emission Rate	N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	3,250,834.30		
NH3	Emission Factor	N/A			2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30		
	Emission Rate	N/A			0.0973	0.0973	0.0608	0.0608	0.0973	0.0546	0.0546	0.0819	0.1310	N/A	N/A	N/A	N/A	59.60		
NOx	Emission Factor	N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0298		
	Emission Rate	N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.49		
Particulate	Emission Factor	N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	---		
	Emission Rate	N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	205.89		
PM10	Emission Factor	N/A			7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
	Emission Rate	N/A			0.3214	0.3214	0.2009	0.2009	0.3214	0.1803	0.1803	0.2705	0.4328	N/A	N/A	N/A	N/A	---		
PM2.5	Emission Factor	N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	---		
	Emission Rate	N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1029		
SO2	Emission Factor	N/A			0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		
	Emission Rate	N/A			0.0254	0.0254	0.0159	0.0159	0.0254	0.0142	0.0142	0.0214	0.0342	N/A	N/A	N/A	N/A	---		
VOC	Emission Factor	N/A			5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50		
	Emission Rate	N/A			0.2326	0.2326	0.1454	0.1454	0.2326	0.1305	0.1305	0.1958	0.3132	N/A	N/A	N/A	N/A	---		
CO2E	Emission Factor	N/A			120.7300	120.7300	120.7300	120.7300	120.7300	120.7300	120.7300	120.7300	120.7300	120.7300	120.7300	120.7300	120.7300	120.7300		
	Emission Rate	N/A			5,105.9294	5,105.9294	3,191.2059	3,191.2059	5,105.9294	2,864.8223	2,864.8223	4,297.2334	6,875.5735	N/A	N/A	N/A	N/A	---		
		N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	3,270,610.21		
		N/A			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	1,635.3051		





2013	Emissions Calculations			Units		October												Total for the Month			
	Area	West Heating Plant			Convocation Center		Monsanto Building		Convocation Center		Monsanto 1		Monsanto 2		1E	2E	3E	4E			
		Boiler Identifier	Boiler Runtime	Natural Gas Heating Value	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1					Monsanto 2		
Boiler Information	Boiler Identifier	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---			
	Boiler Runtime	hrs	hrs	hrs	499.0	379.0	14.0	180.0	19.0	208.0	N/A	N/A	N/A	N/A	278.0	2.0	396.0	31.0			
Natural Gas Information	Natural Gas Heating Value	BTU/scf	244,869.72	1,018.00																	
	Total Natural Gas Consumed	therms	24,054,000.00	220,763.48														657,153.10			
Burner Information	Gas Burner Maximum Input	mmBTU/hr	75.00	50.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00	75.00			
	Gas Burner Fire Rate	scf	73,673.87	49,115.91	117,878.19	49,115.91	49,115.91	73,673.87	117,878.19	12,377.21	12,377.21	3,438.11	3,438.11	117,762.51	117,762.51	73,601.57	73,601.57	73,601.57			
CO	Emission Factor	mmscf/hr	0.02176	0.03005	0.03482	0.03005	0.03005	0.04507	0.07212	N/A	N/A	N/A	N/A	0.06220	0.06220	0.03887	0.03887	0.03887			
	Emission Rate	lb/mmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00			
CO2	Emission Factor	lb/hr	1.8279	1.8279	2.9246	2.5241	2.5241	3.7861	6.0578	N/A	N/A	N/A	N/A	5.2245	5.2245	3.2653	3.2653	3.2653			
	Emission Rate	lb/time	0.00	0.00	1,108.43	35.34	454.33	71.94	1,260.02	N/A	N/A	N/A	N/A	1,452.41	1,452.41	1,293.07	1,293.07	1,293.07			
Methane	Emission Factor	tons/time	0.0000	0.0000	0.5542	0.0177	0.2272	0.0360	0.6300	N/A	N/A	N/A	N/A	0.7262	0.7262	0.6465	0.6465	0.6465			
	Emission Rate	lb/mmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00			
N2O	Emission Factor	lb/hr	2,611.2538	2,611.2538	4,178.0062	3,605.8196	3,605.8196	5,408.7294	8,653.9670	N/A	N/A	N/A	N/A	7,463.5805	7,463.5805	4,664.7378	4,664.7378	4,664.7378			
	Emission Rate	lb/time	0.00	0.00	1,583,464.33	50,481.47	649,047.53	102,765.86	1,800,025.14	N/A	N/A	N/A	N/A	2,074,875.37	2,074,875.37	1,847,236.17	1,847,236.17	1,847,236.17			
NH3	Emission Factor	tons/time	0.0000	0.0000	0.0145	0.0005	0.0009	0.0009	0.0165	N/A	N/A	N/A	N/A	0.0190	0.0190	0.0169	0.0169	0.0169			
	Emission Rate	lb/mmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49			
NOx	Emission Factor	lb/hr	0.0107	0.0107	0.0171	0.0147	0.0147	0.0221	0.0353	N/A	N/A	N/A	N/A	0.0305	0.0305	0.0190	0.0190	0.0190			
	Emission Rate	lb/time	0.00	0.00	6.47	0.21	2.65	0.42	7.35	N/A	N/A	N/A	N/A	8.47	8.47	7.54	7.54	7.54			
PM10	Emission Factor	tons/time	0.0000	0.0000	0.0032	0.0001	0.0002	0.0002	0.0037	N/A	N/A	N/A	N/A	0.0042	0.0042	0.0038	0.0038	0.0038			
	Emission Rate	lb/mmscf	100.00	100.00	280.00	100.00	100.00	280.00	450.73	20,192.6	100.00	100.00	100.00	280.00	280.00	100.00	100.00	100.00			
PM2.5	Emission Factor	lb/hr	2.1760	2.1760	9.7487	3.0048	3.0048	4.5073	20,192.6	N/A	N/A	N/A	N/A	17,415.0	17,415.0	3,887.3	3,887.3	3,887.3			
	Emission Rate	lb/time	0.00	0.00	3,694.75	42.07	540.87	85.64	4,200.06	N/A	N/A	N/A	N/A	4,841.38	4,841.38	1,539.36	1,539.36	1,539.36			
SO2	Emission Factor	tons/time	0.0000	0.0000	1.8474	0.0210	0.2704	0.0428	2.1000	N/A	N/A	N/A	N/A	2.4207	2.4207	0.7697	0.7697	0.7697			
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
VOC	Emission Factor	lb/hr	0.1654	0.1654	0.2646	0.2284	0.2284	0.3426	0.5481	N/A	N/A	N/A	N/A	0.4727	0.4727	0.2954	0.2954	0.2954			
	Emission Rate	lb/time	0.00	0.00	100.29	3.20	41.11	6.51	114.00	N/A	N/A	N/A	N/A	131.41	131.41	116.99	116.99	116.99			
CO2E	Emission Factor	tons/time	0.0000	0.0000	0.0040	0.0001	0.0003	0.0003	0.0045	N/A	N/A	N/A	N/A	0.0657	0.0657	0.0585	0.0585	0.0585			
	Emission Rate	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00			
CO2E	Emission Rate	lb/hr	2,627.1390	2,627.1390	4,203.4224	3,627.7550	3,627.7550	5,441.6325	8,706.6120	N/A	N/A	N/A	N/A	7,508.9839	7,508.9839	4,693.1149	4,693.1149	4,693.1149			
	Emission Rate	lb/time	0.00	0.00	1,593,097.07	50,788.57	652,995.90	103,391.02	1,810,975.29	N/A	N/A	N/A	N/A	2,087,497.53	2,087,497.53	1,858,473.52	1,858,473.52	1,858,473.52			
CO2E	Emission Rate	tons/time	0.0000	0.0000	796.5485	25.3943	326.4979	51.6955	905.4876	N/A	N/A	N/A	N/A	1,043.7488	1,043.7488	7.5090	7.5090	7.5090			
	Emission Rate	tons/time	0.0000	0.0000	655.4712	25.3943	326.4979	51.6955	905.4876	N/A	N/A	N/A	N/A	1,043.7488	1,043.7488	7.5090	7.5090	7.5090			

2013		November																December								
Emissions Calculations			Units		West Heating Plant										Convocation Center		Monsanto Building		East Heating Plant							
Area	---		---		1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	Total for the Month	1E				2E	3E	4E	5E
Boiler Identifier	hrs		BTU/scf		490.0	75.0	0.0	102.0	N/A	N/A	N/A	N/A	608.0	644.0	239.0	0.0	0.0	---	608.0	644.0	239.0	0.0	0.0	0.0	1W	
Boiler Runtime	thrms		scf		1,019.00	1,019.00										14,153.91		10,657.59		953,332.80						
Natural Gas Heating Value	thrms		scf		6,176,000.00																93,464,000.00					
Total Natural Gas Consumed	mmBTU/hr		scf		120.00	50.00	50.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00	120.00	---	120.00	120.00	75.00	75.00	120.00	120.00	50.00	
Gas Burner Maximum Input	scf		scf		117,762.51	49,067.71	49,067.71	117,762.51	12,365.06	12,365.06	3,434.74	3,434.74	117,647.06	117,647.06	73,529.41	73,529.41	117,647.06	---	117,647.06	117,647.06	73,529.41	73,529.41	117,647.06	117,647.06	49,019.61	
Gas Burner Fire Rate	mmscf/hr		mmscf/hr		0.06220	0.01931	0.01931	0.04635	N/A	N/A	N/A	N/A	0.06669	0.06669	0.04168	0.04168	0.06669	---	0.06669	0.06669	0.04168	0.04168	0.06669	0.06669	0.00000	
Emission Factor	lb/mmmscf		lb/mmmscf		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	
Emission Rate	lb/hr		lb/hr		5.2245	1.6222	1.6222	3.8933	N/A	N/A	N/A	N/A	5.6023	5.6023	3.5015	3.5015	5.6023	---	5.6023	5.6023	3.5015	3.5015	5.6023	5.6023	0.0000	
Emission Factor	lb/time		lb/time		2,560.01	0.00	0.00	397.12	N/A	N/A	N/A	N/A	3,406.22	3,406.22	836.85	836.85	3,406.22	8,183.20	3,406.22	3,406.22	836.85	836.85	3,406.22	3,406.22	0.00	
Emission Rate	tons/time		tons/time		1.2800	0.0000	0.0000	0.1986	N/A	N/A	N/A	N/A	1.7031	1.8040	0.4184	0.0000	0.0000	4,091.6	1,703.1	1,804.0	0.4184	0.0000	0.0000	0.0000	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	
Emission Rate	lb/hr		lb/hr		7,463.5805	2,317.4484	2,317.4484	5,561.8762	N/A	N/A	N/A	N/A	8,003.3396	8,003.3396	5,002.0872	5,002.0872	8,003.3396	---	8,003.3396	8,003.3396	5,002.0872	5,002.0872	8,003.3396	8,003.3396	0.0000	
Emission Factor	lb/time		lb/time		3,657,154.43	0.00	0.00	567,311.37	N/A	N/A	N/A	N/A	4,866,030.46	4,866,030.46	1,195,498.85	1,195,498.85	4,866,030.46	11,690,280.00	4,866,030.46	4,866,030.46	1,195,498.85	1,195,498.85	4,866,030.46	4,866,030.46	0.00	
Emission Rate	tons/time		tons/time		1,828.5772	0.0000	0.0000	283.6557	N/A	N/A	N/A	N/A	2,433.0152	2,433.0152	597.7494	597.7494	2,433.0152	5,845.1400	2,433.0152	2,433.0152	597.7494	597.7494	2,433.0152	2,433.0152	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
Emission Rate	lb/hr		lb/hr		0.1431	0.0444	0.0444	0.1066	N/A	N/A	N/A	N/A	0.1534	0.1534	0.0959	0.0959	0.1534	---	0.1534	0.1534	0.0959	0.0959	0.1534	0.1534	0.0000	
Emission Factor	lb/time		lb/time		70.10	0.00	0.00	10.87	N/A	N/A	N/A	N/A	93.27	98.79	22.91	22.91	93.27	224.06	93.27	98.79	22.91	22.91	93.27	93.27	0.00	
Emission Rate	tons/time		tons/time		0.0350	0.0000	0.0000	0.0054	N/A	N/A	N/A	N/A	0.0466	0.0494	0.0115	0.0000	0.0000	0.1120	0.0466	0.0494	0.0115	0.0000	0.0000	0.0000	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	
Emission Rate	lb/hr		lb/hr		0.1368	0.0425	0.0425	0.1020	N/A	N/A	N/A	N/A	0.1467	0.1467	0.0917	0.0917	0.1467	---	0.1467	0.1467	0.0917	0.0917	0.1467	0.1467	0.0000	
Emission Factor	lb/time		lb/time		67.05	0.00	0.00	10.40	N/A	N/A	N/A	N/A	89.21	94.49	21.92	21.92	89.21	214.32	89.21	94.49	21.92	21.92	89.21	89.21	0.00	
Emission Rate	tons/time		tons/time		0.0335	0.0000	0.0000	0.0052	N/A	N/A	N/A	N/A	0.0446	0.0472	0.0110	0.0000	0.0000	0.1072	0.0446	0.0472	0.0110	0.0000	0.0000	0.0000	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
Emission Rate	lb/hr		lb/hr		0.0305	0.0095	0.0095	0.0227	N/A	N/A	N/A	N/A	0.0327	0.0327	0.0204	0.0204	0.0327	---	0.0327	0.0327	0.0204	0.0204	0.0327	0.0327	0.0000	
Emission Factor	lb/time		lb/time		14.93	0.71	0.00	2.32	N/A	N/A	N/A	N/A	19.87	21.05	4.88	4.88	19.87	47.74	19.87	21.05	4.88	4.88	19.87	19.87	0.00	
Emission Rate	tons/time		tons/time		0.0075	0.0000	0.0000	0.0012	N/A	N/A	N/A	N/A	0.0099	0.0105	0.0024	0.0000	0.0000	0.0239	0.0099	0.0105	0.0024	0.0000	0.0000	0.0000	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		280.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	280.00	280.00	280.00	100.00	100.00	100.00	100.00	100.00	100.00	
Emission Rate	lb/hr		lb/hr		17,4150	1,931.2	1,931.2	12,977	N/A	N/A	N/A	N/A	18,6745	18,6745	4,1684	4,1684	18,6745	---	18,6745	18,6745	4,1684	4,1684	18,6745	18,6745	0.0000	
Emission Factor	lb/time		lb/time		8,533.36	0.00	0.00	1,323.73	N/A	N/A	N/A	N/A	11,354.07	12,026.35	996.25	996.25	11,354.07	24,376.67	11,354.07	12,026.35	996.25	996.25	11,354.07	11,354.07	0.00	
Emission Rate	tons/time		tons/time		4.2667	0.0000	0.0000	0.6619	N/A	N/A	N/A	N/A	5.6770	6.0132	0.4981	0.4981	5.6770	12.1888	5.6770	6.0132	0.4981	0.4981	5.6770	5.6770	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
Emission Rate	lb/hr		lb/hr		0.4727	0.1468	0.1468	0.3523	N/A	N/A	N/A	N/A	0.5069	0.5069	0.3168	0.3168	0.5069	---	0.5069	0.5069	0.3168	0.3168	0.5069	0.5069	0.0000	
Emission Factor	lb/time		lb/time		231.62	0.00	0.00	35.93	N/A	N/A	N/A	N/A	308.18	326.43	75.71	75.71	308.18	740.38	308.18	326.43	75.71	75.71	308.18	308.18	0.00	
Emission Rate	tons/time		tons/time		0.1158	0.0000	0.0000	0.0180	N/A	N/A	N/A	N/A	0.1541	0.1632	0.0379	0.0000	0.0000	0.3702	0.1541	0.1632	0.0379	0.0000	0.0000	0.0000	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
Emission Rate	lb/hr		lb/hr		0.4727	0.1468	0.1468	0.3523	N/A	N/A	N/A	N/A	0.5069	0.5069	0.3168	0.3168	0.5069	---	0.5069	0.5069	0.3168	0.3168	0.5069	0.5069	0.0000	
Emission Factor	lb/time		lb/time		231.62	0.00	0.00	35.93	N/A	N/A	N/A	N/A	308.18	326.43	75.71	75.71	308.18	740.38	308.18	326.43	75.71	75.71	308.18	308.18	0.00	
Emission Rate	tons/time		tons/time		0.1158	0.0000	0.0000	0.0180	N/A	N/A	N/A	N/A	0.1541	0.1632	0.0379	0.0000	0.0000	0.3702	0.1541	0.1632	0.0379	0.0000	0.0000	0.0000	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Emission Rate	lb/hr		lb/hr		0.0373	0.0116	0.0116	0.0278	N/A	N/A	N/A	N/A	0.0400	0.0400	0.0250	0.0250	0.0400	---	0.0400	0.0400	0.0250	0.0250	0.0400	0.0400	0.0000	
Emission Factor	lb/time		lb/time		18.29	0.87	0.00	2.84	N/A	N/A	N/A	N/A	24.33	25.77	5.98	5.98	24.33	58.45	24.33	25.77	5.98	5.98	24.33	24.33	0.00	
Emission Rate	tons/time		tons/time		0.0091	0.0000	0.0000	0.0014	N/A	N/A	N/A	N/A	0.0122	0.0129	0.0030	0.0000	0.0000	0.0292	0.0122	0.0129	0.0030	0.0000	0.0000	0.0000	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
Emission Rate	lb/hr		lb/hr		0.3421	0.1062	0.1062	0.2549	N/A	N/A	N/A	N/A	0.3668	0.3668	0.2293	0.2293	0.3668	---	0.3668	0.3668	0.2293	0.2293	0.3668	0.3668	0.0000	
Emission Factor	lb/time		lb/time		167.62	0.00	0.00	26.00	N/A	N/A	N/A	N/A	223.03	236.23	54.79	54.79	223.03	535.80	223.03	236.23	54.79	54.79	223.03	223.03	0.00	
Emission Rate	tons/time		tons/time		0.0838	0.0000	0.0000	0.0130	N/A	N/A	N/A	N/A	0.1115	0.1181	0.0274	0.0000	0.0000	0.2679	0.1115	0.1181	0.0274	0.0000	0.0000	0.0000	0.0000	
Emission Factor	lb/mmmscf		lb/mmmscf		120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	
Emission Rate	lb/hr		lb/hr		7,508.9839	2,331.5462	2,331.5462	5,595.7109	N/A	N/A	N/A	N/A	8,052.0266	8,052.0266	5,032.5166	5										



2014	Emissions Calculations					Units	Yearly Total (Summation)															
	Area	Boiler Identifier	Boiler Runtime	Natural Gas Heating Value	Total Natural Gas Consumed	Total for Year	East Heating Plant				West Heating Plant				Convocation Center				Monsanto Building			
							1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2			
			hrs		---		2,227.0	2,063.0	606.0	1,135.0	632.0	520.5	1,735.0	2,671.5	1,225.0	850.0	850.0	1,250.0	1,250.0			
	Natural Gas	BTU/scf		1,022.50			120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	149,887.35	105,421.97	105,421.97			
	Total Natural Gas Consumed	therms		6,528,138.56			117,359.41	117,359.41	73,349.63	73,349.63	117,359.41	48,899.76	48,899.76	73,349.63	117,359.41	12,322.74	14,662,960.90	10,313,160.20	10,313,160.20			
		scf		638,640,496.10			0.06435	0.06435	0.04022	0.04022	0.06435	0.02466	0.02466	0.03698	0.05917	0.00863	0.00863	0.00413	0.00413			
	Burner Information					84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00			
		lb/hr		---		5.6642	5.4467	2.9502	3.0671	0.0000	3.0671	2.2625	2.1470	0.0000	5.3529	0.7245	0.7245	0.3465	0.3465			
		lb/time		53,642.11		12,614.18	11,236.45	1,787.82	3,481.19	3,367.52	1,177.62	1,177.62	3,725.12	6,557.28	615.84	615.84	433.15	433.15	433.15			
		tons/time		26,821.1		6.3071	5.6182	0.8939	1.7406	1.6838	0.5888	0.5888	1.8626	3.2786	0.3079	0.3079	0.2166	0.2166	0.2166			
		lb/mmscf		120,000.00		120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00			
		lb/hr		---		8,091.7154	7,780.9395	4,214.5711	4,381.6172	0.0000	3,232.1196	3,067.2042	0.0000	7,646.9764	1,035.0325	1,035.0325	495.0317	495.0317	495.0317			
		lb/time		76,631,579.53		18,020,250.14	16,052,078.17	2,554,030.10	4,973,135.55	4,810,746.05	1,682,318.25	5,321,599.30	10,852,741.35	9,367,546.10	879,777.65	879,777.65	618,789.61	618,789.61	618,789.61			
		tons/time		38,315,789.8		9,010.1251	8,026.0391	1,277.0150	2,486.5678	2,405.3730	841.1591	2,660.7996	5,426.3707	4,683.7731	439.8888	439.8888	309.3948	309.3948	309.3948			
		lb/mmscf		2.30		0.1551	0.1491	0.0808	0.0840	0.0000	0.0619	0.0588	0.0000	0.1466	0.0198	0.0198	0.0095	0.0095	0.0095			
		lb/hr		---		345.39	307.66	48.95	95.32	92.21	32.24	102.00	208.01	179.54	16.86	16.86	11.86	11.86	11.86			
		lb/time		1,468.77		0.1727	0.1538	0.0245	0.0477	0.0461	0.0161	0.0510	0.1040	0.0898	0.0084	0.0084	0.0059	0.0059	0.0059			
		tons/time		0.7344		2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20			
		lb/mmscf		2.20		0.1483	0.1427	0.0773	0.0803	0.0000	0.0593	0.0562	0.0000	0.1402	0.0190	0.0190	0.0091	0.0091	0.0091			
		lb/hr		---		330.37	294.29	46.82	91.17	88.20	30.84	97.56	198.97	171.74	16.13	16.13	11.34	11.34	11.34			
		lb/time		1,404.91		0.1652	0.1471	0.0234	0.0456	0.0441	0.0154	0.0488	0.0995	0.0859	0.0081	0.0081	0.0057	0.0057	0.0057			
		tons/time		0.7025		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49			
		lb/mmscf		0.49		0.0330	0.0318	0.0172	0.0179	0.0000	0.0132	0.0125	0.0000	0.0312	0.0042	0.0042	0.0020	0.0020	0.0020			
		lb/hr		---		73.58	65.55	10.43	20.31	19.64	6.87	21.73	44.32	38.25	3.59	3.59	2.53	2.53	2.53			
		lb/time		312.91		0.0368	0.0328	0.0052	0.0102	0.0098	0.0034	0.0109	0.0222	0.0191	0.0018	0.0018	0.0013	0.0013	0.0013			
		tons/time		0.1565		280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	100.00			
		lb/mmscf		280.00		18.8807	18.1555	3.5121	3.6513	0.0000	2.6934	2.5560	0.0000	17.8429	0.8625	0.8625	0.4125	0.4125	0.4125			
		lb/hr		---		42,047.25	37,454.85	2,128.36	4,144.28	11,225.07	1,401.93	4,434.67	9,043.95	21,857.61	733.15	733.15	515.66	515.66	515.66			
		lb/time		136,235.58		21,023.6	18,727.4	1,064.2	2,072.1	5,612.5	701.0	2,217.3	4,522.0	10,928.8	0.3666	0.3666	0.2578	0.2578	0.2578			
		tons/time		68,117.8		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
		lb/mmscf		7.60		0.5125	0.4928	0.2669	0.2775	0.0000	0.2047	0.1943	0.0000	0.4843	0.0656	0.0656	0.0314	0.0314	0.0314			
		lb/hr		---		1,141.28	1,016.63	161.76	314.97	304.68	106.55	337.03	687.34	593.28	55.72	55.72	39.19	39.19	39.19			
		lb/time		4,853.33		0.5706	0.5083	0.0809	0.1575	0.1523	0.0533	0.1685	0.3437	0.2966	0.0279	0.0279	0.0196	0.0196	0.0196			
		tons/time		2,426.7		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
		lb/mmscf		7.60		0.5125	0.4928	0.2669	0.2775	0.0000	0.2047	0.1943	0.0000	0.4843	0.0656	0.0656	0.0314	0.0314	0.0314			
		lb/hr		---		1,141.28	1,016.63	161.76	314.97	304.68	106.55	337.03	687.34	593.28	55.72	55.72	39.19	39.19	39.19			
		lb/time		4,853.33		0.5706	0.5083	0.0809	0.1575	0.1523	0.0533	0.1685	0.3437	0.2966	0.0279	0.0279	0.0196	0.0196	0.0196			
		tons/time		2,426.7		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
		lb/mmscf		7.60		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60			
		lb/hr		---		0.0405	0.0389	0.0211	0.0219	0.0000	0.0162	0.0153	0.0000	0.0382	0.0052	0.0052	0.0025	0.0025	0.0025			
		lb/time		383.16		90.10	80.26	12.77	24.87	24.05	8.41	26.61	54.26	46.84	4.40	4.40	3.09	3.09	3.09			
		tons/time		0.1916		0.0451	0.0401	0.0064	0.0124	0.0120	0.0042	0.0133	0.0271	0.0234	0.0022	0.0022	0.0015	0.0015	0.0015			
		lb/mmscf		5.50		5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50			
		lb/hr		---		0.3709	0.3566	0.1932	0.2008	0.0000	0.1481	0.1406	0.0000	0.3505	0.0474	0.0474	0.0227	0.0227	0.0227			
		lb/time		3,512.28		825.93	735.72	117.06	227.94	220.49	77.11	243.91	497.42	429.35	40.32	40.32	28.36	28.36	28.36			
		tons/time		1,756.1		0.4130	0.3679	0.0585	0.1140	0.1102	0.0386	0.1220	0.2487	0.2147	0.0202	0.0202	0.0142	0.0142	0.0142			
		lb/mmscf		120,730.00		120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00			
		lb/hr		---		8,140.9400	7,828.2735	4,240.2098	4,408.2721	0.0000	3,251.7817	3,085.8630	0.0000	7,693.4955	1,041.3290	1,041.3290	498.0431	498.0431	498.0431			
		lb/time		77,097,754.97		18,129,873.33	16,149,728.31	2,569,567.11	5,003,388.79	4,840,011.42	1,692,552.35	5,353,972.36	10,918,762.20	9,424,532.01	885,129.63	885,129.63	622,553.92	622,553.92	622,553.92			
		tons/time		38,548.8775		9,064.9367	8,074.8642	1,284.7836	2,501.6944	2,420.0057	846.2762	2,676.9862	5,459.3811	4,712.2660	442.5648	442.5648	311.2770	311.2770	311.2770			





2014	Emissions Calculations			March													Total for the Month				
	Area	Units	t	West Heating Plant				Convocation Center				Monsanto Building		East Heating Plant							
Boiler Information	Boiler Identifier	---	---	1W	2W	3W	4W	Convo 1	Convo 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E					
	Boiler Runtime	hrs	4E	0.0	7.0	0.0	0.0	N/A	N/A	N/A	N/A	220.0	500.0	0.0	49.0	60.0					
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,021.00														1,022.00				
	Total Natural Gas Consumed	therms		5,819.70													517,018.45				
Burner Information	Total Natural Gas Consumed	scf		570,000.00													50,588,889.43				
	Gas Burner Maximum Input	mmBTU/hr	75.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00	120.00					
	Gas Burner Fire Rate	scf	73,457.39	48,971.60	48,971.60	73,457.39	117,531.83	12,340.84	12,340.84	3,428.01	3,428.01	117,416.83	117,416.83	73,385.52	73,385.52	117,416.83					
	Emission Factor	mmscf/hr	0.03773	0.08143	0.08143	0.12214	0.19543	N/A	N/A	N/A	N/A	0.06040	0.06040	0.03775	0.03775	0.06040					
	Emission Rate	lb/mmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00					
	Emission Rate	lb/hr	3.1696	6.8400	6.8400	10.2600	16.4160	N/A	N/A	N/A	N/A	5.0735	5.0735	3.1710	3.1710	5.0735					
	Emission Rate	lb/time	1,516.67	1,465.64	1,465.64	0.00	0.00	0.00	0.00	0.00	0.00	1,116.17	2,536.76	0.00	155.38	304.41					
	Emission Rate	tons/time	0.7583	0.7328	0.7328	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5581	1.2684	0.0000	0.0777	0.1522					
	Emission Rate	lb/mmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00					
	Emission Rate	lb/hr	4,528.0506	7,244.8810	7,244.8810	14,657.1429	23,451.4286	N/A	N/A	N/A	N/A	7,247.8890	7,247.8890	4,529.9306	4,529.9306	7,247.8890					
	Emission Rate	lb/time	2,166,672.22	2,093,770.61	2,093,770.61	0.00	0.00	0.00	0.00	0.00	0.00	1,594,535.57	3,623,944.49	0.00	221,966.60	434,873.34					
	Emission Rate	tons/time	1,083.3361	1,046.8853	1,046.8853	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	797.2678	1,811.9722	0.0000	110.9833	217.4367					
	Emission Rate	lb/mmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30					
	Emission Rate	lb/hr	0.0868	0.1389	0.1389	0.2809	0.4495	N/A	N/A	N/A	N/A	0.1389	0.1389	0.0868	0.0868	0.1389					
	Emission Rate	lb/time	41.53	40.13	40.13	0.00	0.00	0.00	0.00	0.00	0.00	30.56	69.46	0.00	4.25	8.34					
	Emission Rate	tons/time	0.0208	0.0201	0.0201	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0153	0.0347	0.0000	0.0021	0.0042					
Emission Rate	lb/mmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20						
Emission Rate	lb/hr	0.0830	0.1328	0.1328	0.2687	0.4299	N/A	N/A	N/A	N/A	0.1329	0.1329	0.0830	0.0830	0.1329						
Emission Rate	lb/time	39.72	38.39	38.39	0.00	0.00	0.00	0.00	0.00	0.00	29.23	66.44	0.00	4.07	7.97						
Emission Rate	tons/time	0.0199	0.0192	0.0192	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0146	0.0332	0.0000	0.0020	0.0040						
Emission Rate	lb/mmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49						
Emission Rate	lb/hr	0.0185	0.0296	0.0296	0.0599	0.0958	N/A	N/A	N/A	N/A	0.0296	0.0296	0.0185	0.0185	0.0296						
Emission Rate	lb/time	8.85	8.55	8.55	0.00	0.00	0.00	0.00	0.00	0.00	6.51	14.80	0.00	0.91	1.78						
Emission Rate	tons/time	0.0044	0.0043	0.0043	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0074	0.0074	0.0000	0.0005	0.0009						
Emission Rate	lb/mmscf	100.00	280.00	280.00	100.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	280.00						
Emission Rate	lb/hr	3.7734	16.9047	16.9047	8.1429	8.1429	54.7200	N/A	N/A	N/A	16.9117	16.9117	3.7749	3.7749	16.9117						
Emission Rate	lb/time	1,805.56	4,885.46	4,885.46	0.00	0.00	0.00	0.00	0.00	0.00	3,720.58	8,455.87	0.00	184.97	1,014.70						
Emission Rate	tons/time	0.9028	2.4427	2.4427	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.8603	4.2279	0.0000	0.0925	0.5074						
Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60						
Emission Rate	lb/hr	0.2868	0.4588	0.4588	0.9283	1.4853	N/A	N/A	N/A	N/A	0.4590	0.4590	0.2869	0.2869	0.4590						
Emission Rate	lb/time	137.22	132.61	132.61	0.00	0.00	0.00	0.00	0.00	0.00	100.99	229.52	0.00	14.06	27.54						
Emission Rate	tons/time	0.0686	0.0663	0.0663	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0505	0.1148	0.0000	0.0070	0.0138						
Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60						
Emission Rate	lb/hr	0.2868	0.4588	0.4588	0.9283	1.4853	N/A	N/A	N/A	N/A	0.4590	0.4590	0.2869	0.2869	0.4590						
Emission Rate	lb/time	137.22	132.61	132.61	0.00	0.00	0.00	0.00	0.00	0.00	100.99	229.52	0.00	14.06	27.54						
Emission Rate	tons/time	0.0686	0.0663	0.0663	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0505	0.1148	0.0000	0.0070	0.0138						
Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60						
Emission Rate	lb/hr	0.2868	0.4588	0.4588	0.9283	1.4853	N/A	N/A	N/A	N/A	0.4590	0.4590	0.2869	0.2869	0.4590						
Emission Rate	lb/time	137.22	132.61	132.61	0.00	0.00	0.00	0.00	0.00	0.00	100.99	229.52	0.00	14.06	27.54						
Emission Rate	tons/time	0.0686	0.0663	0.0663	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0505	0.1148	0.0000	0.0070	0.0138						
Emission Rate	lb/mmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60						
Emission Rate	lb/hr	0.0226	0.0362	0.0362	0.0733	0.1173	N/A	N/A	N/A	N/A	0.0362	0.0362	0.0226	0.0226	0.0362						
Emission Rate	lb/time	10.83	10.47	10.47	0.00	0.00	0.00	0.00	0.00	0.00	7.97	18.12	0.00	1.11	2.17						
Emission Rate	tons/time	0.0054	0.0052	0.0052	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0040	0.0091	0.0000	0.0006	0.0011						
Emission Rate	lb/mmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50						
Emission Rate	lb/hr	0.2075	0.3321	0.3321	0.6718	1.0749	N/A	N/A	N/A	N/A	0.3322	0.3322	0.2076	0.2076	0.3322						
Emission Rate	lb/time	99.31	95.96	95.96	0.00	0.00	0.00	0.00	0.00	0.00	73.08	166.10	0.00	10.17	19.93						
Emission Rate	tons/time	0.0497	0.0480	0.0480	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0365	0.0830	0.0000	0.0051	0.0100						
Emission Rate	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00						
Emission Rate	lb/hr	4,555.5963	7,288.9540	7,288.9540	14,746.3071	23,594.0914	N/A	N/A	N/A	N/A	7,291.9803	7,291.9803	4,557.4877	4,557.4877	7,291.9803						
Emission Rate	lb/time	2,179,852.81	2,106,507.71	2,106,507.71	0.00	0.00	0.00	0.00	0.00	0.00	1,604,235.67	3,645,990.15	0.00	223,316.90	437,518.82						
Emission Rate	tons/time	1,089.9264	1,053.2539	1,053.2539	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	802.1178	1,822.9951	0.0000	111.6584	218.7594						





2014			Emissions Calculations				Units			June									
Boiler Information	Area	Convocation Center		Monsanto Building		Total for the Month	East Heating Plant					West Heating Plant							
	Boiler Identifier	Conv 1	Conv 2	Monsanto 1	Monsanto 2		1E	2E	3E	4E	5E	1W	2W	3W	4W				
Boiler Runtime	hrs	N/A	N/A	N/A	N/A	---	0.0	0.0	0.0	0.0	0.0	0.0	0.0	2.5	547.5	173.5	0.0		
Natural Gas Heating Value		5,907.16		5,117.99		1,022.00	1,022.00												
Total Natural Gas Consumed		578,000.00		500,781.80		232,606.04	224,788.90												
Gas Burner Maximum Input		12,328.77		3,424.66		22,759,886.50	120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	120.00	120.00	120.00	
Gas Burner Fire Rate		12,328.77		3,424.66		---	117,416.83	117,416.83	73,385.52	73,385.52	117,416.83	48,923.68	48,923.68	73,385.52	117,416.83	48,923.68	73,385.52	117,416.83	
Emission Factor		84.00		84.00		84.00	0.00000	0.00000	0.00000	0.00000	0.00000	0.02715	0.02715	0.04072	0.02715	0.04072	0.06515	0.06515	
Emission Rate		3,8186		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	2.2803	2.2803	3.4204	2.2803	3.4204	5.4726	5.4726	
Emission Rate		643.44		N/A		1,911.83	0.00	0.00	0.00	0.00	0.00	5.70	5.70	1,248.44	5.70	1,248.44	9.9344	9.9344	
Emission Rate		0.3217		N/A		0.9559	0.0000	0.0000	0.0000	0.0000	0.0000	0.0029	0.0029	0.2967	0.0029	0.2967	0.0000	0.0000	
Emission Factor		120,000.00		120,000.00		120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	
Emission Rate		5,455.2078		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	3,257.5131	3,257.5131	4,886.2697	3,257.5131	4,886.2697	7,818.0315	7,818.0315	
Emission Rate		919,202.52		N/A		2,731,186.38	0.00	0.00	0.00	0.00	0.00	8,143.78	8,143.78	1,783,488.43	8,143.78	1,783,488.43	847,767.79	847,767.79	
Emission Factor		202.8655		N/A		1,365,593.2	0.0000	0.0000	0.0000	0.0000	0.0000	4,071.9	4,071.9	423,883.9	4,071.9	423,883.9	0.0000	0.0000	
Emission Factor		2.30		2.30		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
Emission Rate		0.0653		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0624	0.0624	0.0937	0.0624	0.0937	0.1498	0.1498	
Emission Rate		7.78		N/A		52.35	0.00	0.00	0.00	0.00	0.00	0.16	0.16	16.25	0.16	16.25	0.00	0.00	
Emission Rate		0.0039		N/A		0.0262	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0081	0.0001	0.0081	0.0000	0.0000	
Emission Factor		2.20		2.20		2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	
Emission Rate		0.0625		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0597	0.0597	0.0896	0.0597	0.0896	0.1433	0.1433	
Emission Rate		7.44		N/A		50.07	0.00	0.00	0.00	0.00	0.00	0.15	0.15	15.54	0.15	15.54	0.00	0.00	
Emission Factor		0.0037		N/A		0.0250	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001	0.0078	0.0001	0.0078	0.0000	0.0000	
Emission Factor		0.49		0.49		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
Emission Rate		0.0139		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0133	0.0133	0.0200	0.0133	0.0200	0.0319	0.0319	
Emission Rate		1.66		N/A		11.15	0.00	0.00	0.00	0.00	0.00	0.03	0.03	3.46	0.03	3.46	0.00	0.00	
Emission Factor		0.0008		N/A		0.0056	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0000	0.0017	0.0000	0.0000	
Emission Factor		100.00		100.00		280.00	280.00	280.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	
Emission Rate		2.8413		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	2.7146	2.7146	4.0719	2.7146	4.0719	18.2421	18.2421	
Emission Rate		338.11		N/A		2,199.50	0.00	0.00	0.00	0.00	0.00	6.79	6.79	706.47	6.79	706.47	0.00	0.00	
Emission Factor		0.1691		N/A		1.0998	0.0000	0.0000	0.0000	0.0000	0.0000	0.0034	0.0034	0.3532	0.0034	0.3532	0.0000	0.0000	
Emission Factor		7.60		7.60		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
Emission Rate		0.2159		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	0.2063	0.2063	0.3095	0.2063	0.3095	0.4951	0.4951	
Emission Rate		25.70		N/A		172.98	0.00	0.00	0.00	0.00	0.00	0.52	0.52	53.69	0.52	53.69	0.00	0.00	
Emission Rate		0.0128		N/A		0.0865	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.0268	0.0003	0.0268	0.0000	0.0000	
Emission Factor		7.60		7.60		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
Emission Factor		0.2159		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	0.2063	0.2063	0.3095	0.2063	0.3095	0.4951	0.4951	
Emission Rate		25.70		N/A		172.98	0.00	0.00	0.00	0.00	0.00	0.52	0.52	53.69	0.52	53.69	0.00	0.00	
Emission Rate		0.0128		N/A		0.0865	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.0268	0.0003	0.0268	0.0000	0.0000	
Emission Factor		0.60		0.60		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Emission Factor		0.0170		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0163	0.0163	0.0244	0.0163	0.0244	0.0391	0.0391	
Emission Rate		2.03		N/A		13.66	0.00	0.00	0.00	0.00	0.00	0.04	0.04	4.24	0.04	4.24	0.00	0.00	
Emission Rate		0.0010		N/A		0.0068	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0021	0.0000	0.0021	0.0000	0.0000	
Emission Factor		5.50		5.50		5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
Emission Factor		0.1563		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	0.1493	0.1493	0.2240	0.1493	0.2240	0.3583	0.3583	
Emission Rate		18.60		N/A		125.18	0.00	0.00	0.00	0.00	0.00	0.37	0.37	38.86	0.37	38.86	0.00	0.00	
Emission Rate		0.0093		N/A		0.0626	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002	0.0194	0.0002	0.0194	0.0000	0.0000	
Emission Factor		120,730.00		120,730.00		120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	
Emission Rate		3,430.2460		N/A		---	0.0000	0.0000	0.0000	0.0000	0.0000	3,277.3297	3,277.3297	4,915.9945	3,277.3297	4,915.9945	7,865.5912	7,865.5912	
Emission Rate		408,199.28		N/A		2,747,801.10	0.00	0.00	0.00	0.00	0.00	8,193.32	8,193.32	852,925.04	8,193.32	852,925.04	0.00	0.00	
Emission Rate		204.0996		N/A		1,375.9005	0.0000	0.0000	0.0000	0.0000	0.0000	4.0967	4.0967	426.4625	4.0967	426.4625	0.0000	0.0000	





2014	Emissions Calculations		September												Total for the							
	Area	Units	East Heating Plant						West Heating Plant						Convocation Center		Monsanto Building		Total for the Month	1E	0.0	
			1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2							
Boiler Information	Boiler Identifier	---																			1E	1E
	Boiler Runtime	hrs	1,023.00																		---	0.0
Natural Gas Information	Natural Gas Heating Value	BTU/scf	272,875.02																		1,024.00	
	Total Natural Gas Consumed	therms	26,674,000.00																		292,275.81	
Burner Information	Gas Burner Maximum Input	mmBTU/hr	513,000.00																		28,542,559.57	
	Gas Burner Fire Rate	scf	120.00	117,302.05	73,313.78	75.00	120.00	48,875.86	73,313.78	117,302.05	50.00	48,875.86	73,313.78	117,302.05	12,316.72	12,316.72	3,421.31	3,421.31	---	---	120.00	
CO	Emission Factor	mmscf/hr	0.00000	0.00000	0.00000	0.00000	0.00000	0.02461	0.03691	0.03691	0.02461	0.03691	0.03691	0.03691	N/A	N/A	N/A	N/A	---	---	0.00000	
	Emission Rate	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2.0670	3.1005	3.1005	2.0670	3.1005	3.1005	N/A	N/A	N/A	N/A	---	---	0.0000	
CO2	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0041	1.1162	1.1162	0.0041	1.1162	1.1162	N/A	N/A	N/A	N/A	1.1988	1.1988	0.0000	
	Emission Factor	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	2,952.8413	2,952.8413	4,429.2620	7,086.8192	4,429.2620	7,086.8192	4,429.2620	7,086.8192	N/A	N/A	N/A	N/A	3,425,107.15	3,425,107.15	0.0000
Methane	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5.9057	1,594.5343	1,594.5343	0.0000	5.9057	1,594.5343	N/A	N/A	N/A	N/A	1,712.5536	1,712.5536	0.0000	
	Emission Rate	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0566	0.0849	0.1358	0.0566	0.0849	0.1358	0.0566	0.0849	N/A	N/A	N/A	---	---	0.0000	
N2O	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0306	0.0306	0.0000	0.0001	0.0306	N/A	N/A	N/A	N/A	0.0928	0.0928	0.0000	
	Emission Factor	lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0541	0.0541	0.1299	0.0541	0.1299	0.0541	0.1299	N/A	N/A	N/A	N/A	62.79	62.79	0.0000	
NH3	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0292	0.0292	0.0000	0.0001	0.0292	N/A	N/A	N/A	N/A	0.0314	0.0314	0.0000	
	Emission Rate	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0121	0.0181	0.0289	0.0121	0.0181	0.0289	0.0121	0.0181	N/A	N/A	N/A	---	---	0.0000	
NOx	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0065	0.0065	0.0000	0.0005	0.0065	N/A	N/A	N/A	N/A	13.99	13.99	0.0000	
	Emission Factor	lb/mmmscf	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	2.4607	2.4607	16.5359	2.4607	16.5359	2.4607	16.5359	N/A	N/A	N/A	N/A	0.0070	0.0070	0.0000	
Emissions Data	Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	9.84	2,657.56	9.84	2,657.56	0.00	9.84	2,657.56	N/A	N/A	N/A	N/A	3,141.94	3,141.94	0.0000	
	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0049	1.3288	0.0049	1.3288	0.0000	0.0049	1.3288	N/A	N/A	N/A	N/A	1.5710	1.5710	0.0000	
	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
Particulate	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.1870	0.2805	0.4488	0.1870	0.2805	0.4488	0.1870	0.2805	N/A	N/A	N/A	---	---	0.0000	
	Emission Factor	lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.1010	0.1010	0.0000	0.0004	0.1010	N/A	N/A	N/A	N/A	0.1085	0.1085	0.0000	
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.1870	0.2805	0.4488	0.1870	0.2805	0.4488	0.1870	0.2805	N/A	N/A	N/A	---	---	0.0000	
PM10	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.1010	0.1010	0.0000	0.0004	0.1010	N/A	N/A	N/A	N/A	0.1085	0.1085	0.0000	
	Emission Factor	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0148	0.0148	0.0354	0.0148	0.0354	0.0148	0.0354	N/A	N/A	N/A	N/A	---	---	0.0000	
PM2.5	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	216.92	216.92	0.0000	
	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.1870	0.2805	0.4488	0.1870	0.2805	0.4488	0.1870	0.2805	N/A	N/A	N/A	---	---	0.0000	
SO2	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0004	0.1010	0.1010	0.0000	0.0004	0.1010	N/A	N/A	N/A	N/A	0.1085	0.1085	0.0000	
	Emission Factor	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0148	0.0148	0.0354	0.0148	0.0354	0.0148	0.0354	N/A	N/A	N/A	N/A	---	---	0.0000	
VOC	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0086	0.0086	0.0000	
	Emission Factor	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.1353	0.2030	0.3248	0.1353	0.2030	0.3248	0.1353	0.2030	N/A	N/A	N/A	---	---	0.0000	
CO2E	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0003	0.0731	0.0731	0.0000	0.0003	0.0731	N/A	N/A	N/A	N/A	0.0785	0.0785	0.0000	
	Emission Factor	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00		
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	2,970.8044	2,970.8044	7,129.9307	2,970.8044	7,129.9307	2,970.8044	7,129.9307	N/A	N/A	N/A	N/A	3,445,943.22	3,445,943.22	0.0000	
	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	1,722.9716	1,722.9716	0.0000	

2014	Emissions Calculations		October												Total for the Month			
	Area	Units	East Heating Plant				West Heating Plant				Convocation Center		Monsanto Building		1E	2E	3E	
Boiler Information	Boiler Identifier	---	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	
	Boiler Runtime	hrs	30.0	120.0	0.0	0.0	144.0	297.0	440.0	43.0	N/A	N/A	N/A	N/A	0.0	0.0	0.0	
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,024.00															
	Total Natural Gas Consumed	therms	278,736.64															
Burner Information		scf	8,284.16															
	Gas Burner Maximum Input	mmBTU/hr	809,000.00															
CO	Gas Burner Fire Rate	scf	117,187.50	73,242.19	73,242.19	117,187.50	48,828.13	48,828.13	73,242.19	117,187.50	117,187.50	12,304.69	12,304.69	3,417.97	3,417.97	117,073.17	117,073.17	73,170.73
	Emission Factor	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	1.8988	1.8988	2.8482	4.5571	4.5571	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000
	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	273.42	273.42	1,253.20	195.95	195.95	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	2,712.5436	2,712.5436	4,068.8154	6,510.1046	6,510.1046	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	390,606.28	390,606.28	805,625.45	1,790,278.77	279,934.50	279,934.50	N/A	N/A	N/A	0.0000	0.0000	0.0000
	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	195.3031	195.3031	402.8127	895.1394	139.9672	139.9672	N/A	N/A	N/A	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	2.30	2.30	2.30	2.30	0.0520	0.0520	0.0780	0.1248	0.1248	2.30	2.30	2.30	2.30	2.30	2.30	2.30
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	7.49	7.49	34.31	5.37	5.37	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000
	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0037	0.0037	0.0172	0.0027	0.0027	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000
	Emission Rate	lb/mmmscf	2.20	2.20	2.20	2.20	0.0497	0.0497	0.0746	0.1194	0.1194	2.20	2.20	2.20	2.20	2.20	2.20	2.20
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	14.77	14.77	32.82	5.13	5.13	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0036	0.0036	0.0164	0.0026	0.0026	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Rate	lb/mmmscf	0.49	0.49	0.49	0.49	0.0111	0.0111	0.0166	0.0266	0.0266	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0111	0.0111	0.0166	0.0266	0.0266	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	1.59	1.59	7.31	1.14	1.14	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Rate	lb/mmmscf	280.00	280.00	280.00	280.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	2.2605	2.2605	3.3907	15.1902	15.1902	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.1628	0.1628	0.3357	0.7459	0.3266	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	0.1718	0.1718	0.2577	0.4123	0.4123	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	24.74	24.74	113.38	17.73	17.73	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0124	0.0124	0.0255	0.0089	0.0089	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	0.1718	0.1718	0.2577	0.4123	0.4123	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	24.74	24.74	113.38	17.73	17.73	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0124	0.0124	0.0255	0.0089	0.0089	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Rate	lb/mmmscf	0.60	0.60	0.60	0.60	0.0136	0.0136	0.0203	0.0326	0.0326	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	1.95	1.95	8.95	1.40	1.40	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0010	0.0010	0.0045	0.0007	0.0007	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Rate	lb/mmmscf	5.50	5.50	5.50	5.50	0.1243	0.1243	0.1865	0.2984	0.2984	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	17.90	17.90	82.05	12.83	12.83	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0090	0.0090	0.0410	0.0064	0.0064	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Rate	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	2,729.0449	2,729.0449	4,093.5674	6,549.7078	281,637.43	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	392,982.47	392,982.47	810,526.34	1,801,169.64	281,637.43	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	196.4912	196.4912	405.2632	900.5848	140.8187	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0000	



2014		Emissions Calculations					December		Units	
Area		West Heating Plant					Convocation Center		Monsanto Building	
Boiler Identifier		1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	
Boiler Runtime		53.0	242.0	0.0	267.0	N/A	N/A	N/A	N/A	
Natural Gas Heating Value		1,026.00								
Total Natural Gas Consumed		21,248.46								
		2,071,000.00								
		14,233.55								
		1,387,285.58								
Gas Burner Maximum Input		50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	
Gas Burner Fire Rate		48,732.94	48,732.94	73,099.42	116,959.06	12,280.70	12,280.70	3,411.31	3,411.31	
Emission Factor		0.02650	0.02650	0.03976	0.06361	N/A	N/A	N/A	N/A	
Emission Rate		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	
Emission Factor		2.2263	2.2263	3.3394	5.3431	N/A	N/A	N/A	N/A	
Emission Rate		117.99	538.76	0.00	1,426.61	N/A	N/A	N/A	N/A	
Emission Factor		0.0590	0.2694	0.0000	0.7133	N/A	N/A	N/A	N/A	
Emission Rate		120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	
Emission Factor		3,180.4232	3,180.4232	4,770.6348	7,633.0156	N/A	N/A	N/A	N/A	
Emission Rate		168,562.43	769,662.41	0.00	2,038,015.17	N/A	N/A	N/A	N/A	
Emission Factor		84.2812	384.8312	0.0000	1,019.0076	N/A	N/A	N/A	N/A	
Emission Rate		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
Emission Factor		0.0610	0.0610	0.0914	0.1463	N/A	N/A	N/A	N/A	
Emission Rate		3.23	14.75	0.00	39.06	N/A	N/A	N/A	N/A	
Emission Factor		0.0016	0.0074	0.0000	0.0195	N/A	N/A	N/A	N/A	
Emission Rate		2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	
Emission Factor		0.0583	0.0583	0.0875	0.1399	N/A	N/A	N/A	N/A	
Emission Rate		3.09	14.11	0.00	37.36	N/A	N/A	N/A	N/A	
Emission Factor		0.0015	0.0071	0.0000	0.0187	N/A	N/A	N/A	N/A	
Emission Rate		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
Emission Factor		0.0130	0.0130	0.0195	0.0312	N/A	N/A	N/A	N/A	
Emission Rate		0.69	3.14	0.00	8.32	N/A	N/A	N/A	N/A	
Emission Factor		0.0003	0.0016	0.0000	0.0042	N/A	N/A	N/A	N/A	
Emission Rate		100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	
Emission Factor		2.6504	2.6504	3.9755	17.8104	N/A	N/A	N/A	N/A	
Emission Rate		140.47	641.39	0.00	4,755.37	N/A	N/A	N/A	N/A	
Emission Factor		0.0702	0.3207	0.0000	2.3777	N/A	N/A	N/A	N/A	
Emission Rate		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
Emission Factor		0.2014	0.2014	0.3021	0.4834	N/A	N/A	N/A	N/A	
Emission Rate		10.68	48.75	0.00	129.07	N/A	N/A	N/A	N/A	
Emission Factor		0.0053	0.0244	0.0000	0.0645	N/A	N/A	N/A	N/A	
Emission Rate		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
Emission Factor		0.2014	0.2014	0.3021	0.4834	N/A	N/A	N/A	N/A	
Emission Rate		10.68	48.75	0.00	129.07	N/A	N/A	N/A	N/A	
Emission Factor		0.0053	0.0244	0.0000	0.0645	N/A	N/A	N/A	N/A	
Emission Rate		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	
Emission Factor		0.0159	0.0159	0.0239	0.0382	N/A	N/A	N/A	N/A	
Emission Rate		0.84	3.85	0.00	10.19	N/A	N/A	N/A	N/A	
Emission Factor		0.0004	0.0019	0.0000	0.0051	N/A	N/A	N/A	N/A	
Emission Rate		5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	
Emission Factor		0.1458	0.1458	0.2187	0.3498	N/A	N/A	N/A	N/A	
Emission Rate		7.73	35.28	0.00	93.41	N/A	N/A	N/A	N/A	
Emission Factor		0.0039	0.0176	0.0000	0.0467	N/A	N/A	N/A	N/A	
Emission Rate		120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	
Emission Factor		3,199.7707	3,199.7707	4,799.6561	7,679.4498	N/A	N/A	N/A	N/A	
Emission Rate		169,587.85	774,344.52	0.00	2,050,413.09	N/A	N/A	N/A	N/A	
Emission Factor		84.7939	387.1723	0.0000	1,025.2065	N/A	N/A	N/A	N/A	
CO	CO	---								---
	CO2	---								---
Methane	Methane	hrs								hrs
	CO2	BTU/scf								BTU/scf
N2O	N2O	therms								therms
	CO2	scf								scf
NH3	NH3	mmBTU/hr								mmBTU/hr
	CO2	lb/hr								lb/hr
NOx	NOx	lb/time								lb/time
	CO2	tons/time								tons/time
Particulate	Particulate	lb/hr								lb/hr
	CO2	lb/hr								lb/hr
PM10	PM10	lb/time								lb/time
	CO2	tons/time								tons/time
PM2.5	PM2.5	lb/hr								lb/hr
	CO2	lb/time								lb/time
SO2	SO2	tons/time								tons/time
	CO2	lb/hr								lb/hr
VOC	VOC	lb/hr								lb/hr
	CO2	lb/time								lb/time
CO2E	CO2E	tons/time								tons/time
	CO2E	lb/hr								lb/hr









2015		Emissions Calculations		Units		March												Total for the		Af			
Boiler Information		Area	Boiler Identifier	West Heating Plant						Convocation Center		Monsanto Building		East Heating Plant						Month			
Boiler Runtime		hrs	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W	5E	1W				
Natural Gas Heating Value		BTU/scf	147.5	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	339.5	384.0	0.0	0.0	0.0	0.0	0.0	0.0				
Total Natural Gas Consumed		therms	1,029.00												1,029.00								
Total Natural Gas Consumed		scf	34,101.06												446,673.46								
Gas Burner Maximum Input		mmBTU/hr	3,314,000.00												43,408,499.51								
Gas Burner Fire Rate		scf	116,618.08	48,590.86	72,886.30	116,618.08	12,244.90	12,244.90	12,244.90	3,401.36	3,401.36	116,618.08	72,886.30	72,886.30	116,618.08	116,618.08	48,590.86						
Emission Factor		mmscf/hr	0.05121	0.00000	0.00000	0.00000	0.00000	N/A	N/A	N/A	N/A	0.05699	0.05699	0.03562	0.03562	0.05699	0.00000						
Emission Rate		lb/mmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00						
Emission Rate		lb/hr	4.3017	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	4.7870	4.7870	2.9919	2.9919	4.7870	0.0000						
Emission Rate		lb/time	634.50	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	1,625.19	1,625.19	0.00	0.00	1,625.19	0.00						
Emission Rate		tons/time	0.3172	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.8126	0.9191	0.0000	0.0000	0.8126	0.0000						
Emission Factor		lb/mmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00						
Emission Rate		lb/hr	6,145.2733	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	6,838.5902	6,838.5902	4,274.1189	4,274.1189	6,838.5902	0.0000						
Emission Rate		lb/time	906,427.81	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	2,321,701.37	2,626,018.63	0.00	0.00	2,321,701.37	0.00						
Emission Factor		tons/time	453.2139	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	1,160.8507	1,313.0093	0.0000	0.0000	1,160.8507	0.0000						
Emission Factor		lb/mmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30						
Emission Rate		lb/hr	0.1178	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1311	0.1311	0.0819	0.0819	0.1311	0.0000						
Emission Rate		lb/time	17.37	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	44.50	50.33	0.00	0.00	44.50	0.00						
Emission Rate		tons/time	0.0087	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0222	0.0252	0.0000	0.0000	0.0222	0.0000						
Emission Factor		lb/mmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20						
Emission Rate		lb/hr	0.1127	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1254	0.1254	0.0784	0.0784	0.1254	0.0000						
Emission Rate		lb/time	16.62	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	42.56	48.14	0.00	0.00	42.56	0.00						
Emission Factor		tons/time	0.0083	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0213	0.0241	0.0000	0.0000	0.0213	0.0000						
Emission Factor		lb/mmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49						
Emission Rate		lb/hr	0.0251	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0279	0.0279	0.0175	0.0175	0.0279	0.0000						
Emission Rate		lb/time	3.70	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	9.48	10.72	0.00	0.00	9.48	0.00						
Emission Rate		tons/time	0.0019	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0047	0.0054	0.0000	0.0000	0.0047	0.0000						
Emission Factor		lb/mmscf	280.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	280.00	100.00						
Emission Rate		lb/hr	14.3390	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	15.9567	15.9567	3.5618	3.5618	15.9567	0.0000						
Emission Rate		lb/time	2,115.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	5,417.30	6,127.38	0.00	0.00	5,417.30	0.00						
Emission Factor		tons/time	1.0575	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	2.7087	3.0637	0.0000	0.0000	2.7087	0.0000						
Emission Factor		lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60						
Emission Rate		lb/hr	0.3892	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4331	0.4331	0.2707	0.2707	0.4331	0.0000						
Emission Rate		lb/time	57.41	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	147.04	166.31	0.00	0.00	147.04	0.00						
Emission Rate		tons/time	0.0287	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0735	0.0832	0.0000	0.0000	0.0735	0.0000						
Emission Factor		lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60						
Emission Rate		lb/hr	0.3892	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4331	0.4331	0.2707	0.2707	0.4331	0.0000						
Emission Rate		lb/time	57.41	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	147.04	166.31	0.00	0.00	147.04	0.00						
Emission Rate		tons/time	0.0287	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0735	0.0832	0.0000	0.0000	0.0735	0.0000						
Emission Factor		lb/mmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60						
Emission Rate		lb/hr	0.0307	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0342	0.0342	0.0214	0.0214	0.0342	0.0000						
Emission Rate		lb/time	4.53	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	11.61	13.13	0.00	0.00	11.61	0.00						
Emission Rate		tons/time	0.0023	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0058	0.0066	0.0000	0.0000	0.0058	0.0000						
Emission Factor		lb/mmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50						
Emission Rate		lb/hr	0.2817	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.3134	0.3134	0.1959	0.1959	0.3134	0.0000						
Emission Rate		lb/time	41.54	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	106.41	120.36	0.00	0.00	106.41	0.00						
Emission Rate		tons/time	0.0208	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0532	0.0602	0.0000	0.0000	0.0532	0.0000						
Emission Factor		lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00						
Emission Rate		lb/hr	6,182.6571	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	6,880.1916	6,880.1916	4,300.1198	4,300.1198	6,880.1916	0.0000						
Emission Rate		lb/time	911,941.92	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	2,335,825.05	2,641,993.58	0.00	0.00	2,335,825.05	0.00						
Emission Rate		tons/time	455.9710	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	1,167.9125	1,320.9968	0.0000	0.0000	1,167.9125	0.0000						





2015			Emissions Calculations						Units		July																	
Boiler Information	Area	Emissions Calculations						Units	East Heating Plant						West Heating Plant						Convocation Center		Monsanto 1					
		Boiler Identifier	Monsanto 1	Monsanto 2	Convoc 1	Convoc 2	1E		2E	3E	4E	5E	1W	2W	3W	4W	Convoc 1	Convoc 2	Monsanto 1									
Boiler Runtime	Boiler Runtime	hrs	N/A	N/A	N/A	N/A	N/A	hrs	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	327.5	87.0	0.0	370.5	N/A	N/A	N/A		
Natural Gas Information	Natural Gas Heating Value	BTU/scf						1,032.00												1,032.00								
	Total Natural Gas Consumed	therms	52	4,377.48				249,496.32													246,039.12							
Burner Information	Gas Burner Maximum Input	mmBTU/hr	12.60	3.50	3.50	3.50	3.50	24,176,000.00													50.00	50.00	75.00	120.00	12.60			
	Gas Burner Fire Rate	scf	12,221.14	3,394.76	3,394.76	3,394.76	3,394.76	3,394.76	3,394.76												48,449.61	48,449.61	72,674.42	116,279.07	12,209.30			
CO	Emission Factor	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00													84.00	84.00	84.00	84.00	84.00			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													1,536.1	1,536.1	2,304.2	3,686.7	N/A			
CO2	Emission Factor	tons/time	N/A	N/A	N/A	N/A	N/A	N/A													503.08	503.08	0.00	1,365.92	N/A			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													2,050.78	2,050.78	0.00	5,830.0	N/A			
Methane	Emission Factor	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00													120,000.00	120,000.00	120,000.00	120,000.00	120,000.00			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													2,194.4619	2,194.4619	3,291.6929	5,266.7086	N/A			
N2O	Emission Factor	lb/time	N/A	N/A	N/A	N/A	N/A	N/A													718,686.28	718,686.28	0.00	1,951,315.54	N/A			
	Emission Rate	tons/time	N/A	N/A	N/A	N/A	N/A	N/A													359,343.1	359,343.1	0.0000	975,657.8	N/A			
NH3	Emission Factor	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30													0.0421	0.0421	0.0631	0.1009	N/A			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													0.0000	0.0000	0.0000	0.0000	N/A			
NOx	Emission Factor	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49													0.0090	0.0090	0.0134	0.0215	N/A			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													0.0000	0.0000	0.0000	0.0000	N/A			
PM10	Emission Factor	lb/mmmscf	280.00	280.00	280.00	280.00	280.00	280.00													100.00	100.00	100.00	100.00	100.00			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													1,828.7	1,828.7	2,743.1	4,553.07	N/A			
PM2.5	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60													7.60	7.60	7.60	7.60	7.60			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													0.1390	0.1390	0.2085	0.3336	N/A			
SO2	Emission Factor	lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000													0.0000	0.0000	0.0000	0.0000	N/A			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													0.0000	0.0000	0.0000	0.0000	N/A			
VOC	Emission Factor	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50													5.50	5.50	5.50	5.50	5.50			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													0.1006	0.1006	0.1509	0.2414	N/A			
CO2E	Emission Factor	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00													120,730.00	120,730.00	120,730.00	120,730.00	120,730.00			
	Emission Rate	lb/hr	N/A	N/A	N/A	N/A	N/A	N/A													2,207,811.6	2,207,811.6	3,311,717.3	5,298,747.7	N/A			
		tons/time	N/A	N/A	N/A	N/A	N/A	N/A													361,529.1	361,529.1	96,039.8	0.0000	N/A			
		tons/time	N/A	N/A	N/A	N/A	N/A	N/A													2,918,768.48	2,918,768.48	1,459,384.2	1,459,384.2	N/A			

2015	Emissions Calculations			Units	August												Total for the Month
	Area	Building	Boiler Identifier	Boiler Runtime	1E	2E	3E	4E	5E	1W	2W	3W	4W	Convoco 1	Convoco 2	Monsanto 1	
Natural Gas Information	Natural Gas Heating Value	---	---	hrs	0.0	0.0	0.0	0.0	0.0	237.0	739.0	0.0	0.0	N/A	N/A	N/A	N/A
	Total Natural Gas Consumed	1,033.00	257,558.92	BTU/scf	0.00	0.00	0.00	0.00	0.00	1,033.00	247,062.61	0.00	0.00	6,012.06	4,484.25	4,484.25	25,825,000.00
Burner Information	Gas Burner Maximum Input	---	---	therms	116,166.51	116,166.51	72,604.07	72,604.07	116,166.51	48,402.71	48,402.71	72,604.07	116,166.51	12,197.48	12,197.48	3,388.19	3,388.19
	Gas Burner Fire Rate	---	---	scf	0.00000	0.00000	0.00000	0.00000	0.00000	0.02451	0.02451	0.03676	0.05881	N/A	N/A	N/A	N/A
CO	Emission Factor	84.00	84.00	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
	Emission Rate	---	---	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	2.0584	2.0584	3.0876	4.9402	N/A	N/A	N/A	N/A
CO2	Emission Factor	1,047.2	1,047.2	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.2439	0.2439	0.0000	0.0000	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	2,940.6148	2,940.6148	4,410.9221	7,057.4754	120,000.00	120,000.00	120,000.00	120,000.00
Methane	Emission Factor	2,991,971.97	1,495,986.0	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	348.4628	1,086.5572	0.0000	0.0000	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
N2O	Emission Factor	0.49	0.49	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0120	0.0120	0.0180	0.0288	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	0.00	0.00	0.00	0.00	0.00	8.87	8.87	0.00	0.00	N/A	N/A	N/A	N/A
NH3	Emission Factor	0.0061	0.0061	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0014	0.0044	0.0000	0.0000	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00
NOx	Emission Factor	2,391.70	1,195.9	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	2.4505	2.4505	3.6758	16.4674	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	0.00	0.00	0.00	0.00	0.00	580.77	1,810.93	0.00	0.00	N/A	N/A	N/A	N/A
Particulate	Emission Factor	7.60	7.60	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.2904	0.9055	0.0000	0.0000	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
PM10	Emission Factor	189.49	189.49	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	44.14	137.63	0.00	0.00	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	0.00	0.00	0.00	0.00	0.00	137.63	0.00	0.00	0.00	N/A	N/A	N/A	N/A
PM2.5	Emission Factor	0.0947	0.0947	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0221	0.0688	0.0000	0.0000	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
SO2	Emission Factor	0.60	0.60	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.1862	0.1862	0.2794	0.4470	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	0.00	0.00	0.00	0.00	0.00	44.14	137.63	0.00	0.00	N/A	N/A	N/A	N/A
VOC	Emission Factor	5.50	5.50	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0017	0.0054	0.0000	0.0000	N/A	N/A	N/A	N/A
	Emission Rate	---	---	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	10.87	0.00	0.00	0.00	N/A	N/A	N/A	N/A
CO2E	Emission Factor	120,730.00	120,730.00	lb/hr	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	2,958.5035	2,958.5035	4,437.7552	7,100.4084	120,730.00	120,730.00	120,730.00	120,730.00
	Emission Rate	---	---	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	350.5827	1,093.1670	0.0000	0.0000	N/A	N/A	N/A	N/A



2015		Emissions Calculations										September										Total for the Month	
Boiler Information		East Heating Plant					West Heating Plant					Convocation Center		Monsanto Building		1E	2E						
Area	Units	1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E							
Boiler Identifier	---																						
Boiler Runtime	hrs	0.0	0.0	0.0	0.0	0.0	720.0	694.0	0.0	0.0	N/A	N/A	N/A	N/A	0.0	238.0							
Natural Gas Heating Value		1,033.00										3,543.19		1,034.00									
Total Natural Gas Consumed		299.57										5,061.70		375,462.97									
		29,000.00										490,000.00		36,311,699.23									
Gas Burner Maximum Input		120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00							
Gas Burner Fire Rate		116,166.51	116,166.51	72,604.07	72,604.07	116,166.51	48,402.71	48,402.71	72,604.07	116,166.51	12,197.48	12,197.48	3,388.19	3,388.19	116,054.16	116,054.16							
Emission Factor		0.0000	0.0000	0.0000	0.0000	0.0000	0.01765	0.01765	0.02648	0.04237	N/A	N/A	N/A	N/A	0.05895	0.05895							
Emission Rate		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00							
Emission Factor		0.0000	0.0000	0.0000	0.0000	0.0000	1.4830	1.4830	2.2244	3.5591	N/A	N/A	N/A	N/A	4.9521	4.9521							
Emission Rate		0.00	0.00	0.00	0.00	0.00	1,067.72	1,029.17	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Factor		120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	0.5339	0.5146	0.0000	0.0000	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	2,118.5007	2,118.5007	3,177.7511	5,084.4017	N/A	N/A	N/A	N/A	7,074.4538	7,074.4538							
Emission Factor		0.00	0.00	0.00	0.00	0.00	1,525,320.51	1,470,239.49	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	762.6603	735.1197	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0406	0.0406	0.0609	0.0975	N/A	N/A	N/A	N/A	0.1356	0.1356							
Emission Factor		0.00	0.00	0.00	0.00	0.00	29.24	28.18	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0146	0.0141	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0388	0.0388	0.0583	0.0932	N/A	N/A	N/A	N/A	0.1297	0.1297							
Emission Factor		0.00	0.00	0.00	0.00	0.00	27.96	26.95	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0140	0.0135	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0087	0.0087	0.0130	0.0208	N/A	N/A	N/A	N/A	0.0289	0.0289							
Emission Factor		0.00	0.00	0.00	0.00	0.00	6.23	6.00	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0031	0.0030	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	1.7654	1.7654	2.6481	11.8636	N/A	N/A	N/A	N/A	16.5071	16.5071							
Emission Factor		0.00	0.00	0.00	0.00	0.00	1,271.10	1,225.20	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.6356	0.6126	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.1342	0.1342	0.2013	0.3220	N/A	N/A	N/A	N/A	0.4480	0.4480							
Emission Factor		0.00	0.00	0.00	0.00	0.00	96.60	93.12	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0483	0.0466	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.1342	0.1342	0.2013	0.3220	N/A	N/A	N/A	N/A	0.4480	0.4480							
Emission Factor		0.00	0.00	0.00	0.00	0.00	96.60	93.12	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0483	0.0466	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0106	0.0106	0.0159	0.0254	N/A	N/A	N/A	N/A	0.0354	0.0354							
Emission Factor		0.00	0.00	0.00	0.00	0.00	7.63	7.35	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0038	0.0037	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0971	0.0971	0.1456	0.2330	N/A	N/A	N/A	N/A	0.3242	0.3242							
Emission Factor		0.00	0.00	0.00	0.00	0.00	69.91	67.39	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	0.0350	0.0337	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							
Emission Factor		120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	2,131.3883	2,131.3883	3,197.0824	5,115.3318	N/A	N/A	N/A	N/A	7,117.4900	7,117.4900							
Emission Factor		0.00	0.00	0.00	0.00	0.00	1,534,599.54	1,479,183.45	0.00	0.00	N/A	N/A	N/A	N/A	0.00	0.00							
Emission Rate		0.0000	0.0000	0.0000	0.0000	0.0000	767.2998	739.5917	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0000	0.0000							



2015		November												December											
Emissions Calculations		Units				West Heating Plant				Convocation Center				Monsanto Building				Total for the Month							
Area		5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W									
Boiler Information		Boiler Identifier	Boiler Runtime	hrs	BTU/scf	therms	East Heating Plant																		
Natural Gas Information	Natural Gas Heating Value	1,034.00													1,034.00										
	Total Natural Gas Consumed	1,912.90													680,181.74										
Burner Information	Gas Burner Maximum Input	185,000.00													65,781,599.61										
	Gas Burner Fire Rate	1,703,000.00													62,647,000.00										
CO	Emission Factor	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00									
	Emission Rate	4.8103	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	4.9942	4.9942	3.1214	3.1214	4.9942	0.0000									
CO2	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	3.7157	3.7157	0.0125	0.7608	0.0000	0.0000									
	Emission Rate	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00									
Methane	Emission Factor	6,871.9030	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	7,134.6011	7,134.6011	4,459.1257	4,459.1257	7,134.6011	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	5,308,143.22	35,673.01	2,173,823.77	0.0000	0.0000	0.0000									
N2O	Emission Factor	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30									
	Emission Rate	0.1317	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1367	0.1367	0.0855	0.0855	0.1367	0.0000									
NH3	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	101.74	101.74	0.68	41.66	0.0000	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0509	0.0003	0.0208	0.0000	0.0000	0.0000									
NOx	Emission Factor	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20									
	Emission Rate	0.1260	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1308	0.1308	0.0818	0.0818	0.1308	0.0000									
Particulate	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0487	0.0003	0.0199	0.0000	0.0000	0.0000									
	Emission Rate	0.49	0.49	0.49	0.49	0.49	N/A	N/A	N/A	N/A	0.49	0.49	0.49	0.49	0.49	0.49									
PM10	Emission Factor	0.0281	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0291	0.0291	0.0182	0.0182	0.0291	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	21.67	0.15	8.88	0.0000	0.0000	0.0000									
PM2.5	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0108	0.0001	0.0044	0.0000	0.0000	0.0000									
	Emission Rate	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	280.00	100.00									
SO2	Emission Factor	16.0344	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	16.6474	16.6474	3.7159	3.7159	16.6474	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	12,385.67	83.24	1,811.52	0.0000	0.0000	0.0000									
VOC	Emission Factor	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60									
	Emission Rate	0.4352	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4519	0.4519	0.2824	0.2824	0.4519	0.0000									
CO2E	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	336.18	336.18	2.26	137.68	0.0000	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1681	0.0011	0.0688	0.0000	0.0000	0.0000									
CO2E	Emission Factor	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60									
	Emission Rate	0.4352	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4519	0.4519	0.2824	0.2824	0.4519	0.0000									
CO2E	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	336.18	336.18	2.26	137.68	0.0000	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1681	0.0011	0.0688	0.0000	0.0000	0.0000									
CO2E	Emission Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60									
	Emission Rate	0.0344	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0357	0.0357	0.0223	0.0223	0.0357	0.0000									
CO2E	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	26.54	10.87	0.18	0.0000	0.0000	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0133	0.0001	0.0054	0.0000	0.0000	0.0000									
CO2E	Emission Factor	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50									
	Emission Rate	0.3150	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.3270	0.3270	0.2044	0.2044	0.3270	0.0000									
CO2E	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	243.29	1.64	99.63	0.0000	0.0000	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1216	0.0008	0.0498	0.0000	0.0000	0.0000									
CO2E	Emission Factor	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00									
	Emission Rate	6,913.7070	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	7,178.0033	7,178.0033	4,486.2520	4,486.2520	7,178.0033	0.0000									
CO2E	Emission Factor	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	2,670.2172	17,945.0	1,093.5239	0.0000	0.0000	0.0000									
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	5,340,434.43	35,890.02	2,187,047.87	0.0000	0.0000	0.0000									

2015		Emissions Calculations				Units		mber		Monsanto Building							
Area		West Heating Plant				Convocation Center		Monsanto Building		Monsanto 1		Monsanto 2					
Boiler Identifier		2W		3W		4W		Conv 1		Conv 2		Monsanto 1		Monsanto 2			
Boiler Runtime		hrs		0.0		0.0		N/A		N/A		N/A		N/A			
Natural Gas Information	Natural Gas Heating Value	BTU/scf		1,034.00		258.50		22,810.04		9,343.22							
	Total Natural Gas Consumed	therms		25,000.00		2,206,000.00		12.60		12.60		3.50		3.50			
Burner Information	Gas Burner Maximum Input	mmBTU/hr		50.00		120.00		12.60		12.60		3.50		3.50			
	Gas Burner Fire Rate	scf		48,355.90		72,533.85		116,054.16		12,185.69		12,185.69		3,384.91		3,384.91	
CO	Emission Factor	mmscf/hr		0.00000		0.00000		0.00000		N/A		N/A		N/A		N/A	
	Emission Rate	lb/mmscf		84.00		84.00		84.00		84.00		84.00		84.00		84.00	
CO2	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
	Emission Rate	lb/time		0.00		0.00		0.00		N/A		N/A		N/A		N/A	
Methane	Emission Rate	tons/time		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
	Emission Factor	lb/mmscf		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00	
N2O	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
	Emission Rate	lb/time		0.00		0.00		0.00		N/A		N/A		N/A		N/A	
NH3	Emission Factor	tons/time		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
	Emission Rate	lb/mmscf		0.49		0.49		0.49		0.49		0.49		0.49		0.49	
NOx	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
	Emission Rate	lb/time		0.00		0.00		0.00		N/A		N/A		N/A		N/A	
Particulate	Emission Factor	tons/time		100.00		100.00		100.00		100.00		100.00		100.00		100.00	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
PM10	Emission Rate	lb/mmscf		7.60		7.60		7.60		7.60		7.60		7.60		7.60	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
PM2.5	Emission Rate	lb/time		0.00		0.00		0.00		N/A		N/A		N/A		N/A	
	Emission Factor	tons/time		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
SO2	Emission Rate	lb/mmscf		0.60		0.60		0.60		0.60		0.60		0.60		0.60	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
VOC	Emission Rate	lb/time		0.00		0.00		0.00		N/A		N/A		N/A		N/A	
	Emission Factor	tons/time		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
CO2E	Emission Factor	lb/mmscf		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	
	Emission Rate	lb/time		0.00		0.00		0.00		N/A		N/A		N/A		N/A	
	Emission Rate	tons/time		0.0000		0.0000		0.0000		N/A		N/A		N/A		N/A	



2016		Emissions Calculations										January										Total for the Month	
Boiler Information		East Heating Plant					West Heating Plant					Convocation Center		Monsanto Building		1E	2E						
Area		1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E							
Boiler Identifier		648.5	469.0	323.0	53.0	0.0	0.0	0.0	0.0	0.0	N/A	N/A	N/A	N/A	610.0	436.0							
Boiler Runtime																							
Natural Gas Heating Value		1,035.00																					
Total Natural Gas Consumed		856,897.20																					
Natural Gas Information		82,792,000.00										13,694.08										780,039.06	
Gas Burner Maximum Input		46,000.00															75,366,092.75						
Gas Burner Fire Rate		115,942.03	115,942.03	72,463.77	72,463.77	115,942.03	48,309.18	48,309.18	72,463.77	115,942.03	12,173.91	12,173.91	3,381.64	3,381.64	115,942.03	115,942.03							
Emission Factor		0.06121	0.06121	0.03826	0.03826	0.06121	0.00000	0.00000	0.00000	0.00000	N/A	N/A	N/A	N/A	0.05788	0.05788							
CO		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00							
Emission Rate		5.1420	5.1420	3.2137	3.2137	5.1420	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	4.8621	4.8621							
Emission Factor		1.6673	1.2058	0.5190	0.0852	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	2.965.89	2.119.88							
Emission Rate		120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00							
Emission Rate		7,345.6858	7,345.6858	4,591.0536	4,591.0536	7,345.6858	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	6,945.8766	6,945.8766							
Emission Rate		4,763,677.22	3,445,126.62	1,482,910.31	243,325.84	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	4,236,984.75	3,028,402.21							
Emission Rate		2,381.8386	1,722.5633	741.4552	121.6629	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	2,118.4924	1,514.2011								
Emission Rate		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30							
Emission Rate		0.1408	0.1408	0.0880	0.0880	0.1408	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1331	0.1331							
Emission Rate		91.30	66.03	28.42	4.66	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	81.21	58.04							
Emission Rate		0.0457	0.0330	0.0142	0.0023	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0406	0.0290							
Emission Rate		2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20							
Emission Rate		0.1347	0.1347	0.0842	0.0842	0.1347	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1273	0.1273							
Emission Rate		87.33	63.16	27.19	4.46	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	77.68	55.52							
Emission Rate		0.0437	0.0316	0.0136	0.0022	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0388	0.0278								
Emission Rate		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49							
Emission Rate		0.0300	0.0300	0.0187	0.0187	0.0300	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0284	0.0284							
Emission Rate		19.45	14.07	6.06	0.99	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	17.30	12.37							
Emission Rate		0.0097	0.0070	0.0030	0.0005	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0087	0.0062							
Emission Rate		280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00							
Emission Rate		17.1399	17.1399	3.8259	3.8259	17.1399	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	16.2070	16.2070							
Emission Rate		11,115.25	8,038.63	1,235.76	202.77	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	9,886.30	7,066.27							
Emission Rate		5.5576	4.0193	0.6179	0.1014	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	4.9431	3.5331								
Emission Rate		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60							
Emission Rate		0.4652	0.4652	0.2908	0.2908	0.4652	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4399	0.4399							
Emission Rate		301.70	218.19	93.92	15.41	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	268.34	191.80							
Emission Rate		0.1508	0.1091	0.0470	0.0077	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1342	0.0959							
Emission Rate		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60							
Emission Rate		0.4652	0.4652	0.2908	0.2908	0.4652	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4399	0.4399							
Emission Rate		301.70	218.19	93.92	15.41	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	268.34	191.80							
Emission Rate		0.1508	0.1091	0.0470	0.0077	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1342	0.0959							
Emission Rate		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60							
Emission Rate		0.4652	0.4652	0.2908	0.2908	0.4652	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4399	0.4399							
Emission Rate		301.70	218.19	93.92	15.41	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	268.34	191.80							
Emission Rate		0.1508	0.1091	0.0470	0.0077	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1342	0.0959							
Emission Rate		0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60							
Emission Rate		0.0367	0.0367	0.0230	0.0230	0.0367	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0347	0.0347							
Emission Rate		23.82	17.23	7.41	1.22	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	21.18	15.14							
Emission Rate		0.0119	0.0086	0.0037	0.0006	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0106	0.0076							
Emission Rate		5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50							
Emission Rate		0.3367	0.3367	0.2104	0.2104	0.3367	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.3184	0.3184							
Emission Rate		218.34	157.90	67.97	11.15	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	194.20	138.80							
Emission Rate		0.1092	0.0790	0.0340	0.0056	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0971	0.0694							
Emission Rate		120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00							
Emission Rate		7,390.3720	7,390.3720	4,618.9825	4,618.9825	7,390.3720	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	6,988.1307	6,988.1307							
Emission Rate		4,792,656.26	3,466,084.48	1,491,931.35	244,806.07	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	4,262,759.74	3,046,824.99							
Emission Rate		2,396.3281	1,733.0422	745.9657	122.4030	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	2,131.3799	1,523.4125								

2016		Emissions Calculations											Units		February													Total for the Month			
Boiler Information		Area	West Heating Plant				Convocation Center				Monsanto Building			East Heating Plant		1E	2E	3E	4E												
		Boiler Identifier	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E														
		Boiler Runtime	hrs	BTU/scf	therms	mmBTU/hr	scf	mmscf/hr	lb/mmscf	lb/hr	lb/time	tons/time	lb/mmscf	lb/hr	lb/time	tons/time	lb/mmscf	lb/hr	lb/time	tons/time											
Natural Gas Information	Natural Gas Heating Value		739,341.90	1,035.00	1,355.85	11,706.81	27,634.50	553,700.56	587,349.84					410.0				553,700.56													
	Total Natural Gas Consumed		71,434,000.00			131,000.00	2,670,000.00	56,694,000.00											53,446,000.00												
Burner Information	Gas Burner Maximum Input		75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	120.00	75.00														
	Gas Burner Fire Rate		72,463.77	72,463.77	115,942.03	48,309.18	48,309.18	72,463.77	115,942.03	12,173.91	12,173.91	3,381.64	3,381.64	115,830.12	115,830.12	115,830.12	72,393.82														
	Emission Factor		0.03618	0.03618	0.05788	0.00000	0.00000	0.00000	0.00000	0.00000	N/A	N/A	N/A	N/A	0.05565	0.05565	0.03478														
	Emission Rate		84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00													
	Emission Rate		3.0388	3.0388	4.8621	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	4.6750	4.6750	2.9219														
CO	Emission Rate		914.69	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	1,916.75	0.00	1,183.36															
	Emission Factor		0.4573	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.9584	0.0000	0.5917														
	Emission Rate		120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00														
	Emission Rate		4,341.1729	4,341.1729	6,945.8766	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	6,678.5760	6,678.5760	4,174.1100														
	Emission Rate		1,306,693.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	2,738,216.15	0.00	1,690,514.55														
Methane	Emission Factor		653.3465	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	1,369.1081	0.0000	845.2573															
	Emission Rate		2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30														
	Emission Rate		0.0832	0.0832	0.1331	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1280	0.1280	0.0800														
	Emission Rate		25.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	52.48	0.00	32.40														
	Emission Rate		0.0125	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0262	0.0000	0.0162														
N2O	Emission Factor		2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20														
	Emission Rate		0.0796	0.0796	0.1273	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1224	0.1224	0.0765														
	Emission Rate		23.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	50.20	0.00	30.99														
	Emission Rate		0.0120	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0251	0.0000	0.0155														
	Emission Rate		0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49													
NH3	Emission Rate		0.0177	0.0177	0.0284	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0273	0.0273	0.0170															
	Emission Rate		5.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	11.18	0.00	6.90														
	Emission Rate		0.0027	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0056	0.0000	0.0035														
	Emission Rate		100.00	100.00	280.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00														
	Emission Rate		3.6176	3.6176	16.2070	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	15.5833	15.5833	3.4784														
NOx	Emission Rate		1,088.91	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	6,389.17	0.00	1,408.76															
	Emission Rate		0.5445	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	3.1946	0.0000	0.7044														
	Emission Rate		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60														
	Emission Rate		0.2749	0.2749	0.4399	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4230	0.4230	0.2644														
	Emission Rate		82.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	173.42	0.00	107.07														
Particulate	Emission Factor		0.0414	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0867	0.0000	0.0535															
	Emission Rate		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60														
	Emission Rate		0.2749	0.2749	0.4399	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4230	0.4230	0.2644														
	Emission Rate		82.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	173.42	0.00	107.07														
	Emission Rate		0.0414	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0867	0.0000	0.0535														
PM10	Emission Factor		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60														
	Emission Rate		0.2749	0.2749	0.4399	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4230	0.4230	0.2644														
	Emission Rate		82.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	173.42	0.00	107.07														
	Emission Rate		0.0414	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0867	0.0000	0.0535														
	Emission Rate		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60													
PM2.5	Emission Factor		7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60														
	Emission Rate		0.2749	0.2749	0.4399	0.0000	0.0000	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.4230	0.4230	0.2644														
	Emission Rate		82.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	173.42	0.00	107.07														





2016		Emissions Calculations										Units										April										May									
Area		West Heating Plant					Convocation Center					Monsanto Building					Total for the Month					East Heating Plant					West Heating Plant														
Boiler Information		Boiler Identifier	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W	2W	3W	1E	2E	3E	4E	5E	1W	2W	3W																
		Boiler Runtime	6.0	0.0	574.0	N/A	N/A	N/A	N/A	0.0	0.0	121.0	301.0	0.0	186.0	186.0	0.0	0.0	0.0	121.0	301.0	0.0	186.0	186.0																	
Natural Gas Information		Natural Gas Heating Value	1,036.00										1,036.00										1,036.00																		
		Total Natural Gas Consumed	383,527.20										7,099.70										217,301.00																		
		therms	37,020,000.00										685,299.23										20,975,000.00																		
Burner Information		Gas Burner Maximum Input	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	120.00	12.60	12.60	3.50	3.50	120.00	115,830.12	115,830.12	72,393.82	72,393.82	115,830.12	48,262.55	48,262.55																	
		Gas Burner Fire Rate	48,262.55	72,393.82	115,830.12	12,162.16	12,162.16	3,378.38	3,378.38	0.05632	0.05632	0.05632	0.05632	0.05632	0.05632	0.05632	0.05632	0.04267	0.04267	0.02667	0.02667	0.04267	0.02147	0.02147																	
		Emission Factor	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00																	
		Emission Rate	1.9711	2.9567	4.7308	N/A	N/A	N/A	N/A	2.71545	2.71545	1.3577	1.3577	2.823.33	2.823.33	2.71545	2.71545	1.3577	1.3577	0.3372	0.3372	0.1677	0.1677																		
		Emission Factor	0.0059	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0059	0.0059	0.0059	0.0059	1.4117	1.4117	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059	0.0059																		
		Emission Rate	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00																		
		Emission Rate	2,815.9229	4,223.8844	6,758.2150	N/A	N/A	N/A	N/A	3,879.21542	3,879.21542	1,939.6077	1,939.6077	4,033.331.93	4,033.331.93	3,879.21542	3,879.21542	1,939.6077	1,939.6077	963.342.65	963.342.65	479.281.33	479.281.33																		
		Emission Factor	8.4478	0.0000	0.0000	N/A	N/A	N/A	N/A	1.939.6077	1.939.6077	2.30	2.30	2,016.6660	2,016.6660	1.939.6077	1.939.6077	2.30	2.30	193.6287	193.6287	239.6407	239.6407																		
		Emission Rate	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30																		
		Emission Factor	0.0540	0.0810	0.1295	N/A	N/A	N/A	N/A	0.0540	0.0540	0.0540	0.0540	0.049	0.049	0.049	0.049	0.049	0.049	0.0587	0.0587	0.0472	0.0472																		
		Emission Rate	0.32	0.00	74.35	N/A	N/A	N/A	N/A	74.35	74.35	15.84	15.84	77.31	77.31	74.35	74.35	15.84	15.84	18.46	18.46	9.19	9.19																		
		Emission Factor	0.0002	0.0000	0.0372	N/A	N/A	N/A	N/A	0.0002	0.0002	0.0372	0.0372	0.0387	0.0387	0.0002	0.0002	0.0002	0.0002	0.0092	0.0092	0.0046	0.0046																		
		Emission Rate	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20																		
		Emission Factor	0.0516	0.0774	0.1239	N/A	N/A	N/A	N/A	0.0516	0.0516	0.1239	0.1239	0.0370	0.0370	0.0516	0.0516	0.0370	0.0370	0.0088	0.0088	0.0044	0.0044																		
		Emission Rate	0.31	0.00	71.12	N/A	N/A	N/A	N/A	71.12	71.12	15.84	15.84	73.94	73.94	71.12	71.12	15.84	15.84	17.66	17.66	8.79	8.79																		
		Emission Factor	0.0002	0.0000	0.0356	N/A	N/A	N/A	N/A	0.0002	0.0002	0.0356	0.0356	0.0370	0.0370	0.0002	0.0002	0.0002	0.0002	0.0035	0.0035	0.0044	0.0044																		
		Emission Rate	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49																		
		Emission Factor	0.0115	0.0172	0.0276	N/A	N/A	N/A	N/A	0.0115	0.0115	0.0276	0.0276	0.0131	0.0131	0.0115	0.0115	0.0131	0.0131	0.0131	0.0131	0.0105	0.0105																		
		Emission Rate	0.07	0.00	15.84	N/A	N/A	N/A	N/A	15.84	15.84	15.84	15.84	16.47	16.47	15.84	15.84	15.84	15.84	3.93	3.93	1.96	1.96																		
		Emission Factor	0.0000	0.0000	0.0079	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0079	0.0079	0.0082	0.0082	0.0000	0.0000	0.0000	0.0000	0.0020	0.0020	0.0010	0.0010																		
		Emission Rate	100.00	100.00	280.00	100.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00	280.00	280.00	100.00	100.00	280.00	280.00	100.00	100.00	100.00	100.00																		
		Emission Factor	2.3466	3.5199	15.7692	N/A	N/A	N/A	N/A	2.3466	2.3466	15.7692	15.7692	5,560.66	5,560.66	2.3466	2.3466	3.5199	3.5199	2.6671	2.6671	2.1473	2.1473																		
		Emission Rate	14.08	0.00	9,051.50	N/A	N/A	N/A	N/A	9,051.50	9,051.50	45.258	45.258	2,780.3	2,780.3	14.08	14.08	0.00	0.00	802.79	802.79	399.40	399.40																		
		Emission Factor	0.0070	0.0000	4.5258	N/A	N/A	N/A	N/A	0.0070	0.0070	4.5258	4.5258	7.60	7.60	0.0070	0.0070	0.0000	0.0000	0.1614	0.1614	0.1997	0.1997																		
		Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60																		
		Emission Factor	0.1783	0.2675	0.4280	N/A	N/A	N/A	N/A	0.1783	0.1783	0.4280	0.4280	0.3243	0.3243	0.1783	0.1783	0.3243	0.3243	0.2027	0.2027	0.1632	0.1632																		
		Emission Rate	1.07	0.00	245.68	N/A	N/A	N/A	N/A	245.68	245.68	245.68	245.68	255.44	255.44	1.07	1.07	245.68	245.68	61.01	61.01	30.35	30.35																		
		Emission Factor	0.0005	0.0000	0.1228	N/A	N/A	N/A	N/A	0.0005	0.0005	0.1228	0.1228	0.1277	0.1277	0.0005	0.0005	0.0000	0.0000	0.0123	0.0123	0.0152	0.0152																		
		Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60																		
		Emission Factor	0.1783	0.2675	0.4280	N/A	N/A	N/A	N/A	0.1783	0.1783	0.4280	0.4280	0.3243	0.3243	0.1783	0.1783	0.3243	0.3243	0.2027	0.2027	0.1632	0.1632																		
		Emission Rate	1.07	0.00	245.68	N/A	N/A	N/A	N/A	245.68	245.68	245.68	245.68	255.44	255.44	1.07	1.07	245.68	245.68	61.01	61.01	30.35	30.35																		
		Emission Factor	0.0005	0.0000	0.1228	N/A	N/A	N/A	N/A	0.0005	0.0005	0.1228	0.1228	0.1277	0.1277	0.0005	0.0005	0.0000	0.0000	0.0123	0.0123	0.0152	0.0152																		
		Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60																		
		Emission Factor	0.60	0.60	0.60	N/A	N/A	N/A	N/A	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60																		
		Emission Rate	0.0141	0.0211	0.0338	N/A	N/A	N/A	N/A	0.0141	0.0141	0.0338	0.0338	20.17	20.17	0.0141	0.0141	0.0211	0.0211	0.0160	0.0160	0.0129	0.0129																		
		Emission Factor	0.08	0.00	19.40	N/A	N/A	N/A	N/A	0.08	0.08	19.40	19.40	0.0101	0.0101	0.08	0.08	0.00	0.00	0.0024	0.0024	0.0012	0.0012																		
		Emission Rate	0.0000	0.0000	0.0097	N/A	N/A	N/A	N/A	0.0000	0.0000	0.0097	0.0097	5.50	5.50	0.0000	0.0000	5.50	5.50	5.50	5.50	5.50	5.50																		
		Emission Factor	5.50	5.50	5.50	N/A	N/A	N/A	N/A	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50																		
		Emission Rate	0.1291	0.1936	0.3098	N/A	N/A	N/A	N/A	0.1291	0.1291	0.3098	0.3098	184.86	184.86	0.1291	0.1291	0.1936	0.1936	0.1467	0.1467	0.1181	0.1181																		
		Emission Factor	0.77	0.00	177.80	N/A	N/A	N/A	N/A	0.77	0.77	177.80	177.80	0.0924	0.0924	0.77	0.77	0.00	0.00	0.0089	0.0089	0.0110	0.0110																		
		Emission Rate	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00																		
		Emission Factor	2,833.0531	4,249.5797	6,799.3275	N/A	N/A	N/A	N/A	2,833.0531	2,833.0531	6,799.3275	6,799.3275	4,057.868.03	4,057.868.03	2,833.0531	2,833.0531	4,249.5797	4,249.5797	3,219.9435	3,219.9435	2,592.4567	2,592.4567																		
		Emission Rate	16,998.32	0.00	3,902.813.98	N/A	N/A	N/A	N/A	3,902.813.98	3,902.813.98	3,902.813.98	3,902.813.98	2,028.9340	2,028.9340	16,998.32	16,998.32	0.00	0.00	194.8066	194.8066	482.196.95	482.196.95																		
		Emission Factor	8.4992	0.0000	1,951.4070	N/A	N/A	N/A	N/A	8.4992	8.4992	1,951.4070	1,951.4070	2,028.9340	2,028.9340	8.4992	8.4992	0.0000	0.0000	484.6015	484.6015	241.0985	241.098																		

2016		Emissions Calculations				Units		June												
Boiler Information		Area	Convocation Center		Monsanto Building		Total for the Month	East Heating Plant			West Heating Plant			Convocati						
Boiler Identifier	Boiler Runtime	4W	Convvo 1	Convvo 2	Monsanto 1	Monsanto 2	---	1E	2E	3E	4E	5E	1W	2W	3W	4W	Convvo 1			
Natural Gas Heating Value	Natural Gas Consumed	252.0	N/A	N/A	N/A	N/A	---	0.0	0.0	19.5	502.5	0.0	231.0	116.5	0.0	0.0	N/A			
BTU/scf	therms	9,448.32				4,859.87		1,036.00	171,064.32									60,709.60		7,38
mmBTU/hr	scf	912,000.00				469,099.42		241,924.64	16,512,000.00									5,860,000.00		713.0
Gas Burner Maximum Input	Gas Burner Fire Rate	120.00	12.60	12.60	3.50	3.50	---	115,830.12	115,830.12	72,393.82	72,393.82	115,830.12	48,262.55	48,262.55	72,393.82	115,830.12	12,162.16			
Emission Factor	Emission Rate	0.05154	N/A	N/A	N/A	N/A	---	0.05061	0.05061	0.03163	0.03163	0.05061	0.01686	0.01686	0.02529	0.04047	N/A			
lb/mmmscf	lb/hr	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00			
Emission Rate	Emission Factor	4.3290	N/A	N/A	N/A	N/A	---	0.00	0.00	51.81	2.6571	4.2514	327.22	165.02	0.00	3.3996	N/A			
lb/time	tons/time	1,090.91	N/A	N/A	N/A	N/A	1,961.55	0.0000	0.0000	1,335.19	0.6676	0.0000	0.1636	0.0825	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00			
Emission Rate	Emission Factor	6,184.2752	N/A	N/A	N/A	N/A	---	6,073.3793	6,073.3793	3,795.8621	3,795.8621	6,073.3793	2,023.5971	2,023.5971	3,035.3957	4,856.6331	N/A			
lb/hr	lb/time	1,558,437.35	N/A	N/A	N/A	N/A	2,802,215.91	0.00	0.00	74,019.31	1,907,420.69	0.00	467,450.94	235,749.06	0.00	0.00	N/A			
Emission Factor	Emission Rate	779.2187	N/A	N/A	N/A	N/A	1,401.1080	0.0000	0.0000	37,009.7	953.7103	0.0000	233.7255	117.8745	0.0000	0.0000	N/A			
Emission Rate	Emission Factor	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30			
lb/mmmscf	lb/hr	0.1185	N/A	N/A	N/A	N/A	---	0.1164	0.1164	0.0728	0.0728	0.1164	0.0388	0.0388	0.0582	0.0931	N/A			
Emission Rate	Emission Factor	29.87	N/A	N/A	N/A	N/A	53.71	0.00	0.00	1.42	36.56	0.00	8.96	4.52	0.00	0.00	N/A			
tons/time	lb/mmmscf	0.0149	N/A	N/A	N/A	N/A	0.0269	0.0000	0.0000	0.0007	0.0183	0.0000	0.0045	0.0023	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20			
lb/mmmscf	lb/hr	0.1134	N/A	N/A	N/A	N/A	---	0.1113	0.1113	0.0696	0.0696	0.1113	0.0371	0.0371	0.0556	0.0890	N/A			
Emission Rate	Emission Factor	28.57	N/A	N/A	N/A	N/A	51.37	0.00	0.00	1.36	34.97	0.00	8.57	4.32	0.00	0.00	N/A			
tons/time	lb/mmmscf	0.0143	N/A	N/A	N/A	N/A	0.0257	0.0000	0.0000	0.0007	0.0175	0.0000	0.0043	0.0022	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49			
lb/mmmscf	lb/hr	0.0253	N/A	N/A	N/A	N/A	---	0.0248	0.0248	0.0155	0.0155	0.0248	0.0083	0.0083	0.0124	0.0198	N/A			
Emission Rate	Emission Factor	6.36	N/A	N/A	N/A	N/A	11.44	0.00	0.00	0.30	7.79	0.00	1.91	0.96	0.00	0.00	N/A			
tons/time	lb/mmmscf	0.0032	N/A	N/A	N/A	N/A	0.0057	0.0000	0.0000	0.0002	0.0039	0.0000	0.0010	0.0005	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	280.00	100.00	100.00	100.00	100.00	280.00	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00			
lb/mmmscf	lb/hr	14.4300	N/A	N/A	N/A	N/A	---	14.1712	14.1712	3.1632	3.1632	14.1712	1.6863	1.6863	2.5295	11.3321	N/A			
Emission Rate	Emission Factor	3,636.35	N/A	N/A	N/A	N/A	2,237.20	0.00	0.00	61.68	1,589.52	0.00	389.54	196.46	0.00	0.00	N/A			
tons/time	lb/mmmscf	1.8182	N/A	N/A	N/A	N/A	1.1186	0.0000	0.0000	0.0308	0.7948	0.0000	0.1948	0.0982	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
lb/mmmscf	lb/hr	0.3917	N/A	N/A	N/A	N/A	---	0.3846	0.3846	0.2404	0.2404	0.3846	0.1282	0.1282	0.1922	0.3076	N/A			
Emission Rate	Emission Factor	98.70	N/A	N/A	N/A	N/A	177.47	0.00	0.00	4.69	120.80	0.00	29.61	14.93	0.00	0.00	N/A			
tons/time	lb/mmmscf	0.0494	N/A	N/A	N/A	N/A	0.0887	0.0000	0.0000	0.0023	0.0604	0.0000	0.0148	0.0075	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
lb/mmmscf	lb/hr	0.3917	N/A	N/A	N/A	N/A	---	0.3846	0.3846	0.2404	0.2404	0.3846	0.1282	0.1282	0.1922	0.3076	N/A			
Emission Rate	Emission Factor	98.70	N/A	N/A	N/A	N/A	177.47	0.00	0.00	4.69	120.80	0.00	29.61	14.93	0.00	0.00	N/A			
tons/time	lb/mmmscf	0.0494	N/A	N/A	N/A	N/A	0.0887	0.0000	0.0000	0.0023	0.0604	0.0000	0.0148	0.0075	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60			
lb/mmmscf	lb/hr	0.0309	N/A	N/A	N/A	N/A	---	0.0304	0.0304	0.0190	0.0190	0.0304	0.0101	0.0101	0.0152	0.0243	N/A			
Emission Rate	Emission Factor	7.79	N/A	N/A	N/A	N/A	14.01	0.00	0.00	0.37	9.54	0.00	2.34	1.18	0.00	0.00	N/A			
tons/time	lb/mmmscf	0.0039	N/A	N/A	N/A	N/A	0.0070	0.0000	0.0000	0.0002	0.0048	0.0000	0.0012	0.0006	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50			
lb/mmmscf	lb/hr	0.2834	N/A	N/A	N/A	N/A	---	0.2784	0.2784	0.1740	0.1740	0.2784	0.0927	0.0927	0.1391	0.2226	N/A			
Emission Rate	Emission Factor	71.43	N/A	N/A	N/A	N/A	128.43	0.00	0.00	3.39	87.42	0.00	21.42	10.81	0.00	0.00	N/A			
tons/time	lb/mmmscf	0.0357	N/A	N/A	N/A	N/A	0.0642	0.0000	0.0000	0.0017	0.0437	0.0000	0.0107	0.0054	0.0000	0.0000	N/A			
Emission Factor	Emission Rate	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00			
lb/mmmscf	lb/hr	6,221.8962	N/A	N/A	N/A	N/A	---	6,110.3257	6,110.3257	3,818.9536	3,818.9536	6,110.3257	2,035.9073	2,035.9073	3,053.8610	4,886.1776	N/A			
Emission Rate	Emission Factor	1,567,917.84	N/A	N/A	N/A	N/A	2,819,262.72	0.00	0.00	74,469.59	1,919,024.17	0.00	470,294.60	237,183.20	0.00	0.00	N/A			
tons/time	lb/mmmscf	783.9589	N/A	N/A	N/A	N/A	1,409.6314	0.0000	0.0000	37.2348	959.5121	0.0000	235.1473	118.5916	0.0000	0.0000	N/A			



2016		Emissions Calculations										August										Total for the Month	
Boiler Information	Area	Units		East Heating Plant					West Heating Plant					Convocation Center		Monsanto Building		Total for the Month					
	Boiler Identifier	Building	---	1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	---						
Boiler Runtime	Boiler Runtime	hrs	---	0.0	0.0	102.0	0.0	0.0	643.0	643.0	0.0	0.0	N/A	N/A	N/A	N/A	---						
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,035.00														1,035.00						
	Total Natural Gas Consumed	therms	257,807.11	23,939.55	2,313,000.00												275,877.18						
Burner Information	Gas Burner Maximum Input	mmBTU/hr	24,908,899.52	120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	26,654,800.00						
	Gas Burner Fire Rate	scf	---	115,942.03	115,942.03	72,463.77	72,463.77	115,942.03	48,309.18	48,309.18	72,463.77	115,942.03	12,173.91	12,173.91	3,381.64	3,381.64	---						
CO	Emission Factor	lb/mmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00						
	Emission Rate	lb/hr	---	3,047.7	1,904.8	1,904.8	1,904.8	3,047.7	1,405.4	1,405.4	2,108.1	3,373.0	N/A	N/A	N/A	N/A	N/A						
CO2	Emission Factor	tons/time	1.0462	0.0000	0.0971	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.1195						
	Emission Rate	lb/hr	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00						
Methane	Emission Factor	lb/hr	2,985,067.94	4,353.8824	2,721.1765	2,721.1765	4,353.8824	2,007.7138	2,007.7138	3,011.5708	4,818.5132	N/A	N/A	N/A	N/A	N/A	3,198,576.00						
	Emission Rate	tons/time	1,494.5340	0.0000	138.7800	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1,599.2880						
N2O	Emission Factor	lb/mmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30						
	Emission Rate	lb/hr	---	0.0834	0.0522	0.0522	0.0834	0.0385	0.0385	0.0577	0.0924	0.0924	N/A	N/A	N/A	N/A	---						
NH3	Emission Factor	lb/time	57.29	0.00	5.32	0.00	0.00	0.00	24.74	24.74	0.00	0.00	N/A	N/A	N/A	N/A	61.31						
	Emission Rate	tons/time	0.0286	0.0000	0.0027	0.0000	0.0000	0.0000	0.0124	0.0124	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0307						
NOx	Emission Factor	lb/mmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20						
	Emission Rate	lb/hr	---	0.0798	0.0499	0.0499	0.0798	0.0368	0.0368	0.0552	0.0883	0.0883	N/A	N/A	N/A	N/A	---						
Particulate	Emission Factor	lb/hr	54.80	0.00	5.09	0.00	0.00	0.00	23.67	23.67	0.00	0.00	N/A	N/A	N/A	N/A	58.64						
	Emission Rate	tons/time	0.0274	0.0000	0.0025	0.0000	0.0000	0.0000	0.0118	0.0118	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0293						
PM10	Emission Factor	lb/mmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49						
	Emission Rate	lb/hr	---	0.0178	0.0111	0.0111	0.0178	0.0082	0.0082	0.0123	0.0197	0.0197	N/A	N/A	N/A	N/A	---						
PM2.5	Emission Factor	lb/time	12.21	0.00	1.13	0.00	0.00	0.00	5.27	5.27	0.00	0.00	N/A	N/A	N/A	N/A	13.06						
	Emission Rate	tons/time	0.0061	0.0000	0.0006	0.0000	0.0000	0.0000	0.0026	0.0026	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0065						
SO2	Emission Factor	lb/mmscf	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	100.00	100.00	280.00						
	Emission Rate	lb/hr	2,382.90	10,159.1	2,267.6	2,267.6	10,159.1	1,673.1	1,673.1	2,509.6	11,243.2	11,243.2	N/A	N/A	N/A	N/A	---						
VOC	Emission Factor	lb/time	1,191.5	0.0000	0.1157	0.0000	0.0000	0.0000	0.5379	0.5379	0.0000	0.0000	N/A	N/A	N/A	N/A	1,278.8						
	Emission Rate	tons/time	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60						
CO2E	Emission Factor	lb/mmscf	189.31	0.00	17.58	0.00	0.00	0.00	81.76	81.76	0.00	0.00	N/A	N/A	N/A	N/A	---						
	Emission Rate	lb/hr	---	0.2757	0.1723	0.1723	0.2757	0.1272	0.1272	0.1907	0.3052	0.3052	N/A	N/A	N/A	N/A	---						
CO2E	Emission Factor	tons/time	0.0947	0.0000	0.0088	0.0000	0.0000	0.0000	0.0409	0.0409	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1013						
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60						
CO2E	Emission Factor	lb/hr	---	0.2757	0.1723	0.1723	0.2757	0.1272	0.1272	0.1907	0.3052	0.3052	N/A	N/A	N/A	N/A	---						
	Emission Rate	tons/time	189.31	0.0000	0.0088	0.0000	0.0000	0.0000	0.0409	0.0409	0.0000	0.0000	N/A	N/A	N/A	N/A	0.1013						
CO2E	Emission Factor	lb/mmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60						
	Emission Rate	lb/hr	---	0.0218	0.0136	0.0136	0.0218	0.0100	0.0100	0.0151	0.0241	0.0241	N/A	N/A	N/A	N/A	---						
CO2E	Emission Factor	lb/time	14.95	0.00	1.39	0.00	0.00	0.00	6.45	6.45	0.00	0.00	N/A	N/A	N/A	N/A	15.99						
	Emission Rate	tons/time	0.0075	0.0000	0.0007	0.0000	0.0000	0.0000	0.0032	0.0032	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0080						
CO2E	Emission Factor	lb/mmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50						
	Emission Rate	lb/hr	---	0.1996	0.1247	0.1247	0.1996	0.0920	0.0920	0.1380	0.2208	0.2208	N/A	N/A	N/A	N/A	---						
CO2E	Emission Factor	lb/time	137.00	0.00	12.72	0.00	0.00	0.00	59.17	59.17	0.00	0.00	N/A	N/A	N/A	N/A	146.60						
	Emission Rate	tons/time	0.0685	0.0000	0.0064	0.0000	0.0000	0.0029	0.0029	0.0000	0.0000	0.0000	N/A	N/A	N/A	N/A	0.0733						
CO2E	Emission Factor	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00						
	Emission Rate	lb/hr	---	4,380.3685	2,737.7303	2,737.7303	4,380.3685	2,019.9274	2,019.9274	3,029.8912	4,847.8258	4,847.8258	N/A	N/A	N/A	N/A	---						
CO2E	Emission Factor	lb/time	3,007,251.44	0.00	279,248.49	0.00	0.00	0.00	1,298,813.34	1,298,813.34	0.00	0.00	N/A	N/A	N/A	N/A	3,218,034.00						
	Emission Rate	tons/time	1,503.6257	0.0000	139.6242	0.0000	0.0000	0.0000	649.4067	649.4067	0.0000	0.0000	N/A	N/A	N/A	N/A	1,609.0170						



2016		Emissions Calculations										October										Total for the Month		
Boiler Information		Area		West Heating Plant					Convocation Center					Monsanto Building		East Heating Plant								
Boiler Identifier		3E		1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E									
Boiler Runtime		hrs	10.0	700.5	690.0	0.0	53.0	N/A	N/A	N/A	N/A	25.0	25.0	13.0	0.0									
Natural Gas Information		BTU/scf	1,036.00													1,037.00								
Total Natural Gas Consumed		therms	362,910.80													37,259.41								
Burner Information		scf	35,030,000.00													3,593,000.00								
Gas Burner Maximum Input		mmBTU/hr	75.00	50.00	50.00	120.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00									
Gas Burner Fire Rate		scf	72,393.82	48,262.55	48,262.55	72,393.82	115,830.12	12,162.16	12,162.16	3,378.38	3,378.38	115,718.42	115,718.42	72,324.01	72,324.01									
Emission Factor		mmscf/hr	0.12320	0.02308	0.02308	0.03462	0.05539	N/A	N/A	N/A	N/A	0.06182	0.06182	0.03863	0.03863									
Emission Rate		lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00									
Emission Rate		lb/hr	10.3488	1.9388	1.9388	2.9082	4.6531	N/A	N/A	N/A	N/A	5.1925	5.1925	3.2453	3.2453									
Emission Rate		lb/time	103.49	1,358.13	1,337.77	0.00	246.62	N/A	N/A	N/A	N/A	129.81	129.81	42.19	42.19									
Emission Rate		tons/time	0.0517	0.0000	0.0000	0.0000	0.1233	N/A	N/A	N/A	N/A	0.0649	0.0649	0.0211	0.0211									
Emission Rate		lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00									
Emission Rate		lb/hr	14,784.0000	2,769.7173	2,769.7173	4,154.5760	6,647.3216	N/A	N/A	N/A	N/A	7,417.8065	7,417.8065	4,636.1290	4,636.1290									
Emission Rate		lb/time	147,840.00	1,940,186.99	1,911,104.96	0.00	352,308.05	N/A	N/A	N/A	N/A	185,445.16	185,445.16	60,269.68	60,269.68									
Emission Rate		tons/time	73.9200	970.0935	955.5525	0.0000	176.1540	N/A	N/A	N/A	N/A	92.7226	92.7226	30.1348	30.1348									
Emission Rate		lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30									
Emission Rate		lb/hr	0.2834	0.0531	0.0531	0.0796	0.1274	N/A	N/A	N/A	N/A	0.1422	0.1422	0.0889	0.0889									
Emission Rate		lb/time	2.83	37.19	36.63	0.00	6.75	N/A	N/A	N/A	N/A	3.55	3.55	1.16	1.16									
Emission Rate		tons/time	0.0014	0.0186	0.0183	0.0000	0.0034	N/A	N/A	N/A	N/A	0.0018	0.0018	0.0006	0.0006									
Emission Rate		lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20									
Emission Rate		lb/hr	0.2710	0.0508	0.0508	0.0762	0.1219	N/A	N/A	N/A	N/A	0.1360	0.1360	0.0850	0.0850									
Emission Rate		lb/time	2.71	35.57	35.04	0.00	6.46	N/A	N/A	N/A	N/A	3.40	3.40	1.10	1.10									
Emission Rate		tons/time	0.0014	0.0178	0.0175	0.0000	0.0032	N/A	N/A	N/A	N/A	0.0017	0.0017	0.0006	0.0006									
Emission Rate		lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49									
Emission Rate		lb/hr	0.0604	0.0113	0.0113	0.0170	0.0271	N/A	N/A	N/A	N/A	0.0303	0.0303	0.0189	0.0189									
Emission Rate		lb/time	0.60	7.92	7.80	0.00	1.44	N/A	N/A	N/A	N/A	0.76	0.76	0.25	0.25									
Emission Rate		tons/time	0.0003	0.0040	0.0039	0.0000	0.0007	N/A	N/A	N/A	N/A	0.0004	0.0004	0.0001	0.0001									
Emission Rate		lb/mmmscf	100.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00									
Emission Rate		lb/hr	12.3200	2.3081	2.3081	3.4621	15.5104	N/A	N/A	N/A	N/A	17.3082	17.3082	3.8634	3.8634									
Emission Rate		lb/time	123.20	1,616.82	1,592.59	0.00	822.05	N/A	N/A	N/A	N/A	432.71	432.71	50.22	50.22									
Emission Rate		tons/time	0.0616	0.8084	0.7963	0.0000	0.4110	N/A	N/A	N/A	N/A	0.2164	0.2164	0.0251	0.0251									
Emission Rate		lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60									
Emission Rate		lb/hr	0.9363	0.1754	0.1754	0.2631	0.4210	N/A	N/A	N/A	N/A	0.4698	0.4698	0.2936	0.2936									
Emission Rate		lb/time	9.36	122.88	121.04	0.00	22.31	N/A	N/A	N/A	N/A	11.74	11.74	3.82	3.82									
Emission Rate		tons/time	0.0047	0.0614	0.0605	0.0000	0.0112	N/A	N/A	N/A	N/A	0.0059	0.0059	0.0019	0.0019									
Emission Rate		lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60									
Emission Rate		lb/hr	0.9363	0.1754	0.1754	0.2631	0.4210	N/A	N/A	N/A	N/A	0.4698	0.4698	0.2936	0.2936									
Emission Rate		lb/time	9.36	122.88	121.04	0.00	22.31	N/A	N/A	N/A	N/A	11.74	11.74	3.82	3.82									
Emission Rate		tons/time	0.0047	0.0614	0.0605	0.0000	0.0112	N/A	N/A	N/A	N/A	0.0059	0.0059	0.0019	0.0019									
Emission Rate		lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60									
Emission Rate		lb/hr	0.9363	0.1754	0.1754	0.2631	0.4210	N/A	N/A	N/A	N/A	0.4698	0.4698	0.2936	0.2936									
Emission Rate		lb/time	9.36	122.88	121.04	0.00	22.31	N/A	N/A	N/A	N/A	11.74	11.74	3.82	3.82									
Emission Rate		tons/time	0.0047	0.0614	0.0605	0.0000	0.0112	N/A	N/A	N/A	N/A	0.0059	0.0059	0.0019	0.0019									
Emission Rate		lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60									
Emission Rate		lb/hr	0.0739	0.0138	0.0138	0.0208	0.0332	N/A	N/A	N/A	N/A	0.0371	0.0371	0.0232	0.0232									
Emission Rate		lb/time	0.74	9.70	9.56	0.00	1.76	N/A	N/A	N/A	N/A	0.93	0.93	0.30	0.30									
Emission Rate		tons/time	0.0004	0.0049	0.0048	0.0000	0.0009	N/A	N/A	N/A	N/A	0.0005	0.0005	0.0002	0.0002									
Emission Rate		lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50									
Emission Rate		lb/hr	0.6776	0.1269	0.1269	0.1904	0.3047	N/A	N/A	N/A	N/A	0.3400	0.3400	0.2125	0.2125									
Emission Rate		lb/time	6.78	88.93	87.59	0.00	16.15	N/A	N/A	N/A	N/A	8.50	8.50	2.76	2.76									
Emission Rate		tons/time	0.0034	0.0445	0.0438	0.0000	0.0081	N/A	N/A	N/A	N/A	0.0042	0.0042	0.0014	0.0014									
Emission Rate		lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00									
Emission Rate		lb/hr	14,873.9360	2,786.5664	2,786.5664	4,179.8497	6,687.7595	N/A	N/A	N/A	N/A	7,462.9314	7,462.9314	4,664.3322	4,664.3322									
Emission Rate		lb/time	148,739.36	1,951,989.80	1,922,730.85	0.00	354,451.25	N/A	N/A	N/A	N/A	186,573.29	186,573.29	60,636.32	60,636.32									
Emission Rate		tons/time	74.3697	975.9949	961.3654	0.0000	177.2256	N/A	N/A	N/A	N/A	93.2866	93.2866	30.3182	30.3182									

2016		Emissions Calculations										November										December													
Boiler Information		Area		Units		West Heating Plant					Convocation Center					Monsanto Building					Total for the Month					East Heating Plant									
		Boiler Identifier		---		1W		2W		3W		4W		Convo 1		Convo 2		Monsanto 1		Monsanto 2		Month		1E		2E		3E		4E		5E		1W	
		Boiler Runtime		hrs		583.0		229.5		0.0		430.0		N/A		N/A		N/A		N/A		---		744.0		5.0		488.0		0.0		0.0		0.0	
Natural Gas Information		Natural Gas Heating Value		BTU/scf		1,037.00		459,142.12		13,190.40		6,925.08		835,171.40		875,884.12		84,544,799.23		85,615,000.00		1,036.00		85,615,000.00		835,171.40		85,615,000.00		80,615,000.00					
Burner Information		Total Natural Gas Consumed		scf		120.00		50.00		75.00		120.00		12.60		12.60		3.50		3.50		---		120.00		75.00		75.00		120.00		120.00		50.00	
		Gas Burner Maximum Input		mmBTU/hr		115,718.42		48,216.01		72,324.01		115,718.42		12,150.43		12,150.43		3,375.12		3,375.12		---		115,830.12		72,393.82		72,393.82		115,830.12		48,262.55		48,262.55	
		Gas Burner Fire Rate		mmscf/hr		0.06182		0.02400		0.03601		0.05761		N/A		N/A		N/A		N/A		---		0.07648		0.04780		0.04780		0.07648		0.07648		0.00000	
CO		Emission Factor		lb/mmmscf		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00		84.00	
		Emission Rate		lb/hr		5.1925		2.0164		3.0245		4.8393		N/A		N/A		N/A		N/A		---		6.4247		4.0155		4.0155		6.4247		6.4247		6.4247	
		Emission Rate		lb/time		0.00		1.175.54		462.76		2,080.89		N/A		N/A		N/A		N/A		7,101.76		4,780.00		32.12		1,959.54		0.00		0.00		0.00	
		Emission Rate		tons/time		0.0000		0.5878		0.2314		0.0000		N/A		N/A		N/A		N/A		3.5509		2.3900		0.0161		0.9798		0.0000		0.0000		0.0000	
CO2		Emission Factor		lb/mmmscf		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00	
		Emission Rate		lb/hr		7,417.8065		2,880.5205		4,320.7807		6,913.2491		N/A		N/A		N/A		N/A		10,145,375.91		6,828,564.71		45,890.89		2,799,344.40		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		1,679,343.43		661,079.45		2,972,697.12		N/A		N/A		N/A		N/A		5,072.6880		3,414.2824		22,9454		1,399,6722		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		839.6717		330.5397		1,486.3486		N/A		N/A		N/A		N/A		2.30		2.30		2.30		2.30		2.30		2.30		2.30	
Methane		Emission Factor		lb/mmmscf		2.30		2.30		2.30		2.30		2.30		2.30		2.30		2.30		---		0.1759		0.1759		0.1099		0.1099		0.1759		0.0000	
		Emission Rate		lb/hr		0.1422		0.0552		0.0828		0.1325		N/A		N/A		N/A		N/A		194.45		130.88		0.88		53.65		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		32.19		12.67		56.98		N/A		N/A		N/A		N/A		0.0972		0.0654		0.0004		0.0268		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.0161		0.0063		0.0285		N/A		N/A		N/A		N/A		2.20		2.20		2.20		2.20		2.20		2.20		2.20	
N2O		Emission Factor		lb/mmmscf		2.20		2.20		2.20		2.20		2.20		2.20		2.20		2.20		---		0.1683		0.1683		0.1052		0.1052		0.1683		0.0000	
		Emission Rate		lb/hr		0.1360		0.0528		0.0792		0.1267		N/A		N/A		N/A		N/A		186.00		125.19		0.84		51.32		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		30.79		12.12		54.50		N/A		N/A		N/A		N/A		0.0930		0.0626		0.0004		0.0257		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.0154		0.0061		0.0272		N/A		N/A		N/A		N/A		0.49		0.49		0.49		0.49		0.49		0.49		0.49	
NH3		Emission Factor		lb/mmmscf		0.49		0.49		0.49		0.49		0.49		0.49		0.49		0.49		---		0.0375		0.0375		0.0234		0.0234		0.0375		0.0000	
		Emission Rate		lb/hr		0.0303		0.0118		0.0176		0.0282		N/A		N/A		N/A		N/A		41.43		27.88		11.43		0.00		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		6.86		2.70		12.14		N/A		N/A		N/A		N/A		0.0207		0.0139		0.0001		0.0057		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.0034		0.0000		0.0061		N/A		N/A		N/A		N/A		280.00		280.00		280.00		100.00		100.00		280.00		100.00	
NOx		Emission Factor		lb/mmmscf		280.00		100.00		100.00		280.00		100.00		100.00		100.00		100.00		---		21.4157		21.4157		4.7803		4.7803		21.4157		0.0000	
		Emission Rate		lb/hr		17.3082		2.4004		3.6007		16.1309		N/A		N/A		N/A		N/A		18,373.18		15,933.32		107.08		2,332.79		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		1,399.45		50.90		6,936.29		N/A		N/A		N/A		N/A		9.1866		7,9667		0.0535		1.1664		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.6997		0.2754		3.4681		N/A		N/A		N/A		N/A		7.60		7.60		7.60		7.60		7.60		7.60		7.60	
Particulate		Emission Factor		lb/mmmscf		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		---		0.5813		0.5813		0.3633		0.3633		0.5813		0.0000	
		Emission Rate		lb/hr		0.4698		0.1824		0.2736		0.4378		N/A		N/A		N/A		N/A		642.54		432.48		2.91		177.29		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		106.36		41.87		188.27		N/A		N/A		N/A		N/A		0.3213		0.2162		0.0015		0.0886		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.0532		0.0209		0.0941		N/A		N/A		N/A		N/A		7.60		7.60		7.60		7.60		7.60		7.60		7.60	
PM10		Emission Factor		lb/mmmscf		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		---		0.5813		0.5813		0.3633		0.3633		0.5813		0.0000	
		Emission Rate		lb/hr		0.4698		0.1824		0.2736		0.4378		N/A		N/A		N/A		N/A		642.54		432.48		2.91		177.29		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		106.36		41.87		188.27		N/A		N/A		N/A		N/A		0.3213		0.2162		0.0015		0.0886		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.0532		0.0209		0.0941		N/A		N/A		N/A		N/A		7.60		7.60		7.60		7.60		7.60		7.60		7.60	
PM2.5		Emission Factor		lb/mmmscf		7.60		7.60		7.60		7.60		7.60		7.60		7.60		7.60		---		0.5813		0.5813		0.3633		0.3633		0.5813		0.0000	
		Emission Rate		lb/hr		0.4698		0.1824		0.2736		0.4378		N/A		N/A		N/A		N/A		642.54		432.48		2.91		177.29		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		106.36		41.87		188.27		N/A		N/A		N/A		N/A		0.3213		0.2162		0.0015		0.0886		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.0532		0.0209		0.0941		N/A		N/A		N/A		N/A		7.60		7.60		7.60		7.60		7.60		7.60		7.60	
SO2		Emission Factor		lb/mmmscf		0.60		0.60		0.60		0.60		0.60		0.60		0.60		0.60		---		0.0459		0.0459		0.0287		0.0287		0.0459		0.0000	
		Emission Rate		lb/hr		0.0371		0.0144		0.0216		0.0346		N/A		N/A		N/A		N/A		50.73		34.14		14.00		14.00		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		8.40		3.31		14.86		N/A		N/A		N/A		N/A		0.0254		0.0171		0.0001		0.0070		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.0042		0.0017		0.0074		N/A		N/A		N/A		N/A		5.50		5.50		5.50		5.50		5.50		5.50		5.50	
VOC		Emission Factor		lb/mmmscf		5.50		5.50		5.50		5.50		5.50		5.50		5.50		5.50		---		0.4207		0.4207		0.2629		0.2629		0.4207		0.0000	
		Emission Rate		lb/hr		0.3400		0.1320		0.1980		0.3169		N/A		N/A		N/A		N/A		465.00		312.98		128.30		128.30		0.00		0.00		0.00	
		Emission Rate		lb/time		0.00		76.97		30.30		136.25		N/A		N/A		N/A		N/A		0.2325		0.1565		0.0642		0.0642		0.0000		0.0000		0.0000	
		Emission Rate		tons/time		0.0000		0.0385																											

2016		Emissions Calculations				Units		mber		Monsanto Building			
Area		West Heating Plant				Convocation Center		Monsanto Building		Monsanto 1		Monsanto 2	
Boiler Identifier		2W		3W		4W		Conv 1		Conv 2		Conv 2	
Boiler Runtime		hrs		0.0		0.0		N/A		N/A		N/A	
Natural Gas Information	Natural Gas Heating Value	BTU/scf		1,036.00									
	Total Natural Gas Consumed	therms		1,274.28				26,055.40		13,383.04			
Burner Information	Gas Burner Maximum Input	mmBTU/hr		123,000.00				2,515,000.00		1,291,799.23			
	Gas Burner Fire Rate	scf		48,262.55		72,393.82		115,830.12		12,162.16		12,162.16	
CO	Emission Factor	lb/mmmscf		84.00		84.00		84.00		84.00		84.00	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
CO2	Emission Factor	lb/mmmscf		120,000.00		120,000.00		120,000.00		120,000.00		120,000.00	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
Methane	Emission Factor	lb/mmmscf		2.30		2.30		2.30		2.30		2.30	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
N2O	Emission Factor	lb/mmmscf		0.0000		0.0000		0.0000		0.0000		0.0000	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
NH3	Emission Factor	lb/mmmscf		0.49		0.49		0.49		0.49		0.49	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
NOx	Emission Factor	lb/mmmscf		100.00		100.00		100.00		100.00		100.00	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
Particulate	Emission Factor	lb/mmmscf		7.60		7.60		7.60		7.60		7.60	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
PM10	Emission Factor	lb/mmmscf		0.0000		0.0000		0.0000		0.0000		0.0000	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
PM2.5	Emission Factor	lb/mmmscf		7.60		7.60		7.60		7.60		7.60	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
SO2	Emission Factor	lb/mmmscf		0.60		0.60		0.60		0.60		0.60	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
VOC	Emission Factor	lb/mmmscf		5.50		5.50		5.50		5.50		5.50	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	
CO2E	Emission Factor	lb/mmmscf		120,730.00		120,730.00		120,730.00		120,730.00		120,730.00	
	Emission Rate	lb/hr		0.0000		0.0000		0.0000		N/A		N/A	





2017	Emissions Calculations												January												Total for the Month	
	Area	East Heating Plant				West Heating Plant				Convocation Center		Monsanto Building		Total for the Month	1E	2E										
		1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1				Monsanto 2									
Boiler Information	Boiler Identifier	---														1,036.00	626,609.06	60,483,500.00								
	Boiler Runtime	hrs																								
Natural Gas Information	Natural Gas Heating Value	BTU/scf														1,036.00	626,609.06	60,483,500.00								
	Total Natural Gas Consumed	therms																								
Burner Information	Gas Burner Maximum Input	120.00	120.00	75.00	75.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	120.00									
	Gas Burner Fire Rate	115,830.12	115,830.12	72,393.82	72,393.82	115,830.12	48,262.55	48,262.55	72,393.82	115,830.12	12,162.16	12,162.16	3,378.38	3,378.38	115,830.12	115,830.12	115,830.12									
	Emission Factor	0.05804	0.05804	0.03627	0.03627	0.05804	0.00000	0.00000	0.00000	0.00000	0.00780	0.00780	0.00000	0.00000	0.04658	0.04658	0.04658									
	Emission Rate	84.00	84.00	3.0471	3.0471	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00									
	Emission Factor	4.8753	4.8753	1.52506	1.52506	4.8753	0.0000	0.0000	0.0000	0.0000	0.6556	0.6556	0.0000	0.0000	3.9128	3.9128	3.9128									
	Emission Rate	3,498.04	3,498.04	292.52	292.52	0.00	0.00	0.00	0.00	0.00	181.27	181.27	#VALUE!	#VALUE!	2,629.39	2,629.39	1,932.92									
	Emission Factor	1.7490	0.6070	0.7625	0.1463	0.0000	0.0000	0.0000	0.0000	0.0000	0.0906	0.0906	#VALUE!	#VALUE!	1.3147	1.3147	0.9665									
	Emission Rate	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00									
	Emission Factor	6,964.7375	6,964.7375	4,352.9609	4,352.9609	6,964.7375	0.0000	0.0000	0.0000	0.0000	936.5642	936.5642	0.0000	0.0000	5,589.6969	5,589.6969	5,589.6969									
	Emission Rate	4,997,199.16	1,734,219.64	2,178,656.95	417,884.25	0.00	0.00	0.00	0.00	0.00	258,960.00	258,960.00	#VALUE!	#VALUE!	3,756,276.34	2,761,310.29	2,761,310.29									
	Emission Factor	2,498.5996	867.1098	1,089.3285	208.9421	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	#VALUE!	#VALUE!	1,878.1382	1,380.6551	1,380.6551									
	Emission Rate	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30									
Emission Factor	0.1335	0.1335	0.0834	0.0834	0.1335	0.0000	0.0000	0.0000	0.0000	0.0180	0.0180	0.0000	0.0000	0.1071	0.1071	0.1071										
Emission Rate	95.78	33.24	41.76	8.01	0.00	0.00	0.00	0.00	0.00	4.96	4.96	#VALUE!	#VALUE!	72.00	72.00	52.93										
Emission Factor	0.0479	0.0166	0.0209	0.0040	0.0000	0.0000	0.0000	0.0000	0.0000	0.0025	0.0025	#VALUE!	#VALUE!	0.0360	0.0265	0.0265										
Emission Rate	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20										
Emission Factor	0.1277	0.1277	0.0798	0.0798	0.1277	0.0000	0.0000	0.0000	0.0000	0.0172	0.0172	0.0000	0.0000	0.1025	0.1025	0.1025										
Emission Rate	91.62	31.79	39.94	7.66	0.00	0.00	0.00	0.00	0.00	4.75	4.75	#VALUE!	#VALUE!	68.87	50.62	50.62										
Emission Factor	0.0458	0.0159	0.0200	0.0038	0.0000	0.0000	0.0000	0.0000	0.0000	0.0024	0.0024	#VALUE!	#VALUE!	0.0344	0.0253	0.0253										
Emission Rate	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49										
Emission Factor	0.0284	0.0284	0.0178	0.0178	0.0284	0.0000	0.0000	0.0000	0.0000	0.0038	0.0038	0.0000	0.0000	0.0228	0.0228	0.0228										
Emission Rate	20.41	7.08	8.90	1.71	0.00	0.00	0.00	0.00	0.00	1.06	1.06	#VALUE!	#VALUE!	15.34	11.28	11.28										
Emission Factor	0.0102	0.0035	0.0044	0.0009	0.0000	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005	#VALUE!	#VALUE!	0.0077	0.0056	0.0056										
Emission Rate	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	280.00										
Emission Factor	16.2511	16.2511	3.6275	3.6275	16.2511	0.0000	0.0000	0.0000	0.0000	0.7805	0.7805	0.0000	0.0000	13.0426	13.0426	13.0426										
Emission Rate	11,660.13	4,046.51	1,815.55	348.24	0.00	0.00	0.00	0.00	0.00	215.80	215.80	#VALUE!	#VALUE!	8,764.64	6,443.06	6,443.06										
Emission Factor	5.8301	2.0233	0.9078	0.1741	0.0000	0.0000	0.0000	0.0000	0.0000	0.1079	0.1079	#VALUE!	#VALUE!	4.3823	3.2215	3.2215										
Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60										
Emission Factor	0.4411	0.4411	0.2757	0.2757	0.4411	0.0000	0.0000	0.0000	0.0000	0.0593	0.0593	0.0000	0.0000	0.3540	0.3540	0.3540										
Emission Rate	316.49	109.83	137.98	26.47	0.00	0.00	0.00	0.00	0.00	16.40	16.40	#VALUE!	#VALUE!	237.90	174.88	174.88										
Emission Factor	0.1582	0.0549	0.0690	0.0132	0.0000	0.0000	0.0000	0.0000	0.0000	0.0082	0.0082	#VALUE!	#VALUE!	0.1189	0.0874	0.0874										
Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60										
Emission Factor	0.4411	0.4411	0.2757	0.2757	0.4411	0.0000	0.0000	0.0000	0.0000	0.0593	0.0593	0.0000	0.0000	0.3540	0.3540	0.3540										
Emission Rate	316.49	109.83	137.98	26.47	0.00	0.00	0.00	0.00	0.00	16.40	16.40	#VALUE!	#VALUE!	237.90	174.88	174.88										
Emission Factor	0.1582	0.0549	0.0690	0.0132	0.0000	0.0000	0.0000	0.0000	0.0000	0.0082	0.0082	#VALUE!	#VALUE!	0.1189	0.0874	0.0874										
Emission Rate	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60										
Emission Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60										
Emission Rate	0.0348	0.0348	0.0218	0.0218	0.0348	0.0000	0.0000	0.0000	0.0000	0.0047	0.0047	0.0000	0.0000	0.0279	0.0279	0.0279										
Emission Factor	0.0125	0.0043	0.0054	0.0010	0.0000	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006	#VALUE!	#VALUE!	0.0094	0.0069	0.0069										
Emission Rate	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50										
Emission Factor	0.3192	0.3192	0.1995	0.1995	0.3192	0.0000	0.0000	0.0000	0.0000	0.0429	0.0429	0.0000	0.0000	0.2562	0.2562	0.2562										
Emission Rate	229.04	79.49	99.86	19.15	0.00	0.00	0.00	0.00	0.00	11.87	11.87	#VALUE!	#VALUE!	172.16	126.56	126.56										
Emission Factor	0.1145	0.0397	0.0499	0.0096	0.0000	0.0000	0.0000	0.0000	0.0000	0.0059	0.0059	#VALUE!	#VALUE!	0.0861	0.0633	0.0633										
Emission Rate	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00										
Emission Factor	7,007.1063	7,007.1063	4,379.4415	4,379.4415	7,007.1063	0.0000	0.0000	0.0000	0.0000	942.2616	942.2616	0.0000	0.0000	5,623.7009	5,623.7009	5,623.7009										
Emission Rate	5,027,598.79	1,744,769.47	2,191,910.45	420,426.38	0.00	0.00	0.00	0.00	0.00	260,535.34	260,535.34	#VALUE!	#VALUE!	3,779,127.02	2,778,108.26	2,778,108.26										
Emission Factor	2,513.7994	872.3847	1,095.9552	210.2132	0.0000	0.0000	0.0000	0.0000	0.0000	130.2677	130.2677	#VALUE!	#VALUE!	1,889.5635	1,389.0541	1,389.0541										



2017	Emissions Calculations			March													Total for the Month	AF	
	Area	Units			West Heating Plant					Convocation Center			Monsanto Building			East Heating Plant			
Boiler Information	Boiler Identifier	Boiler Runtime	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W		
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,037.00														1,036.00		
	Total Natural Gas Consumed	therms	124.44														434,867.21		
Burner Information	Gas Burner Maximum Input	mmBTU/hr	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00	120.00	50.00		
	Gas Burner Fire Rate	scf	115,718.42	48,216.01	48,216.01	72,324.01	115,718.42	12,150.43	12,150.43	3,375.12	3,375.12	115,830.12	115,830.12	72,393.82	72,393.82	115,830.12	48,262.55		
	Emission Factor	mmscf/hr	0.05042	0.00000	0.00000	0.00000	0.00000	0.01041	0.01041	0.00159	0.00159	0.05032	0.05032	0.03145	0.03145	0.05032	0.00000		
	Emission Rate	lb/mmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	
	Emission Factor	lb/hr	4.2354	0.0000	0.0000	0.0000	0.0000	0.0000	0.8743	0.8743	0.1339	0.1339	4.2271	4.2271	2.6420	2.6420	4.2271	0.0000	
	Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.043.54	3.043.54	0.00	0.00	0.00	0.00	
CO	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	Emission Rate	lb/mmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00		
CO2	Emission Factor	lb/hr	6,050.6199	0.0000	0.0000	0.0000	0.0000	1,248.9796	1,248.9796	191.3402	191.3402	6,038.7678	6,038.7678	3,774.2299	3,774.2299	6,038.7678	0.0000		
	Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4,347.912.81	4,347.912.81	0.00	0.00	0.00	0.00		
Methane	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	Emission Rate	lb/mmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30		
N2O	Emission Factor	lb/hr	0.1160	0.0000	0.0000	0.0000	0.0000	0.0239	0.0239	0.0037	0.0037	0.1157	0.1157	0.0723	0.0723	0.1157	0.0000		
	Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	83.33	83.33	0.00	0.00	0.00	0.00		
NH3	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	Emission Rate	lb/mmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20		
NOx	Emission Factor	lb/hr	0.1109	0.0000	0.0000	0.0000	0.0000	0.0229	0.0229	0.0035	0.0035	0.1107	0.1107	0.0692	0.0692	0.1107	0.0000		
	Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	79.71	79.71	0.00	0.00	0.00	0.00		
PM10	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
PM2.5	Emission Factor	lb/hr	0.3832	0.0000	0.0000	0.0000	0.0000	0.0791	0.0791	0.0121	0.0121	0.3825	0.3825	0.2390	0.2390	0.3825	0.0000		
	Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	275.37	275.37	0.00	0.00	0.00	0.00		
SO2	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
VOC	Emission Factor	lb/hr	0.3832	0.0000	0.0000	0.0000	0.0000	0.0791	0.0791	0.0121	0.0121	0.3825	0.3825	0.2390	0.2390	0.3825	0.0000		
	Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	275.37	275.37	0.00	0.00	0.00	0.00		
CO2E	Emission Factor	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00		
	Emission Rate	lb/hr	6,087.4278	0.0000	0.0000	0.0000	0.0000	1,256.5776	1,256.5776	192.5042	192.5042	6,075.5036	6,075.5036	3,797.1898	3,797.1898	6,075.5036	0.0000		
Total		tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2,187.1813	2,187.1813	0.0000	0.0000	2,187.1813	0.0000		
Total		tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	5,067.714.12	5,067.714.12	0.0000	0.0000	5,067.714.12	0.0000		
Total		tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2,533.8571	2,533.8571	0.0000	0.0000	2,533.8571	0.0000		

2017	Emissions Calculations				Units	April												Total for the Month	May											
	Area	West Heating Plant				Convocation Center			Monsanto Building			East Heating Plant			West Heating Plant															
Boiler Information	Boiler Identifier	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W	2W	3W														
	Boiler Runtime	0.0	0.0	0.0	0.5	188.7	327.4	224.3	551.5	0.0	195.0	0.0	0.0	0.0	0.0	0.0														
Natural Gas Information	Natural Gas Heating Value	1,036.00			10,805.48			7,299.65			322,548.48			1,037.00																
	Total Natural Gas Consumed	1,000.00			1,043,000.00			704,599.42			31,104,000.00			1,188,000.00																
Burner Information	Gas Burner Maximum Input	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	120.00	75.00	120.00	50.00	50.00	75.00														
	Gas Burner Fire Rate	48,262.55	72,393.82	115,830.12	12,162.16	12,162.16	3,378.38	3,378.38	0.00000	0.00000	0.00000	0.02887	0.04619	0.00000	0.00000	0.00000														
CO	Emission Factor	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00														
	Emission Rate	0.0000	0.0000	0.0000	0.4631	0.4631	0.1073	0.1073	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
CO2	Emission Factor	0.00	0.00	0.00	0.23	0.23	0.0176	0.0176	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
Methane	Emission Factor	120.000.00	120.000.00	120.000.00	661.5222	661.5222	153.2571	153.2571	120.000.00	120.000.00	120.000.00	120.000.00	120.000.00	120.000.00	120.000.00	120.000.00														
	Emission Rate	0.00	0.00	0.00	330.76	124,829.24	50,176.37	34,375.56	5,542.9441	5,542.9441	3,464.3401	3,464.3401	5,542.9441	0.0000	0.0000	0.0000														
N2O	Emission Factor	0.0000	0.0000	0.0000	0.1654	62.4146	17.1878	25.0882	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
	Emission Rate	2.30	2.30	2.30	0.0127	0.0127	0.0029	0.0029	0.0000	0.0000	0.0000	0.0664	0.1062	0.0000	0.0000	0.0000														
NH3	Emission Factor	0.00	0.00	0.00	0.01	2.29	0.92	0.63	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
NOx	Emission Factor	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49														
	Emission Rate	0.0000	0.0000	0.0000	0.0027	0.0027	0.0006	0.0006	0.0000	0.0000	0.0000	0.0141	0.0226	0.0000	0.0000	0.0000														
Particulate	Emission Factor	0.00	0.00	0.00	0.02	7.91	3.18	2.18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0040	0.0016	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
PM10	Emission Factor	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60														
	Emission Rate	0.0000	0.0000	0.0000	0.0419	0.0419	0.0097	0.0097	0.0000	0.0000	0.0000	0.2194	0.3511	0.0000	0.0000	0.0000														
PM2.5	Emission Factor	0.00	0.00	0.00	0.02	7.91	3.18	2.18	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0040	0.0016	0.0011	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
SO2	Emission Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60														
	Emission Rate	0.0000	0.0000	0.0000	0.0033	0.0033	0.0008	0.0008	0.0000	0.0000	0.0000	0.0173	0.0277	0.0000	0.0000	0.0000														
VOC	Emission Factor	0.00	0.00	0.00	0.62	0.62	0.25	0.17	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.0001	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
CO2E	Emission Factor	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50														
	Emission Rate	0.0000	0.0000	0.0000	0.0303	0.0303	0.0070	0.0070	0.0000	0.0000	0.0000	0.1588	0.2541	0.0000	0.0000	0.0000														
Emissions Data	Emission Factor	0.00	0.00	0.00	0.02	5.72	2.30	1.58	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
	Emission Rate	0.0000	0.0000	0.0000	0.0000	0.0029	0.0011	0.0008	0.0008	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000														
CO2E	Emission Factor	120,730.00	120,730.00	120,730.00	665,5465	665,5465	154,1894	154,1894	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00														
	Emission Rate	0.0000	0.0000	0.0000	332.77	125,588.62	50,481.61	34,584.68	4,082,615.58	4,082,615.58	2,041,3078	2,041,3078	1,537,7650	0.0000	0.0000	0.0000														

2017			Emissions Calculations				Units		June											
Boiler Information		Area	Convocation Center			Monsanto Building		Total for the Month	East Heating Plant				West Heating Plant				Convocati			
Boiler Identifier	Boiler Runtime	4W	Convvo 1	Convvo 2	Monsanto 1	Monsanto 2	---	1E	2E	3E	4E	5E	1W	2W	3W	4W	Convvo 1			
		hrs	0.0	149.4	209.3	279.4	---	0.0	0.0	0.0	0.0	0.0	649.0	668.0	0.0	5.0	0.2			
Natural Gas Information		BTU/scf	9,187.82			6,616.91		1,037.00	1,037.00											
Total Natural Gas Consumed		therms	886,000.00			638,081.97		242,966.90	232,184.30											
Burner Information		mmBTU/hr	12,150.43			3,375.12		23,429,787.85	22,390,000.00											
Gas Burner Maximum Input	Gas Burner Fire Rate	scf	115,718.42	12,150.43	3,375.12	3,375.12	---	115,718.42	115,718.42	72,324.01	72,324.01	115,718.42	48,216.01	48,216.01	72,324.01	115,718.42	12,150.43			
Emission Factor	Emission Rate	mmscf/hr	0.00000	0.00593	0.00131	0.00131	---	0.00000	0.00000	0.00000	0.00000	0.00000	0.01685	0.01685	0.02527	0.04043	0.00437			
CO	Emission Factor	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00			
Emission Rate	Emission Rate	lb/hr	0.4982	0.4982	0.1097	0.1097	---	0.0000	0.0000	0.0000	0.0000	0.0000	1.4152	1.4152	2.1228	3.3964	0.3668			
Emission Factor	Emission Rate	lb/time	0.00	74.42	30.64	30.64	1,968.10	0.00	0.00	0.00	0.00	0.00	918.44	945.33	0.00	16.98	0.07			
Emission Rate	Emission Rate	tons/time	0.0000	0.0372	0.0115	0.0153	0.9841	0.0000	0.0000	0.0000	0.0000	0.0000	0.4592	0.4727	0.0000	0.0085	0.0000			
CO2	Emission Factor	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00			
Emission Rate	Emission Rate	lb/hr	711.6466	711.6466	156.6807	156.6807	---	0.0000	0.0000	0.0000	0.0000	0.0000	2,021.6704	2,021.6704	3,032.5056	4,852.0090	523.9437			
Emission Factor	Emission Rate	lb/time	0.00	106,320.00	32,793.26	43,776.57	2,811,574.54	0.00	0.00	0.00	0.00	0.00	1,312,064.11	1,350,475.85	0.00	24,260.05	104.79			
Methane	Emission Factor	tons/time	0.0000	53.1600	16.3966	21.8883	1,405.7873	0.0000	0.0000	0.0000	0.0000	0.0000	656.0321	675.2379	0.0000	12.1300	0.0524			
Emission Rate	Emission Rate	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30			
Emission Rate	Emission Rate	lb/hr	0.0000	0.0136	0.0030	0.0030	---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0387	0.0387	0.0581	0.0930	0.0100			
Emission Factor	Emission Rate	lb/time	0.00	2.04	0.63	0.84	53.89	0.00	0.00	0.00	0.00	0.00	25.15	25.88	0.00	0.46	0.00			
Emission Rate	Emission Rate	tons/time	0.0000	0.0010	0.0003	0.0004	0.0269	0.0000	0.0000	0.0000	0.0000	0.0000	0.0126	0.0129	0.0000	0.0002	0.0000			
N2O	Emission Factor	lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20			
Emission Rate	Emission Rate	lb/hr	0.0000	0.0130	0.0029	0.0029	---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0371	0.0371	0.0556	0.0890	0.0096			
Emission Factor	Emission Rate	lb/time	0.00	1.95	0.60	0.80	51.55	0.00	0.00	0.00	0.00	0.00	24.05	24.76	0.00	0.44	0.00			
Emission Rate	Emission Rate	tons/time	0.0000	0.0010	0.0003	0.0004	0.0258	0.0000	0.0000	0.0000	0.0000	0.0000	0.0120	0.0124	0.0000	0.0002	0.0000			
NH3	Emission Factor	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49			
Emission Rate	Emission Rate	lb/hr	0.0000	0.0029	0.0006	0.0006	---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0083	0.0083	0.0124	0.0198	0.0021			
Emission Factor	Emission Rate	lb/time	0.00	0.43	0.13	0.18	11.48	0.00	0.00	0.00	0.00	0.00	5.36	5.51	0.00	0.10	0.00			
NOx	Emission Factor	tons/time	0.0000	0.0002	0.0001	0.0001	0.0057	0.0000	0.0000	0.0000	0.0000	0.0000	0.0027	0.0028	0.0000	0.0000	0.0000			
Emission Rate	Emission Rate	lb/mmmscf	280.00	100.00	100.00	100.00	280.00	280.00	280.00	280.00	280.00	280.00	100.00	100.00	100.00	280.00	100.00			
Emission Factor	Emission Rate	lb/hr	0.5930	0.5930	0.1306	0.1306	---	0.0000	0.0000	0.0000	0.0000	0.0000	1.6847	1.6847	2.5271	11.3214	0.4366			
Emission Rate	Emission Rate	lb/time	0.00	88.60	27.33	36.48	2,379.37	0.00	0.00	0.00	0.00	0.00	1,093.39	1,125.40	0.00	56.61	0.09			
Emission Factor	Emission Rate	tons/time	0.0000	0.0443	0.0137	0.0182	1.1897	0.0000	0.0000	0.0000	0.0000	0.0000	0.5467	0.5627	0.0000	0.0283	0.0000			
Particulate	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
Emission Rate	Emission Rate	lb/hr	0.0000	0.0451	0.0099	0.0099	---	0.0000	0.0000	0.0000	0.0000	0.0000	0.1280	0.1280	0.1921	0.3073	0.0332			
Emission Factor	Emission Rate	lb/time	0.00	6.73	2.08	2.77	178.07	0.00	0.00	0.00	0.00	0.00	83.10	85.53	0.00	1.54	0.01			
PM10	Emission Factor	tons/time	0.0000	0.0034	0.0010	0.0014	0.0890	0.0000	0.0000	0.0000	0.0000	0.0000	0.0415	0.0428	0.0000	0.0008	0.0000			
Emission Rate	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
Emission Rate	Emission Rate	lb/hr	0.0000	0.0451	0.0099	0.0099	---	0.0000	0.0000	0.0000	0.0000	0.0000	0.1280	0.1280	0.1921	0.3073	0.0332			
Emission Factor	Emission Rate	lb/time	0.00	6.73	2.08	2.77	178.07	0.00	0.00	0.00	0.00	0.00	83.10	85.53	0.00	1.54	0.01			
PM2.5	Emission Factor	tons/time	0.0000	0.0034	0.0010	0.0014	0.0890	0.0000	0.0000	0.0000	0.0000	0.0000	0.0415	0.0428	0.0000	0.0008	0.0000			
Emission Rate	Emission Rate	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60			
Emission Rate	Emission Rate	lb/hr	0.0000	0.0036	0.0008	0.0008	---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0101	0.0101	0.0152	0.0243	0.0026			
Emission Factor	Emission Rate	lb/time	0.00	0.53	0.16	0.22	14.06	0.00	0.00	0.00	0.00	0.00	6.56	6.75	0.00	0.12	0.00			
SO2	Emission Factor	tons/time	0.0000	0.0003	0.0001	0.0001	0.0070	0.0000	0.0000	0.0000	0.0000	0.0000	0.0033	0.0034	0.0000	0.0001	0.0000			
Emission Rate	Emission Rate	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50			
Emission Rate	Emission Rate	lb/hr	0.0000	0.0326	0.0072	0.0072	---	0.0000	0.0000	0.0000	0.0000	0.0000	0.0927	0.0927	0.1390	0.2224	0.0240			
Emission Factor	Emission Rate	lb/time	0.00	4.87	1.50	2.01	128.86	0.00	0.00	0.00	0.00	0.00	60.14	61.90	0.00	1.11	0.00			
Emission Rate	Emission Rate	tons/time	0.0000	0.0024	0.0008	0.0010	0.0644	0.0000	0.0000	0.0000	0.0000	0.0000	0.0301	0.0309	0.0000	0.0006	0.0000			
CO2E	Emission Factor	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00			
Emission Rate	Emission Rate	lb/hr	0.0000	715.9758	157.6338	157.6338	---	0.0000	0.0000	0.0000	0.0000	0.0000	2,033.9689	2,033.9689	3,050.9534	4,881.5254	527.1310			
Emission Rate	Emission Rate	lb/time	0.00	106,966.78	32,992.75	44,042.88	2,828,678.29	0.00	0.00	0.00	0.00	0.00	1,320,045.83	1,358,691.24	0.00	24,407.63	105.43			
Emission Factor	Emission Rate	tons/time	0.0000	53.4834	16.4964	22.0214	1,414.3391	0.0000	0.0000	0.0000	0.0000	0.0000	660.0229	679.3456	0.0000	12.2038	0.0527			

2017		Emissions Calculations						Units		July											
Boiler Information	Area	East Heating Plant			West Heating Plant			Total for the Month	East Heating Plant						Convocation Center			Monsanto 1			
	Boiler Identifier	Monsanto 1	Monsanto 2	Convo 2	Monsanto 1	Monsanto 2	Convo 1		Convo 2	Monsanto 1	Monsanto 2	Convo 1	Convo 2	Monsanto 1	Monsanto 2	Convo 1	Convo 2				
Boiler Runtime	hrs	219.5	221.6	148.9	219.5	221.6	---	1E	2E	3E	4E	5E	1W	2W	3W	4W	115.1	100.5	170.1		
Natural Gas Information	Natural Gas Heating Value	4,031.73		0.87	1,037.00			1,037.00													
	Total Natural Gas Consumed	388,787.85		00.00	259,840.96			249,077.03													
Burner Information	Gas Burner Maximum Input	3.50		12.60	24,019,000.00			707,000.00													
	Gas Burner Fire Rate	3,375.12		12,150.43	25,056,987.46			707,000.00													
	Emission Factor	84.00		84.00	84.00			120.00	120.00	75.00	75.00	120.00	120.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	
	Emission Rate	0.0740		0.3668	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
	Emission Factor	16.41		54.61	0.0000	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
CO	Emission Rate	0.0082		0.0273	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		
	Emission Factor	120,000.00		120,000.00	120,000.00			120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00		
CO2	Emission Rate	105.7686		523.9437	3,006,838.50			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1,939.8842	1,939.8842	4,655.7222	393.5065	393.5065	122.2860		
	Emission Factor	23,438.33		78,015.21	1,503.4192			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1,434,544.39	1,426,784.86	0.0000	20,950.75	45,292.60	20,800.85		
Methane	Emission Factor	11.7192		39.0076	2.30			2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30		
	Emission Rate	0.0020		0.0100	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0372	0.0372	0.0558	0.0075	0.0075	0.0023		
N2O	Emission Rate	0.45		1.50	57.63			0.00	0.00	0.00	0.00	0.00	0.00	27.50	27.50	0.00	0.87	0.76	0.40		
	Emission Factor	0.0002		0.0007	0.0288			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0137	0.0137	0.0000	0.0002	0.0004	0.0002		
NH3	Emission Rate	2.20		2.20	2.20			2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20		
	Emission Factor	0.0019		0.0096	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0356	0.0356	0.0533	0.0854	0.0072	0.0022		
NOx	Emission Rate	0.43		1.43	55.13			0.00	0.00	0.00	0.00	0.00	0.00	26.30	26.16	0.00	0.83	0.73	0.38		
	Emission Factor	0.0002		0.0007	0.0276			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0131	0.0131	0.0000	0.0002	0.0004	0.0002		
PM10	Emission Rate	0.49		0.49	0.49			0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49		
	Emission Factor	0.0004		0.0021	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0079	0.0079	0.0119	0.0190	0.0016	0.0005		
PM2.5	Emission Rate	0.10		0.32	12.28			0.00	0.00	0.00	0.00	0.00	0.00	5.86	5.83	0.00	0.18	0.16	0.08		
	Emission Factor	0.0000		0.0002	0.0061			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0029	0.0029	0.0000	0.0000	0.0001	0.0000		
SO2	Emission Rate	280.00		100.00	280.00			280.00	280.00	100.00	100.00	280.00	280.00	100.00	100.00	280.00	280.00	100.00	100.00		
	Emission Factor	0.0881		0.4366	0.0881			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.6166	1.6166	2.4249	10.8634	0.3279	0.1019		
VOC	Emission Rate	19.53		65.01	2,537.12			0.00	0.00	0.00	0.00	0.00	1,195.45	1,188.99	0.00	48.89	32.96	17.33			
	Emission Factor	0.0098		0.0325	1.2686			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.5977	0.5945	0.0000	0.0244	0.0189	0.0087		
CO2E	Emission Rate	7.60		7.60	7.60			7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
	Emission Factor	0.0067		0.0332	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1229	0.1229	0.1843	0.2949	0.0249	0.0077		
Particle	Emission Rate	1.48		4.94	190.43			0.00	0.00	0.00	0.00	0.00	90.85	90.36	0.00	1.33	2.87	2.50	1.32		
	Emission Factor	0.0007		0.0025	0.0952			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0454	0.0452	0.0000	0.0007	0.0014	0.0007		
PM10	Emission Rate	7.60		7.60	7.60			7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
	Emission Factor	0.0067		0.0332	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1229	0.1229	0.1843	0.2949	0.0249	0.0077		
PM2.5	Emission Rate	1.48		4.94	190.43			0.00	0.00	0.00	0.00	0.00	0.00	90.85	90.36	0.00	1.33	2.87	2.50		
	Emission Factor	0.0007		0.0025	0.0952			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0454	0.0452	0.0000	0.0007	0.0014	0.0007		
SO2	Emission Rate	0.60		0.60	0.60			0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		
	Emission Factor	0.0005		0.0026	0.0000			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0097	0.0097	0.0145	0.0233	0.0020	0.0006		
VOC	Emission Rate	0.12		0.39	15.03			0.00	0.00	0.00	0.00	0.00	0.00	7.17	7.13	0.00	0.10	0.20	0.10		
	Emission Factor	0.0001		0.0002	0.0075			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0036	0.0036	0.0000	0.0001	0.0001	0.0001		
CO2E	Emission Rate	5.50		5.50	5.50			5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50		
	Emission Factor	0.0048		0.0240	0.0689			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0329	0.0327	0.0000	0.0005	0.0010	0.0005		
CO2E	Emission Rate	106.4121		527.1310	3,025,130.10			120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	1,951,685.2	1,951,685.2	2,927,527.8	4,684,044.5	395,900.3	123,029.9		
	Emission Factor	23,357.45		78,489.80	1,512,565.0			0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1,443,271.21	1,435,464.46	0.0000	21,078.20	45,568.13	20,927.39		
		11.6787		39.2449	22.7841			0.0000	0.0000	0.0000	0.0000	0.0000	721.6356	717.7322	0.0000	10.5391	19.8940	10.4637			

2017	Emissions Calculations			Units	August														Total for the Month
	Area	Boiler Identifier	Boiler Runtime	Building	East Heating Plant				West Heating Plant				Convocation Center		Monsanto Building				
Boiler Information	Area	Boiler Identifier	Boiler Runtime	Monsanto 2	1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	Total for the Month	
	Boiler Identifier	Boiler Runtime	Boiler Runtime	154.7	0.0	0.0	0.0	0.0	0.0	744.0	744.0	0.0	0.0	15.4	0.4	196.7	201.0		---
Natural Gas Information	Natural Gas Heating Value			BTU/scf														1,037.00	
	Total Natural Gas Consumed			therms	120.00	115,718.42	72,324.01	75.00	120.00	48,216.01	48,216.01	72,324.01	115,718.42	6,501.99	627,000.00	3,545.34	341,884.28	284,802.60	
Burner Information	Gas Burner Maximum Input			scf	0.00000	0.00000	0.00000	0.00000	0.00000	0.01708	0.01708	0.02562	0.04099	0.03968	0.03968	0.00086	0.00086	---	
	Gas Burner Fire Rate			mmscf/hr	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	---	
CO	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	84.00	
	Emission Rate			lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
CO2	Emission Factor			tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2,306.98	
	Emission Rate			lb/hr	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	1,153.55	
Methane	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
	Emission Rate			lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
N2O	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
	Emission Rate			lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	60.42	
NH3	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0302	
	Emission Rate			lb/hr	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	
NOx	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
	Emission Rate			lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	13.46	
Emissions Data	Emission Factor			tons/time	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	0.0067	
	Emission Rate			lb/hr	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	280.00	
Particulate	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
	Emission Rate			lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	2,736.91	
PM10	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1.3685	
	Emission Rate			lb/hr	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	
PM2.5	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
	Emission Rate			lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	208.73	
SO2	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.1044	
	Emission Rate			lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	7.60	
VOC	Emission Factor			lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
	Emission Rate			lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	151.05	
CO2E	Emission Factor			lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	0.0755	
	Emission Rate			lb/hr	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	
				tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	---	
				tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3,315,739.43	
				tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	1,657.8697	





2017	Emissions Calculations			October												Total for the Month			
	Area	Units			West Heating Plant			Convocation Center			Monsanto Building			East Heating Plant					
Boiler Information	Boiler Identifier	---	---	---	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E			
	Boiler Runtime	hrs	0.0	0.0	556.0	649.5	0.0	188.0	230.8	0.2	196.2	215.8	354.0	174.0	171.0	357.0			
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,678.32	1,036.00													1,036.00		
	Total Natural Gas Consumed	therms	162,000.00	388,406.76													622,859.77		
Burner Information	Gas Burner Maximum Input	mmBTU/hr	75.00	50.00	50.00	50.00	120.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00			
	Gas Burner Fire Rate	scf	72,393.82	48,262.55	48,262.55	48,262.55	72,393.82	115,830.12	12,162.16	12,162.16	3,378.38	3,378.38	115,830.12	115,830.12	72,393.82	72,393.82			
CO	Emission Factor	mmscf/hr	0.0000	0.02263	0.02263	0.02263	0.03394	0.05431	0.00437	0.00437	0.00125	0.00125	0.05261	0.05261	0.03288	0.03288			
	Emission Rate	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00			
CO2	Emission Factor	lb/hr	0.0000	1.9009	1.9009	1.9009	2.8514	4.5622	0.3673	0.3673	0.1051	0.1051	4.4196	4.4196	2.7622	2.7622			
	Emission Rate	lb/time	0.00	1,056.91	1,056.91	1,234.64	0.00	857.69	84.77	0.07	20.62	20.68	1,564.54	1,564.54	472.34	986.12			
Methane	Emission Factor	tons/time	0.0000	0.0285	0.0285	0.0285	0.0000	0.4288	0.0424	0.0000	0.0103	0.0113	0.7823	0.7823	0.2362	0.4931			
	Emission Rate	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00			
N2O	Emission Factor	lb/hr	0.0000	2,715.5912	2,715.5912	4,073.3869	6,517.4190	524.6753	524.6753	150.1164	150.1164	150.1164	6,313.7063	6,313.7063	3,946.0664	3,946.0664			
	Emission Rate	lb/time	0.00	1,509,868.73	1,763,776.51	0.00	1,225,274.77	121,095.06	104.94	32,395.12	29,452.84	32,395.12	2,235,052.03	1,098,584.90	674,777.36	1,408,745.72			
NH3	Emission Factor	tons/time	0.0000	0.0138	0.0138	0.0162	0.0000	0.0112	0.0011	0.0000	0.0003	0.0003	0.0205	0.0101	0.0062	0.0129			
	Emission Rate	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49			
NOx	Emission Factor	lb/hr	0.0000	0.0111	0.0111	0.0111	0.0166	0.0266	0.0021	0.0021	0.0006	0.0006	0.0258	0.0258	0.0161	0.0161			
	Emission Rate	lb/time	0.00	6.17	7.20	0.00	5.00	0.00	0.49	0.00	0.12	0.13	9.13	4.49	2.76	5.75			
Particulate	Emission Factor	tons/time	0.0000	0.0031	0.0031	0.0036	0.0000	0.0025	0.0002	0.0000	0.0001	0.0001	0.0046	0.0022	0.0014	0.0029			
	Emission Rate	lb/mmmscf	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00			
PM10	Emission Factor	lb/hr	0.0000	2,2630	2,2630	3,3945	15,2073	0.4372	0.4372	0.1251	0.1251	0.1251	14,7320	14,7320	3,2884	3,2884			
	Emission Rate	lb/time	0.00	1,258.22	1,469.81	0.00	2,858.97	100.91	0.09	24.54	27.00	27.00	5,215.12	2,563.36	562.31	1,173.95			
PM2.5	Emission Factor	tons/time	0.0000	0.6291	0.6291	0.7349	1.4295	0.0000	0.0505	0.0000	0.0123	0.0135	2.6076	1.2817	0.2812	0.5870			
	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
SO2	Emission Factor	lb/hr	0.0000	0.1720	0.1720	0.1720	0.2580	0.4128	0.0332	0.0332	0.0095	0.0095	0.3999	0.3999	0.2499	0.2499			
	Emission Rate	lb/time	0.00	95.63	111.71	0.00	77.60	0.00	7.67	0.01	1.87	2.05	141.55	69.58	42.74	89.22			
VOC	Emission Factor	tons/time	0.0000	0.0478	0.0478	0.0559	0.0000	0.0388	0.0038	0.0000	0.0009	0.0010	0.0708	0.0348	0.0214	0.0446			
	Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60			
CO2E	Emission Factor	lb/hr	0.0000	0.0136	0.0136	0.0136	0.0204	0.0326	0.0026	0.0026	0.0008	0.0008	0.0316	0.0316	0.0197	0.0197			
	Emission Rate	lb/time	0.00	7.55	8.82	0.00	6.13	0.00	0.61	0.00	0.15	0.16	11.18	5.49	3.37	7.04			
CO2E	Emission Factor	tons/time	0.0000	0.0038	0.0038	0.0044	0.0000	0.0031	0.0003	0.0000	0.0001	0.0001	0.0056	0.0027	0.0017	0.0035			
	Emission Rate	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50			
CO2E	Emission Factor	lb/hr	0.0000	0.1245	0.1245	0.1867	0.2987	0.0240	0.0240	0.0069	0.0069	0.0069	0.2894	0.2894	0.1809	0.1809			
	Emission Rate	lb/time	0.00	69.20	80.84	0.00	56.16	0.00	5.55	0.00	1.35	1.48	102.44	50.35	30.93	64.57			
CO2E	Emission Factor	tons/time	0.0000	0.0346	0.0346	0.0404	0.0000	0.0281	0.0028	0.0000	0.0007	0.0007	0.0512	0.0252	0.0155	0.0323			
	Emission Rate	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00			
CO2E	Emission Rate	lb/hr	0.0000	2,732.1111	2,732.1111	4,098.1666	6,557.0666	527.8671	527.8671	151.0296	151.0296	151.0296	6,352.1147	6,352.1147	3,970.0717	3,970.0717			
	Emission Rate	lb/time	0.00	1,519,053.76	1,774,506.15	0.00	1,232,728.52	121,831.73	105.57	29,632.01	29,632.01	32,592.19	2,248,648.59	1,105,267.95	678,882.26	1,417,315.59			
CO2E	Emission Rate	tons/time	0.0000	759.5269	887.2531	0.0000	616.3643	60.9159	0.0528	14.8160	16.2961	16.2961	552.6340	339.4411	708.6578	708.6578			



2017		Emissions Calculations				Units				mber			
Area		West Heating Plant				Convocation Center				Monsanto Building			
Boiler Identifier		2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2					
Boiler Runtime		hrs	0.0	0.0	468.4	2.4	345.8	373.4					
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,037.00										
	Total Natural Gas Consumed	therms	20.74										
Burner Information	Gas Burner Maximum Input	mmBTU/hr	50.00	75.00	120.00	12.60	12.60	12.60					
	Gas Burner Fire Rate	scf	48,216.01	72,324.01	115,718.42	12,150.43	12,150.43	12,150.43					
CO	Emission Factor	mmscf/hr	0.00000	0.00000	0.00000	0.00522	0.00522	0.00522					
	Emission Rate	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00					
CO2	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.4382	0.4382	0.4382					
	Emission Factor	lb/time	0.00	0.00	0.00	205.25	1.05	50.41					
Methane	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.1026	0.0005	0.0252					
	Emission Factor	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00					
N2O	Emission Rate	lb/hr	0.0000	0.0000	0.0000	625.9983	625.9983	625.9983					
	Emission Factor	lb/time	0.00	0.00	0.00	293,217.60	1,502.40	72,017.15					
NH3	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000					
	Emission Factor	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30					
NOx	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0120	0.0120	0.0120					
	Emission Factor	lb/time	0.00	0.00	0.00	5.62	0.03	1.38					
Particulate	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0028	0.0000	0.0000					
	Emission Factor	lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20					
PM10	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0115	0.0115	0.0115					
	Emission Factor	lb/time	0.00	0.00	0.00	5.38	0.03	1.32					
PM2.5	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0027	0.0000	0.0000					
	Emission Factor	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49					
SO2	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0026	0.0026	0.0026					
	Emission Factor	lb/time	0.00	0.00	0.00	1.20	0.01	0.29					
VOC	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0006	0.0000	0.0001					
	Emission Factor	lb/mmmscf	100.00	100.00	100.00	100.00	100.00	100.00					
CO2E	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.5217	0.5217	0.5217					
	Emission Factor	lb/time	0.00	0.00	0.00	244.35	1.25	60.01					
CO2E	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.1222	0.0006	0.0300					
	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60					
SO2	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0396	0.0396	0.0396					
	Emission Factor	lb/time	0.00	0.00	0.00	18.57	0.10	4.56					
VOC	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0093	0.0000	0.0023					
	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60					
CO2E	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0396	0.0396	0.0396					
	Emission Factor	lb/time	0.00	0.00	0.00	18.57	0.10	4.56					
PM10	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0093	0.0000	0.0023					
	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60					
PM2.5	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0396	0.0396	0.0396					
	Emission Factor	lb/time	0.00	0.00	0.00	18.57	0.10	4.56					
SO2	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0093	0.0000	0.0023					
	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60					
VOC	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0396	0.0396	0.0396					
	Emission Factor	lb/time	0.00	0.00	0.00	18.57	0.10	4.56					
CO2E	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0067	0.0000	0.0017					
	Emission Factor	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00					
CO2E	Emission Rate	lb/hr	0.0000	0.0000	0.0000	629.8065	629.8065	629.8065					
	Emission Factor	lb/time	0.00	0.00	0.00	295,001.34	1,511.54	72,455.25					
CO2E	Emission Rate	tons/time	0.0000	0.0000	0.0000	147.5007	0.7558	36.2276					
	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60					



2018		January										Total for the Month					
Emissions Calculations		East Heating Plant					West Heating Plant					Convocation Center		Monsanto Building			
Area		1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	
Boiler Information		Boiler Identifier	Boiler Runtime	Units													
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,037.00													1,036.00	
	Total Natural Gas Consumed	therms	725.90													777,068.26	
Burner Information	Gas Burner Maximum Input	mmBTU/hr	70,000.00													75,006,588.80	
	Gas Burner Fire Rate	scf	115,718.42	115,718.42	72,324.01	72,324.01	115,718.42	48,216.01	48,216.01	72,324.01	115,718.42	12,150.43	12,150.43	3,375.12	3,375.12	115,830.12	115,830.12
	Emission Factor	mmscf/hr	0.05290	0.05290	0.03306	0.03306	0.05290	0.00000	0.00000	0.00000	0.00000	0.00370	0.00370	0.00201	0.00201	0.05220	0.05220
	Emission Rate	lb/mmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00
CO	Emission Rate	lb/hr	4.4432	4.4432	2.7770	2.7770	4.4432	0.0000	0.0000	0.0000	0.0000	0.3112	0.3112	0.1689	0.1689	4.3847	4.3847
	Emission Rate	lb/time	2,319.36	3,292.42	1,171.90	1,124.7	0.00	0.00	0.00	0.0000	0.0000	109.03	109.03	60.32	64.75	1,885.43	2,926.80
	Emission Factor	tons/time	1.1597	1.6462	0.5859	0.0562	0.0000	0.0000	0.0000	0.0000	0.0000	0.0545	0.0545	0.0302	0.0324	0.9427	1.4634
	Emission Rate	lb/mmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00
CO2	Emission Rate	lb/hr	6,347.4506	6,347.4506	3,967.1566	3,967.1566	6,347.4506	0.0000	0.0000	0.0000	0.0000	444.5205	444.5205	241.2457	241.2457	6,263.8846	6,263.8846
	Emission Rate	lb/time	3,313,369.20	4,703,460.87	1,674,140.09	160,669.84	0.00	0.00	0.00	0.0000	0.0000	155,760.00	155,760.00	86,172.97	92,493.61	2,693,470.40	4,181,143.00
	Emission Factor	tons/time	1,656.6846	2,351.7304	837.0700	80.3349	0.0000	0.0000	0.0000	0.0000	0.0000	77.8800	77.8800	43.0865	46.2468	1,346.7352	2,090.5715
	Emission Rate	lb/mmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30
Methane	Emission Rate	lb/hr	0.1217	0.1217	0.0760	0.0760	0.1217	0.0000	0.0000	0.0000	0.0000	0.0085	0.0085	0.0046	0.0046	0.1201	0.1201
	Emission Rate	lb/time	63.51	90.15	32.09	3.08	0.00	0.00	0.00	0.0000	0.0000	2.99	2.99	1.65	1.77	51.62	80.14
	Emission Factor	tons/time	0.0318	0.0451	0.0160	0.0015	0.0000	0.0000	0.0000	0.0000	0.0000	0.0015	0.0015	0.0008	0.0009	0.0258	0.0401
	Emission Rate	lb/mmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20
N2O	Emission Rate	lb/hr	0.1164	0.1164	0.0727	0.0727	0.1164	0.0000	0.0000	0.0000	0.0000	0.0081	0.0081	0.0044	0.0044	0.1148	0.1148
	Emission Rate	lb/time	60.75	86.23	30.69	2.95	0.00	0.00	0.00	0.0000	0.0000	2.86	2.86	1.58	1.70	49.38	76.65
	Emission Factor	tons/time	0.0304	0.0431	0.0153	0.0015	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014	0.0008	0.0008	0.0247	0.0383	
	Emission Rate	lb/mmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
NH3	Emission Rate	lb/hr	0.0259	0.0259	0.0162	0.0162	0.0259	0.0000	0.0000	0.0000	0.0000	0.0018	0.0018	0.0010	0.0010	0.0256	0.0256
	Emission Rate	lb/time	13.53	19.21	6.84	0.66	0.00	0.00	0.00	0.0000	0.0000	0.64	0.64	0.35	0.38	11.00	17.07
	Emission Factor	tons/time	0.0068	0.0096	0.0034	0.0003	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003	0.0002	0.0002	0.0055	0.0085	
	Emission Rate	lb/mmscf	280.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	280.00	280.00
NOx	Emission Rate	lb/hr	14.8107	14.8107	3.3060	3.3060	14.8107	0.0000	0.0000	0.0000	0.0000	0.3704	0.3704	0.2010	0.2010	14.6157	14.6157
	Emission Rate	lb/time	7,731.19	10,974.74	1,395.12	133.89	0.00	0.00	0.00	0.0000	0.0000	129.80	129.80	71.81	77.08	6,284.76	9,756.00
	Emission Factor	tons/time	3.8656	5.4874	0.6976	0.0669	0.0000	0.0000	0.0000	0.0000	0.0649	0.0649	0.0359	0.0385	3.1424	4.8780	
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
Particulate	Emission Rate	lb/hr	0.4020	0.4020	0.2513	0.2513	0.4020	0.0000	0.0000	0.0000	0.0000	0.0282	0.0282	0.0153	0.0153	0.3967	0.3967
	Emission Rate	lb/time	209.85	297.89	106.03	10.18	0.00	0.00	0.00	0.0000	0.0000	9.86	9.86	5.46	5.86	170.59	264.81
	Emission Factor	tons/time	0.1049	0.1489	0.0530	0.0051	0.0000	0.0000	0.0000	0.0000	0.0049	0.0049	0.0027	0.0029	0.0853	0.1324	
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
PM10	Emission Rate	lb/hr	0.4020	0.4020	0.2513	0.2513	0.4020	0.0000	0.0000	0.0000	0.0000	0.0282	0.0282	0.0153	0.0153	0.3967	0.3967
	Emission Rate	lb/time	209.85	297.89	106.03	10.18	0.00	0.00	0.00	0.0000	0.0000	9.86	9.86	5.46	5.86	170.59	264.81
	Emission Factor	tons/time	0.1049	0.1489	0.0530	0.0051	0.0000	0.0000	0.0000	0.0000	0.0049	0.0049	0.0027	0.0029	0.0853	0.1324	
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60
PM2.5	Emission Rate	lb/hr	0.4020	0.4020	0.2513	0.2513	0.4020	0.0000	0.0000	0.0000	0.0000	0.0282	0.0282	0.0153	0.0153	0.3967	0.3967
	Emission Rate	lb/time	209.85	297.89	106.03	10.18	0.00	0.00	0.00	0.0000	0.0000	9.86	9.86	5.46	5.86	170.59	264.81
	Emission Factor	tons/time	0.1049	0.1489	0.0530	0.0051	0.0000	0.0000	0.0000	0.0000	0.0049	0.0049	0.0027	0.0029	0.0853	0.1324	
	Emission Rate	lb/mmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60
SO2	Emission Rate	lb/hr	0.0317	0.0317	0.0198	0.0198	0.0317	0.0000	0.0000	0.0000	0.0000	0.0022	0.0022	0.0012	0.0012	0.0313	0.0313
	Emission Rate	lb/time	16.57	23.52	8.37	0.80	0.00	0.00	0.00	0.0000	0.0000	0.78	0.78	0.43	0.46	13.47	20.91
	Emission Factor	tons/time	0.0083	0.0118	0.0042	0.0004	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004	0.0002	0.0002	0.0067	0.0105	
	Emission Rate	lb/mmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50
VOC	Emission Rate	lb/hr	0.2909	0.2909	0.1818	0.1818	0.2909	0.0000	0.0000	0.0000	0.0000	0.0204	0.0204	0.0111	0.0111	0.2871	0.2871
	Emission Rate	lb/time	151.86	215.58	76.73	7.36	0.00	0.00	0.00	0.0000	0.0000	7.14	7.14	3.95	4.24	123.45	191.64
	Emission Factor	tons/time	0.0759	0.1078	0.0384	0.0037	0.0000	0.0000	0.0000	0.0000	0.0036	0.0036	0.0020	0.0021	0.0617	0.0958	
	Emission Rate	lb/mmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00
CO2E	Emission Rate	lb/hr	6,386.0642	6,386.0642	3,991.2901	3,991.2901	6,386.0642	0.0000	0.0000	0.0000	0.0000	447.2247	447.2247	242.7133	242.7133	6,301.9899	6,301.9899
	Emission Rate	lb/time	3,333,525.53	4,732,073.59	1,684,324.44	161,647.25	0.00	0.00	0.00	0.0000	0.0000	156,707.54	156,707.54	86,697.19	93,056.28	2,709,855.67	4,206,578.28
	Emission Factor	tons/time	1,666.7628	2,366.0368	842.1622	80.8236	0.0000	0.0000	0.0000	0.0000	78.3538	78.3538	43.3486	46.5281	1,354.9278	2,103.2891	
	Emission Rate	lb/mmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60

2018	Emissions Calculations			Units		February												Total for the Month			
	Area	West Heating Plant			Convocation Center			Monsanto Building		East Heating Plant			1E	2E	3E	4E					
Boiler Information	Boiler Identifier	---	---																		
	Boiler Runtime	hrs	91.0	337.5	0.0	0.0	0.0	0.0	342.5	109.9	338.9	302.9	338.9	404.0	340.0	249.5	472.0				
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,036.00																		
	Total Natural Gas Consumed	therms	738,336.48	3,781.40												13,318.70	672,716.24				
Burner Information	Gas Burner Maximum Input	mmBTU/hr	365,000.00																		
	Gas Burner Fire Rate	scf	75.00	75.00	120.00	50.00	50.00	50.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00			
	Emission Factor	mmscf/hr	0.03262	0.03262	0.05220	0.02535	0.02535	0.02535	0.06083	0.00462	0.00462	0.00200	0.00200	0.05434	0.05434	0.03396	0.03396				
	Emission Rate	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00				
	Emission Rate	lb/hr	2,740.4	2,740.4	4,384.7	2,129.2	2,129.2	2,129.2	3,193.8	3,877.0	3,877.0	1,683.0	1,683.0	4,564.6	4,564.6	2,852.9	2,852.9				
	Emission Rate	lb/time	249.38	924.90	0.00	0.00	0.00	30.66	42.61	57.02	1,844.11	1,551.98	711.80	1,346.57	1,346.57	1,346.57	1,346.57				
	Emission Rate	tons/time	0.1247	0.4625	0.0000	0.0000	0.0000	0.0153	0.0213	0.0285	0.9221	0.7760	0.3559	0.6733	0.6733	0.6733	0.6733				
	Emission Rate	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00				
	Emission Rate	lb/hr	3,914.9279	3,914.9279	6,263.8846	3,041.6667	3,041.6667	4,562.5000	5,533.8462	5,533.8462	2,403.719	2,403.719	2,403.719	6,520.9101	6,520.9101	4,075.5688	4,075.5688				
	Emission Rate	lb/time	356,258.44	1,321,288.17	0.00	0.00	0.00	43,800.00	60,867.69	60,867.69	81,462.02	81,462.02	81,462.02	1,016,854.42	1,016,854.42	1,923,668.48	1,923,668.48				
	Emission Rate	tons/time	178.1292	660.6441	0.0000	0.0000	0.0000	21.9000	30.4338	30.4338	40.7310	40.7310	40.7310	508.4272	508.4272	961.8342	961.8342				
	Methane	Emission Factor	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30				
Emission Rate		lb/hr	0.0750	0.0750	0.1201	0.0583	0.0583	0.0874	0.0106	0.0106	0.0046	0.0046	0.0781	0.0781	0.0781	0.0781					
N2O	Emission Factor	lb/hr	6.83	25.32	0.00	0.00	0.84	1.17	1.49	1.56	1.56	1.56	50.49	42.49	19.49	36.87					
	Emission Rate	tons/time	0.0034	0.0127	0.0000	0.0000	0.0004	0.0018	0.0006	0.0008	0.0007	0.0008	0.0780	0.0780	0.0097	0.0184					
NH3	Emission Factor	lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20					
	Emission Rate	lb/hr	0.0718	0.0718	0.1148	0.0558	0.0558	0.0836	0.0102	0.0102	0.0044	0.0044	0.0747	0.0747	0.0747	0.0747					
NOx	Emission Factor	lb/time	6.53	24.22	0.00	0.00	0.80	1.12	1.49	1.56	1.56	1.56	50.49	42.49	19.49	36.87					
	Emission Rate	tons/time	0.0033	0.0121	0.0000	0.0000	0.0004	0.0017	0.0006	0.0007	0.0007	0.0007	0.0746	0.0746	0.0093	0.0176					
Particulate	Emission Factor	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49					
	Emission Rate	lb/hr	0.0160	0.0160	0.0256	0.0124	0.0124	0.0186	0.0023	0.0023	0.0010	0.0010	0.166	0.166	0.166	0.166					
PM10	Emission Factor	lb/time	1.45	5.40	0.00	0.00	0.18	0.25	0.33	0.33	0.33	0.33	10.76	9.05	4.15	7.85					
	Emission Rate	tons/time	0.0007	0.0027	0.0000	0.0000	0.0001	0.0004	0.0001	0.0002	0.0001	0.0002	0.0166	0.0166	0.0039	0.0039					
PM2.5	Emission Factor	lb/mmmscf	100.00	100.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00	100.00	100.00					
	Emission Rate	lb/hr	3,262.4	3,262.4	14,615.7	2,534.7	2,534.7	3,802.1	4,615.0	4,615.0	60.67	60.67	847.38	847.38	1,603.06	1,603.06					
SO2	Emission Factor	lb/time	296.88	1,101.07	0.00	0.00	102.20	158.08	50.72	67.89	67.89	67.89	2,173.26	2,173.26	2,173.26	2,173.26					
	Emission Rate	tons/time	0.1484	0.5505	0.0000	0.0000	0.0511	0.0790	0.0254	0.0339	0.0339	0.0339	7.0272	7.0272	0.8015	0.8015					
VOC	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60					
	Emission Rate	lb/hr	0.2479	0.2479	0.3967	0.1926	0.1926	0.2890	0.4623	0.0351	0.0351	0.0152	0.152	0.152	0.152	0.152					
CO2E	Emission Factor	lb/time	22.56	83.68	0.00	0.00	2.77	3.85	5.16	5.16	5.16	5.16	166.85	140.42	64.40	121.83					
	Emission Rate	tons/time	0.0113	0.0418	0.0000	0.0000	0.0014	0.0060	0.0019	0.0026	0.0026	0.0026	0.2576	0.2576	0.0609	0.0609					
CO2E	Emission Factor	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60					
	Emission Rate	lb/hr	0.0196	0.0196	0.0313	0.0152	0.0152	0.0228	0.0028	0.0028	0.0012	0.0012	0.0204	0.0204	0.0204	0.0204					
CO2E	Emission Factor	lb/time	1.78	6.61	0.00	0.00	0.22	0.30	0.41	0.41	0.41	0.41	13.17	11.09	5.08	9.62					
	Emission Rate	tons/time	0.0009	0.0033	0.0000	0.0000	0.0001	0.0005	0.0002	0.0002	0.0002	0.0002	0.0066	0.0055	0.0025	0.0048					
CO2E	Emission Factor	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50					
	Emission Rate	lb/hr	0.1794	0.1794	0.2871	0.1394	0.1394	0.2091	0.0254	0.0254	0.0110	0.0110	0.2989	0.2989	0.1868	0.1868					
CO2E	Emission Factor	lb/time	16.33	60.56	0.00	0.00	2.01	2.79	3.73	3.73	3.73	3.73	120.75	101.62	46.61	88.17					
	Emission Rate	tons/time	0.0082	0.0303	0.0000	0.0000	0.0010	0.0043	0.0019	0.0019	0.0019	0.0019	0.0604	0.0508	0.0233	0.0441					
CO2E	Emission Factor	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00					
	Emission Rate	lb/hr	3,938.7437	3,938.7437	6,301.9899	3,060.1701	3,060.1701	4,590.2552	5,572.154	5,572.154	241.8341	241.8341	6,560.5790	6,560.5790	4,100.3618	4,100.3618					
CO2E	Emission Factor	lb/time	358,425.68	1,329,326.00	0.00	0.00	44,066.45	190,846.27	61,237.97	81,957.58	81,957.58	81,957.58	1,023,040.28	1,023,040.28	1,935,370.79	1,935,370.79					
	Emission Rate	tons/time	179.2128	664.6630	0.0000	0.0000	22.0332	95.4231	30.6190	40.9788	40.9788	40.9788	1,115.2984	1,115.2984	967.6854	967.6854					













2018	Emissions Calculations												September												Total for the Month	
	Area	East Heating Plant				West Heating Plant				Convocation Center		Monsanto Building		1E	2E											
Boiler Identifier	1E	2E	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2			1E	2E									
Boiler Runtime	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	hrs	0.0	0.0											
Natural Gas Heating Value	BTU/scf	1,037.00												1,036.00												
Total Natural Gas Consumed	therms	284,050.48												472,941.15												
Gas Burner Maximum Input	mmBTU/hr	27,391,560.27												45,650,690.15												
Gas Burner Fire Rate	scf	115,718.42	120,000.00	72,324.01	72,324.01	115,718.42	48,216.01	72,324.01	115,718.42	12,150.43	12,150.43	3,375.12	3,375.12	115,830.12	120,000.00											
Emission Factor	mmscf/hr	0.00000	0.00000	0.00000	0.00000	0.00000	0.01902	0.02853	0.04565	0.00452	0.00452	0.00076	0.00076	0.00000	0.00000											
Emission Rate	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00											
Emission Factor	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	1.5978	2.3968	3.8348	0.3798	0.3798	0.0637	0.0637	0.0000	0.0000											
Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	1,150.45	1,150.45	0.00	43.30	43.30	16.71	18.45	0.00	0.00											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.5752	0.0000	0.0000	0.0217	0.0000	0.0084	0.0092	0.0000	0.0000											
Emission Rate	lb/mmmscf	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	2,282.6300	3,423.9450	5,478.3121	542.6341	542.6341	90.9911	90.9911	120,000.00	120,000.00											
Emission Rate	lb/hr	0.00	0.00	0.00	0.00	0.00	1,643,493.62	1,643,493.62	0.00	61,860.29	61,860.29	23,866.96	26,351.02	0.00	0.00											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	821.7468	821.7468	0.0000	30.9301	30.9301	11.9335	13.1755	0.0000	0.0000											
Emission Rate	lb/mmmscf	2.30	2.30	2.30	2.30	2.30	0.0438	0.0438	0.1050	0.0104	0.0104	0.0017	0.0017	2.30	2.30											
Emission Rate	lb/time	0.00	0.00	0.00	0.00	0.00	31.50	31.50	0.00	1.19	1.19	0.46	0.51	0.00	0.00											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0158	0.0000	0.0000	0.0006	0.0006	0.0002	0.0003	0.0000	0.0000											
Emission Rate	lb/mmmscf	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20											
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0418	0.0418	0.1004	0.0099	0.0099	0.0017	0.0017	0.0000	0.0000											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	30.13	30.13	0.00	1.13	1.13	0.44	0.48	0.0000	0.0000											
Emission Rate	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.0093	0.0093	0.0224	0.0022	0.0022	0.0004	0.0004	0.49	0.49											
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	6.71	6.71	0.00	0.25	0.25	0.11	0.11	0.0000	0.0000											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0034	0.0034	0.0000	0.0001	0.0001	0.0000	0.0001	0.0000	0.0000											
Emission Rate	lb/mmmscf	280.00	280.00	100.00	100.00	280.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	280.00	280.00											
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	1,902.2	2,853.3	12,782.7	0.4522	0.4522	0.0758	0.0758	0.0000	0.0000											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	1,369.58	1,369.58	0.00	51.55	51.55	19.89	21.96	0.0000	0.0000											
Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60											
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.1446	0.1446	0.3470	0.0344	0.0344	0.0058	0.0058	0.0000	0.0000											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0520	0.0000	0.0000	0.0020	0.0020	0.0008	0.0008	0.0000	0.0000											
Emission Rate	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60											
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	104.09	104.09	0.00	3.92	3.92	1.51	1.67	0.0000	0.0000											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0520	0.0000	0.0000	0.0020	0.0020	0.0008	0.0008	0.0000	0.0000											
Emission Rate	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60											
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0114	0.0114	0.0274	0.0027	0.0027	0.0005	0.0005	0.0000	0.0000											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	8.22	8.22	0.00	0.31	0.31	0.12	0.13	0.0000	0.0000											
Emission Rate	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50											
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.1046	0.1569	0.2511	0.0249	0.0249	0.0042	0.0042	0.0000	0.0000											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0377	0.0377	0.0000	0.0014	0.0014	0.0005	0.0006	0.0000	0.0000											
Emission Rate	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	2,296.5160	3,444.7740	5,511.6385	545.9351	545.9351	91.5446	91.5446	120,730.00	120,730.00											
Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	1,653,491.54	1,653,491.54	0.00	62,236.61	62,236.61	24,012.15	26,511.32	0.0000	0.0000											
Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	826.7458	826.7458	0.0000	31.1183	31.1183	12.0061	13.2557	0.0000	0.0000											

2018	Emissions Calculations				October										Total for the Month			
	Area	West Heating Plant		Convocation Center		Monsanto Building		East Heating Plant				East Heating Plant						
Boiler Information	Boiler Identifier	3E	4E	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E		
Natural Gas Information	Natural Gas Heating Value	1,419.32	1,036.00	1,036.00	269.5	304.0	0.0	475.0	162.1	0.0	477.7	0.0	316.5	336.5	167.5	291.0		
	Total Natural Gas Consumed	137,000.00	44,118,000.00	44,118,000.00	50.00	50.00	75.00	120.00	12.60	12.60	3.50	3.50	120.00	120.00	75.00	75.00		
Burner Information	Gas Burner Maximum Input	72,393.82	72,393.82	115,830.12	48,262.55	48,262.55	72,393.82	115,830.12	12,162.16	12,162.16	3,378.38	3,378.38	115,718.42	115,718.42	72,324.01	72,324.01		
	Gas Burner Fire Rate	0.0000	0.0000	0.0000	0.02575	0.02575	0.03862	0.06179	0.00492	0.00492	0.00125	0.00125	0.06088	0.06088	0.03805	0.03805		
CO	Emission Factor	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00		
	Emission Rate	0.0000	0.0000	0.0000	2.1628	2.1628	3.2442	5.1907	0.4135	0.4135	0.1051	0.1051	5.1137	5.1137	3.1961	3.1961		
CO2	Emission Factor	0.0000	0.0000	0.0000	582.87	657.48	0.0000	2,465.56	67.03	67.03	50.21	50.21	1,618.48	1,720.76	535.34	930.05		
	Emission Rate	120,000.00	120,000.00	120,000.00	0.2914	0.3287	0.0000	1,232.8	0.0335	0.0000	0.0251	0.0000	0.8092	0.8604	0.2677	0.4650		
Methane	Emission Factor	0.0000	0.0000	0.0000	3,089.6761	3,089.6761	4,634.5142	7,415.2226	590.7465	590.7465	150.1420	150.1420	7,305.2724	7,305.2724	4,565.7953	4,565.7953		
	Emission Rate	0.0000	0.0000	0.0000	832,667.71	939,261.53	0.0000	3,522,230.76	95,760.00	95,760.00	71,722.82	0.0000	0.0000	2,312,118.71	2,458,224.16	764,770.70	1,328,646.42	
N2O	Emission Factor	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30	2.30		
	Emission Rate	0.0000	0.0000	0.0000	0.0592	0.0592	0.0888	0.1421	0.0113	0.0113	0.0029	0.0029	0.1400	0.1400	0.0875	0.0875		
NH3	Emission Factor	0.0000	0.0000	0.0000	15.96	18.00	0.0000	67.51	1.84	0.0000	1.37	0.0000	44.32	47.12	14.66	25.47		
	Emission Rate	0.0000	0.0000	0.0000	0.0080	0.0090	0.0000	0.0338	0.0009	0.0000	0.0007	0.0000	0.0222	0.0236	0.0073	0.0127		
NOx	Emission Factor	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20	2.20		
	Emission Rate	0.0000	0.0000	0.0000	0.0566	0.0566	0.0850	0.1359	0.0108	0.0108	0.0028	0.0028	0.1339	0.1339	0.0837	0.0837		
PM10	Emission Factor	0.0000	0.0000	0.0000	0.0076	0.0086	0.0000	0.0323	0.0009	0.0000	0.0007	0.0000	0.0212	0.0225	0.0070	0.0122		
	Emission Rate	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49		
PM2.5	Emission Factor	0.0000	0.0000	0.0000	0.0126	0.0126	0.0189	0.0303	0.0024	0.0024	0.0006	0.0006	0.0298	0.0298	0.0186	0.0186		
	Emission Rate	0.0000	0.0000	0.0000	3.40	3.84	0.0000	14.38	0.39	0.0000	0.29	0.0000	9.44	10.04	3.12	5.43		
SO2	Emission Factor	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00		
	Emission Rate	0.0000	0.0000	0.0000	2.5747	2.5747	3.8621	17.3022	0.4923	0.4923	0.1251	0.1251	17.0456	17.0456	3.8048	3.8048		
VOC	Emission Factor	0.0000	0.0000	0.0000	693.89	782.72	0.0000	8,218.54	79.80	0.0000	59.77	0.0000	5,394.94	5,735.86	637.31	1,107.21		
	Emission Rate	0.0000	0.0000	0.0000	0.3469	0.3914	0.0000	4.1093	0.0399	0.0000	0.0299	0.0000	2.6975	2.8679	0.3187	0.5536		
CO2e	Emission Factor	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
	Emission Rate	0.0000	0.0000	0.0000	0.1957	0.1957	0.2935	0.4696	0.0374	0.0374	0.0095	0.0095	0.4627	0.4627	0.2892	0.2892		
CO2e	Emission Rate	0.0000	0.0000	0.0000	52.74	59.49	0.0000	223.07	6.06	6.06	4.54	4.54	146.43	155.69	48.44	84.15		
	Emission Rate	0.0000	0.0000	0.0000	0.0264	0.0297	0.0000	0.1115	0.0030	0.0000	0.0023	0.0000	0.0732	0.0778	0.0242	0.0421		
CO2e	Emission Factor	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60		
	Emission Rate	0.0000	0.0000	0.0000	0.1957	0.1957	0.2935	0.4696	0.0374	0.0374	0.0095	0.0095	0.4627	0.4627	0.2892	0.2892		
CO2e	Emission Rate	0.0000	0.0000	0.0000	52.74	59.49	0.0000	223.07	6.06	6.06	4.54	4.54	146.43	155.69	48.44	84.15		
	Emission Rate	0.0000	0.0000	0.0000	0.0264	0.0297	0.0000	0.1115	0.0030	0.0000	0.0023	0.0000	0.0732	0.0778	0.0242	0.0421		
CO2e	Emission Factor	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60		
	Emission Rate	0.0000	0.0000	0.0000	0.0154	0.0154	0.0232	0.0371	0.0030	0.0030	0.0008	0.0008	0.0365	0.0365	0.0228	0.0228		
CO2e	Emission Rate	0.0000	0.0000	0.0000	4.16	4.70	0.0000	17.61	0.48	0.48	0.36	0.36	11.56	12.29	3.82	6.64		
	Emission Rate	0.0000	0.0000	0.0000	0.0021	0.0023	0.0000	0.0088	0.0002	0.0000	0.0002	0.0000	0.0058	0.0061	0.0019	0.0033		
CO2e	Emission Rate	0.0000	0.0000	0.0000	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50		
	Emission Rate	0.0000	0.0000	0.0000	0.1416	0.1416	0.2124	0.3399	0.0271	0.0271	0.0069	0.0069	0.3348	0.3348	0.2093	0.2093		
CO2e	Emission Rate	0.0000	0.0000	0.0000	38.16	43.05	0.0000	161.44	4.39	4.39	3.29	3.29	105.97	112.67	35.05	60.90		
	Emission Rate	0.0000	0.0000	0.0000	0.0191	0.0215	0.0000	0.0807	0.0022	0.0000	0.0016	0.0000	0.0530	0.0563	0.0175	0.0304		
CO2e	Emission Rate	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00		
	Emission Rate	0.0000	0.0000	0.0000	3,108.4716	3,108.4716	4,662.7074	7,460.3319	594.3402	594.3402	151.0553	151.0553	7,349.7128	7,349.7128	4,593.5705	4,593.5705		
CO2e	Emission Rate	0.0000	0.0000	0.0000	837,733.10	944,975.38	0.0000	3,543,657.66	96,342.54	96,342.54	72,159.13	72,159.13	2,326,184.10	2,473,178.36	769,423.06	1,336,729.02		
	Emission Rate	0.0000	0.0000	0.0000	418.8666	472.4877	0.0000	1,771.8288	48.1713	48.1713	36.0796	36.0796	1,163.0921	1,236.5892	384.7115	668.3645		

2018	Emissions Calculations				November												December				
	Area	Units			West Heating Plant				Convocation Center		Monsanto Building		East Heating Plant				Total for the Month	December			
Boiler Information	Boiler Identifier	5E	1W	2W	3W	4W	Conv 1	Conv 2	Monsanto 1	Monsanto 2	1E	2E	3E	4E	5E	1W					
	Boiler Runtime	hrs	0.0	9.0	0.0	160.0	154.7	121.6	349.0	302.5	436.5	602.0	72.0	379.5	0.0	0.0					
Natural Gas Information	Natural Gas Heating Value	BTU/scf	1,037.00																		
	Total Natural Gas Consumed	therms	18,323.79																		
Burner Information	Gas Burner Maximum Input	mmBTU/hr	9,671,000.00																		
	Gas Burner Fire Rate	scf	115,718.42	48,216.01	72,324.01	115,718.42	12,150.43	12,150.43	3,375.12	3,375.12	115,718.42	120.00	115,718.42	72,324.01	72,324.01	115,718.42	48,216.01				
CO	Emission Factor	lb/mmmscf	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00	84.00					
	Emission Rate	lb/hr	5,1137	2,0671	2,0671	3,1006	4,9610	5,372	5,372	4,1416	4,1416	4,4684	4,4684	2,7928	2,7928	4,4684					
CO2	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
	Emission Rate	lb/hr	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00	120,000.00					
Methane	Emission Factor	lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
N2O	Emission Factor	lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
NH3	Emission Factor	lb/mmmscf	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49						
	Emission Rate	lb/hr	0.0298	0.0121	0.0121	0.0181	0.0289	0.0031	0.0031	0.0008	0.0008	0.0061	0.0261	0.0163	0.0261						
NOx	Emission Factor	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
	Emission Rate	lb/hr	280.00	100.00	100.00	100.00	280.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00						
Emissions Data	Emission Factor	lb/mmmscf	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60	7.60						
	Emission Rate	tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
Particulate	Emission Factor	lb/mmmscf	0.4627	0.1870	0.1870	0.2805	0.4489	0.0486	0.0486	0.0128	0.0128	0.4043	0.4043	0.2527	0.4043						
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
PM10	Emission Factor	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60						
	Emission Rate	lb/hr	0.4627	0.1870	0.1870	0.2805	0.4489	0.0486	0.0486	0.0128	0.0128	0.4043	0.4043	0.2527	0.4043						
PM2.5	Emission Factor	lb/mmmscf	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60	0.60						
	Emission Rate	lb/hr	0.4627	0.1870	0.1870	0.2805	0.4489	0.0486	0.0486	0.0128	0.0128	0.4043	0.4043	0.2527	0.4043						
SO2	Emission Factor	lb/mmmscf	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
	Emission Rate	lb/hr	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
VOC	Emission Factor	lb/mmmscf	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50	5.50						
	Emission Rate	lb/hr	0.3348	0.1353	0.1353	0.2030	0.3248	0.0352	0.0352	0.0093	0.0093	0.2926	0.2926	0.1829	0.2926						
CO2E	Emission Factor	lb/mmmscf	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00	120,730.00						
	Emission Rate	lb/hr	7,349,7128	2,970,9410	2,970,9410	4,456,4116	7,130,2585	772,0952	772,0952	203,5619	203,5619	6,422,3264	6,422,3264	4,013,9540	6,422,3264						
		tons/time	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000						
		tons/time	8,910,065.75	4,455,032.9	4,455,032.9	6,422,326.4	1,401,672.7	1,401,672.7	386,624.47	386,624.47	289,004.69	1,523,295.53	1,523,295.53	1,401,672.7							





 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-BOD</b>		
		Rev. 1	Date: 03/09/2021	Appendix F

## APPENDIX F – STEAM AND CONDENSATE FLOW ANALYSIS

# **Steam and Condensate Flow Analysis**

## **East and West Boiler Plants and Connecting Tunnel**

Northern Illinois University, DeKalb (NIU), Illinois

### **Overview**

The steam distribution for winter heating to various buildings at NIU campus is supplied by two boiler plants located on east and west side of the campus and connected through a common steam pipe header and condensate pipes which run in an underground tunnel. The boiler plant located on east side is called East Heating Plant (EHP) and the boiler plant located on west side is called West Heating Plant (WHP). As the boilers in the EHP are old NIU has decided to abandon the EHP and expand WHP by providing additional boilers to serve the entire campus from WHP.

### **Purpose**

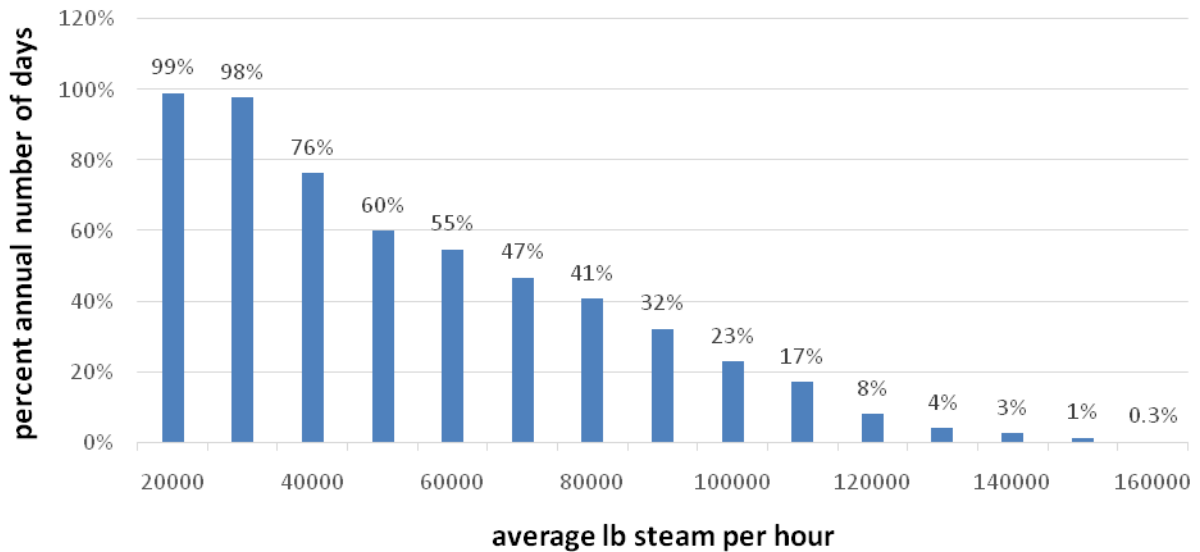
The purpose of this report, prepared by General Energy Corporation (GEC) is to evaluate existing steam pipes and condensate pipes sizes running in the underground tunnel serving various campus buildings and make recommendations. GEC analysis is based on information provided by Middough, Emission Calculations, and NIU operating and maintenance (O&M) staff in the form of daily steam and gas consumption data logs for each plant, natural gas consumption data for each plant from NICOR, make-up water consumption logs, 'Boiler and Steam System Assessment' report by Stanley Consultant, and interview with O&M staff.

### **Analysis**

GEC has reviewed daily Boiler Feed Water Make-Up data and daily Boiler Steam Totalizer data from the multiple handwritten "Northern Illinois University DeKalb Daily Heating Plant Report" provided by Middough as "Emissions Calculations". While actual peak demand is greater than the daily averages which are compiled and calculated in the following graphical figures, the daily averages provide useful check figures to compare with any design-hour performance.

NIU staff confirmed that the water meter daily readings are only for boiler feed make-up water and do not include other city water uses like domestic softened water or cooling tower make-up water. Middough also provided to GEC "plot KPPH vs OAT" which showed 170,000 lb per hour steam flow at - 25 degrees F outside air temperature (OAT) encountered in the month of January 2019. We are basing our analysis based on steam flow of 200,000 lbs. per hour as suggested in Stanley Consultants' report.

**Figure 1: NIU duration of daily average steam supply between July 1, 2018 and June 30, 2019**



The Figure 1 duration bar chart is similar in concept to Figure 3.2 in “Boiler and Steam System Assessment” by Stanley Consultants, dated December 20, 2016.

**Figure 2: NIU duration of daily average steam supply between July 1, 2018 and June 30, 2019**

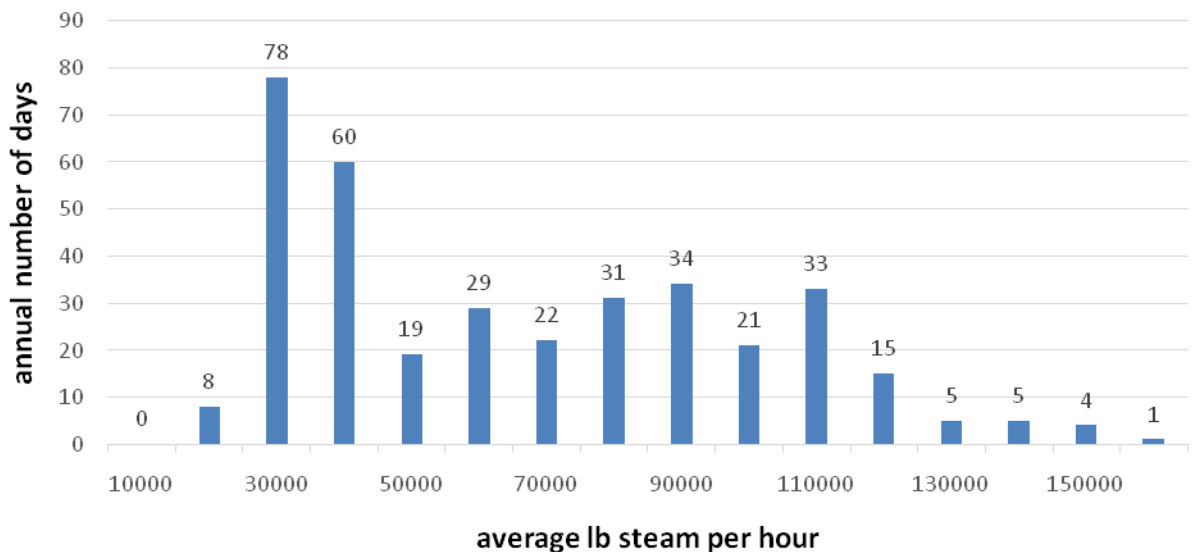
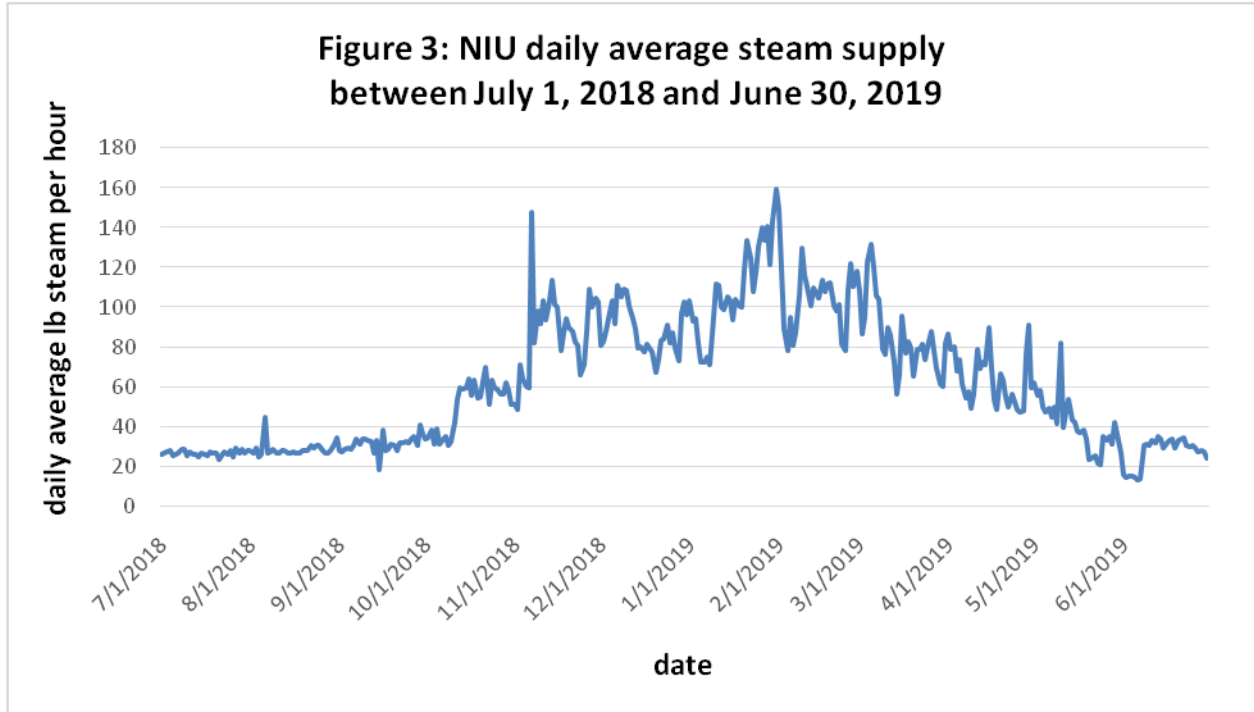


Figure 1 and Figure 2 show duration at each level of operation, Figure 3 shows the daily average steam supply during a recent year. A meteorological polar vortex occurred on January 30, 2019,



**Steam Distribution:** The existing 12” steam pipe header between the East Heating Plant (EHP) and the West Heating Plant (WHP) in the tunnel is sufficient for steam velocity and steam pressure drop within design tolerance up to steam flow rate of 200,000 lbs. per hour. Based on SARCO/SPIREX steam pipe sizing guidelines. GEC estimates a maximum steam velocity in the existing 12 inch pipe size of approximately 200 feet per second (fps) at a steam flow rate of 200,000 lb per hour.

Based on the information available from the NIU maintenance staff, the existing 12” steam pipe header was able to maintain adequate steam supply to all the buildings in the campus in the extremely cold day of last winter when outdoor air temperature went down to -27 F, an all-time low and about 17 F below the normal outdoor design temperature of - 10F in this area and surroundings, when only the East Heating Plant was operating and west heating plant was shut down. GEC feel that there should not be any problem with exiting steam header of 12” and condensate pipe sizes if the steam flow is from WHP to east. Main reason for this is that we are maintaining a high steam pressure of 140 psig in the steam pipe header. To verify this assessment we performed the following additional analysis.

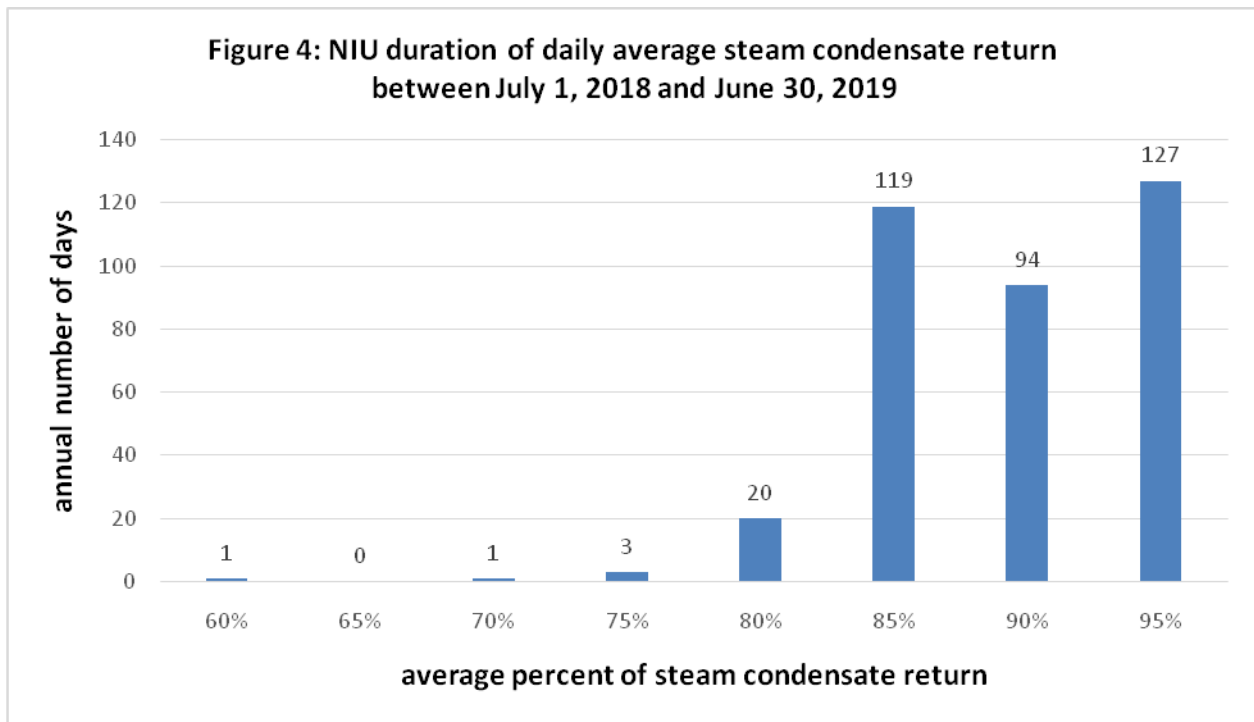
Figure 6 shows steam Nodal diagram in the pipe tunnel. This figure shows 12” Steam pipe header and the steam distribution to various groups of buildings throughout the campus. The connection point on the steam header where the steam supply branches are taken off, are referred to as nodes. There are about eight nodes between WHP and EHP. Based on the condensate annual use data available in (lbs.) from 2015/2016 data sheet attached in Stanley

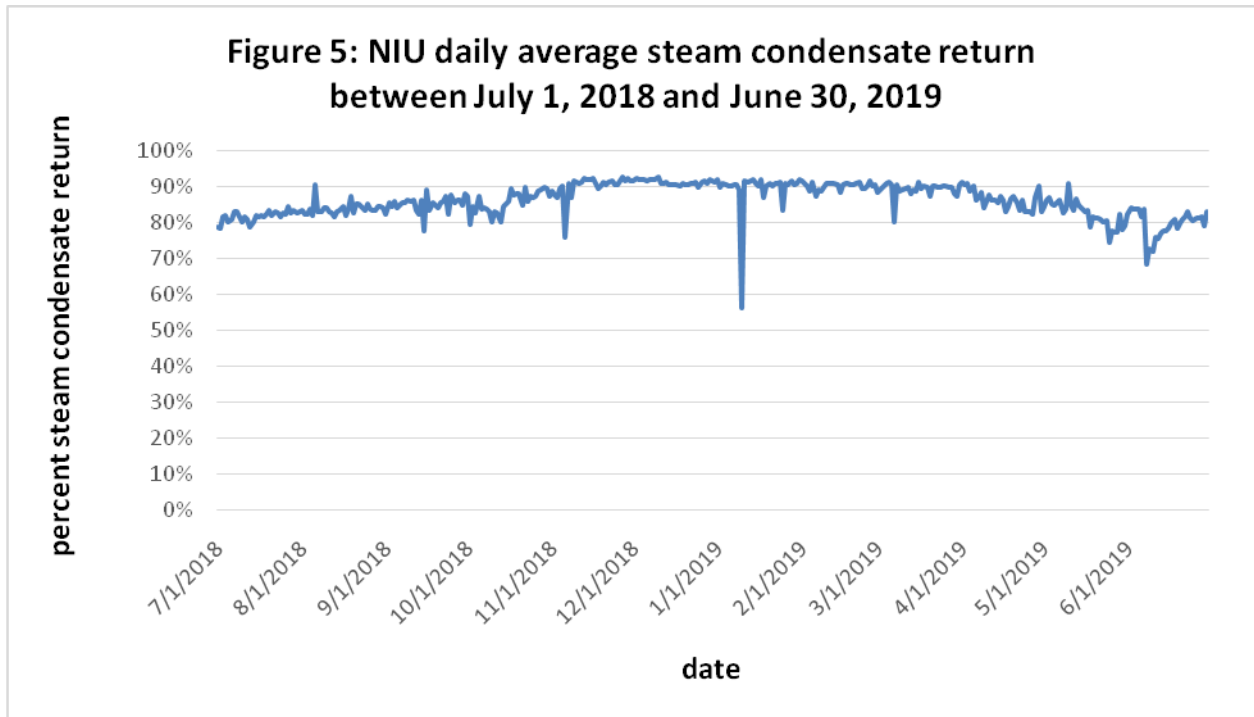
Steam Assessment Report, we determined the percentage of condensate used at each node branch based on Condensate flow. This helped in determining the steam flow in (lbs./Hr.) in the steam

header and the pressure drop as shown in the Figure 6. There was no condensate return shown in the Stanley Report at Node 5 branch, GEC ignored that and continued our pressure drop calculations in the tunnel steam header. It means the steam pressure in nodes 6 and above conservatively lower.

As shown in the diagram, Figure 6 and Table 1, there is about 47.9 psi pressure drop in the header and based on 140 PSI steam pressure maintained in WHP the steam pressure at EHP will be about 92 psi, which is adequate for steam supply to the east side of EHP. This is based on total steam generation of 200,000 lbs./hr. The last branch east of EHP (Nodes 9 through 13) has a pressure drop of 3 psi. i.e. the calculated pressure at the end of the branch is 89 psi. This pressure should be adequate to operate steam condensate pumps as there is sufficient factor of safety included in pressure drop calculations. In the worst case scenario a 2" steam pipe line may be require to operate the last of the steam pumps in the east branch from EHP.

**Condensate Return:** Based on the daily Boiler Feed Water Make-Up data from the multiple handwritten "Northern Illinois University DeKalb Daily Heating Plant Report" which Middough transmitted on August 13, 2019, as "Emissions Calculations", Figure 4 shows that as much as between 90 % of steam condensate and 95 % of steam condensate returns to the surge/receiver tank on approximately 127 days of a recent year. Figure 5 shows that the between 90 % of steam condensate and 95 % of steam condensate return to the surge/receiver tank predominantly occurs in the winter operating months.





**Condensate Piping:** The existing steam condensate return pipe is 5 “diameter between the East and West Heating Plants, and is capable of carrying up to 500 gpm of condensate flow. Steam flow at 200,00lbs/hr. will generate a maximum of 386 gpm assuming 95% of condensate returns. We propose to install surge tank in the basement of EHP which will collect all the condensate from the buildings presently served by EHP and pump it to the WHP using existing 5” condensate pipe. The pipe friction loss at 386 gpm condensate flow is about 2.6 ft./100 ft. of pipe. A new condensate return pump will be sized to meet this requirement.

## Conclusion

Based on the above analysis, the 12” steam supply header is adequate to supply steam to entire campus from West to East on any peak days. Similarly, steam condensate return pipe of 5” diameter is adequate. Only the pressure drop in condensate flow from east to west should be evaluated to select the size of condensate return pump.

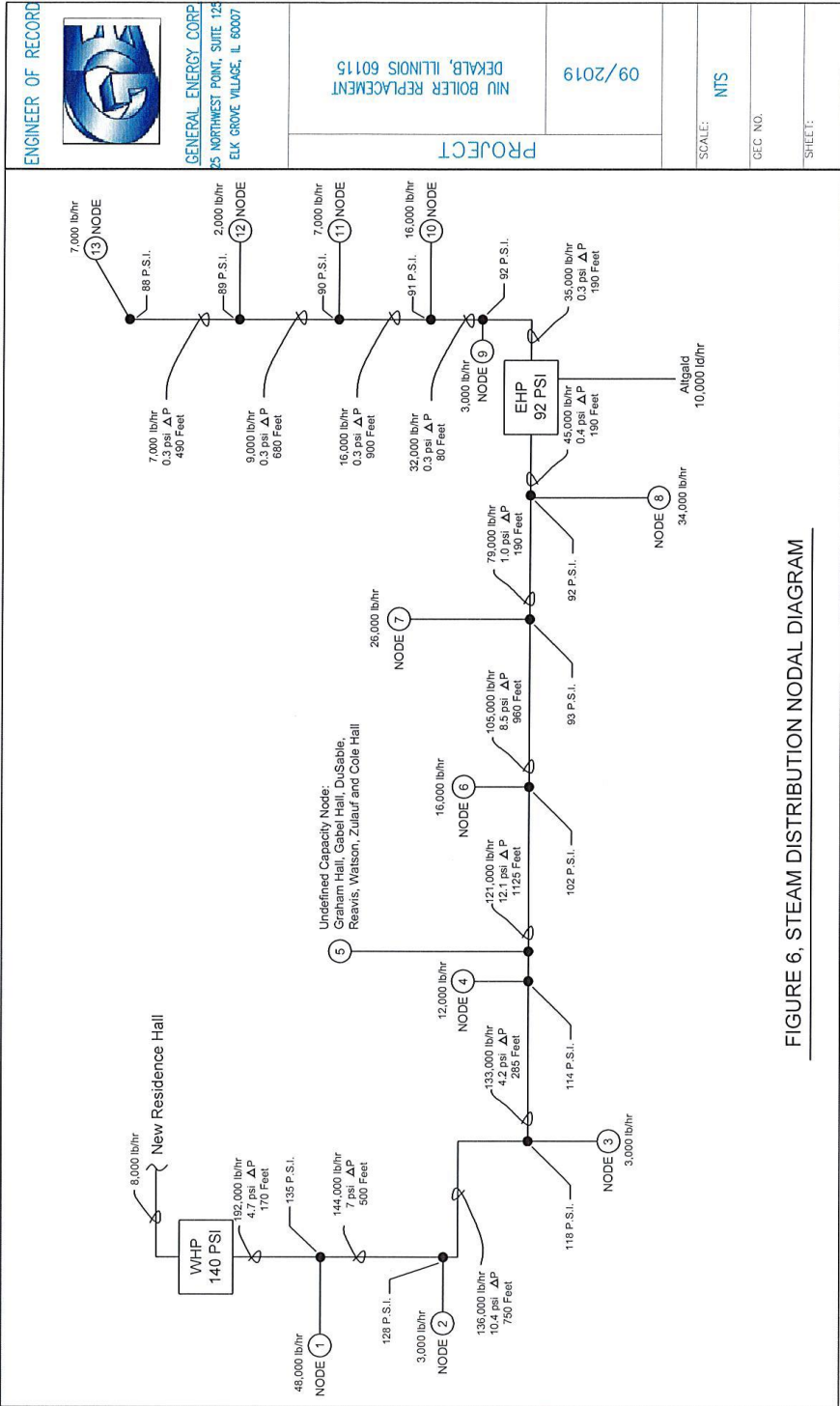




FIGURE 6, STEAM DISTRIBUTION NODAL DIAGRAM

**Table 1, Steam Flow at Nodes in the Steam Header in the Tunnel**

Node No.	steam flow (lb per hour)	pipe size (inches)	pipe length (feet)	pressure drop (psig/100 ft)	pressure drop in segment (psig)	segment entering pressure (psig)	segment leaving pressure (psig)
1	192000	12	170	2.8	4.7	140	135
2	144000	12	500	1.4	7	135	128
3	136000	12	750	1.4	10.4	128	118
4	133000	12	285	1.4	4.2	118	114
5	133000	12					
6	121000	12	1125	1.1	12.1	114	102
7	105000	12	960	0.9	8.5	102	93
8	79000	12	190	0.5	1	93	92
EHP	45000	12	190	0.2	0.4	92	92
9	35000	10	190	0.1	0.3	92	92
10	32000	10	80	0.1	0.3	92	91
11	16000	8 and 10	900	0.1	1	91	90
12	9000	8	680	0.1	0.3	90	89
13	5000	8	490	0.1	0.3	89	88
					<b>50.5</b>		





 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-BOD</b>		
		Rev. 1	Date: 03/09/2021	Appendix G

**APPENDIX G – CITY WATER ANALYSIS**

**Final - Report Number:** 2740991  
**ESSENTIAL WATER TECHNOLOGY**  
 1761 S NAPERVILLE RD  
 WHEATON IL 60189 USA  
**Sold To:** 0150199218 **Ship To:** 0150199217  
**Representative:** Ryan Best

**Sample Number:** NW325576  
**Date Sampled:**  
**Date Received:** 11-Sep-2019  
**Date Completed:** 18-Sep-2019  
**Date Authorized:** 18-Sep-2019

**Water Analysis**

This sample was analyzed as received, the results being as follows:

**Sampling point:** NIU Raw

**Water**

<b>Cations - Metals</b>	<b>Test Method: CW14024</b>	<b>Filtered</b>	<b>Total</b>
Aluminum (Al)		<0.03 mg/L	<0.03 mg/L
Barium (Ba)		0.138 mg/L	0.138 mg/L
Boron (B)		0.17 mg/L	0.17 mg/L
Cadmium (Cd)		<0.005 mg/L	<0.005 mg/L
Calcium (Ca)		33 mg/L	33 mg/L
<i>Calcium (CaCO3)</i>		83 mg/L	83 mg/L
Chromium (Cr)		<0.015 mg/L	<0.015 mg/L
Copper (Cu)		<0.03 mg/L	<0.03 mg/L
Iron (Fe)		<0.02 mg/L	0.05 mg/L
Lead (Pb)		<0.10 mg/L	<0.10 mg/L
Lithium (Li)		0.012 mg/L	0.012 mg/L
Magnesium (Mg)		18 mg/L	18 mg/L
<i>Magnesium (CaCO3)</i>		73 mg/L	73 mg/L
Manganese (Mn)		<0.005 mg/L	0.005 mg/L
Molybdenum (Mo)		<0.04 mg/L	<0.04 mg/L
Nickel (Ni)		<0.01 mg/L	<0.01 mg/L
Phosphorus (P)		0.66 mg/L	0.67 mg/L
Potassium (K)		3.7 mg/L	3.7 mg/L
Silicon (Si)		5.4 mg/L	5.4 mg/L
<i>Silica (SiO2)</i>		12 mg/L	12 mg/L
Sodium (Na)		73 mg/L	73 mg/L
<i>Sodium (CaCO3)</i>		160 mg/L	160 mg/L
Strontium (Sr)		0.706 mg/L	0.706 mg/L
Vanadium (V)		<0.01 mg/L	<0.01 mg/L
Zinc (Zn)		0.01 mg/L	0.02 mg/L
<i>Total Hardness (CaCO3)</i>		160 mg/L	160 mg/L

**Final - Report Number:** 2740991  
**ESSENTIAL WATER TECHNOLOGY**  
 1761 S NAPERVILLE RD  
 WHEATON IL 60189 USA  
**Sold To:** 0150199218 **Ship To:** 0150199217  
**Representative:** Ryan Best

**Sample Number:** NW325576  
**Date Sampled:**  
**Date Received:** 11-Sep-2019  
**Date Completed:** 18-Sep-2019  
**Date Authorized:** 18-Sep-2019

**Water Analysis**

This sample was analyzed as received, the results being as follows:

**Sampling point:** NIU Raw

<b>Anions</b>	<b>Test Method: CW15000</b>	<b>Filtered</b>
Chloride (Cl)		4.4 mg/L
Nitrite (NO <sub>2</sub> )		<0.20 mg/L
Bromide (Br)		<0.20 mg/L
Nitrate (NO <sub>3</sub> )		1.4 mg/L
Sulfate (SO <sub>4</sub> )		6.0 mg/L
Chloride (CaCO <sub>3</sub> )		6.2 mg/L
Nitrate (CaCO <sub>3</sub> )		1.2 mg/L
Sulfate (CaCO <sub>3</sub> )		6.3 mg/L

<b>Alkalinity</b>	<b>Test Method: CW11059</b>	<b>Total</b>
Total Alkalinity (CaCO <sub>3</sub> )		330 mg/L
Phenolphthalein Alkalinity (CaCO <sub>3</sub> )		<10 mg/L
Bicarbonate (CaCO <sub>3</sub> )		330 mg/L

<b>Other Analytes</b>	<b>Test Method</b>	<b>Total</b>
Conductivity at 25°C	CW11063	580 µS/cm
pH @ 25°C	CW11059	8.1 pH Units


 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-BOD</b>		
		Rev. 1	Date: 03/09/2021	Appendix H

**APPENDIX H – EQUIPMENT / LINE / TIE POINT LISTS**





**PROJECT LINE LIST**

<b>PROJECT TITLE:</b>	NIU Boiler Replacement	 <b>Northern Illinois University</b>
<b>CLIENT:</b>	NIU / CDB 822-010-127	
<b>MIDDOUGH PROJ. NO.</b>	ILC1801	

IFR	A	9/13/19	RAK		
IFR	B	10/7/19	RAK		
IFR	C	10/31/19	RAK	MJT	
IFP	D	1/10/20	RAK	EPW	
STATUS	REVISION	DATE	BY	CHK'D	

LINE NUMBER							INSULATION / TRACING		PROCESS/MECHANICAL												
ITEM NO.	UTILITY CODE	SOURCE P&ID	SEQUENTIAL NUMBER	SIZE (IN)	PIPE SPEC	TRACING SPEC	INSULATED	P&ID NO.	FROM	TO	OPERATING				DESIGN		STRESS ANALYSIS REQUIRED (Y/N)	GAS FLOW (SCFM)	REV.	NOTES / COMMENTS	ESTIMATED TAKE-OFF FEET
											P NORM. (PSIG)	T NORM (F)	P MAX. (PSIG)	T MAX. (F)	P (PSIG)	TEMP (F)					
<b>TOTAL</b>																				<b>2250</b>	
1	NG	H-1	01	10	CS				Natural Gas Supply Line in Basement	Gas to Boilers 5 & 6	20	60	20	100	150	100					140
2	CW	H-4	02	2	CS				City Water Line to Boiler 4	City Water to Boilers 5 & 6	60	60	100	100	125	100					160
3	BFW	H-4	03	6	CS		Glass Fiber - 3"		BFW Line to Boiler 4	BFW to Boilers 5 & 6	175	227	200	295	300	420					160
4	NG	H-15	01	6	CS				Natural Gas Supply	Natural Gas to Boiler 5	20	60	20	100	150	100					20
5	CW	H-15	02	2	CS				City Water Supply	City Water to Boiler 5	60	60	100	100	125	100					20
6	BFW	H-15	03	6	CS		Glass Fiber - 3"		BFW Supply	BFW to Boiler 5	175	227	200	295	300	420					20
7	HPS	H-15	04	18	CS		Calsil - 5"		Boilers 5 & 6	HPS Supply	140	360	200	388	300	420					160
8	MPS	H-15	05	1	CS		Calsil - 4.5"		HPS Supply	Boiler 5 & 6 Steam Pack	50	360	200	388	300	420					50
9	HPR	H-15	06	1 1/2	CS		Glass Fiber - 2"		Steam Traps around Boilers 5 & 6	Condensate Return	140	360	200	388	300	420					180
10	IA	H-16	01	1/2	CS				IA line near water softeners / existing air compressor.	Instrument Air for, additional water softener, RO & Deaerator	100	80	125	100	150	150					40
11	IA	H-16	02	1/2	CS				1/2"-IA-H16-CS-01	additional water softener	100	80	125	100	150	150					20
12	IA	H-16	03	1/2	CS				1/2"-IA-H16-CS-01	RO	100	80	125	100	150	150					40
13	IA	H-16	04	1/2	CS				1/2"-IA-H16-CS-01	Deaerator	100	80	125	100	150	150					20
14	IA	H-16	05	1	CS				New Air Compressor	Instrument Air for Boilers 5 & 6 and tie into existing IA System	100	80	125	100	150	150					180
15	IA	H-16	06	1	CS				1"-IA-H16-CS-05	Instrument Air for Boiler 5	100	80	125	100	150	150					20
16	IA	H-16	07	1	CS				1"-IA-H16-CS-05	Instrument Air for Boiler 6	100	80	125	100	150	150					20
17	HPS	H-2	02	6	CS		Calsil - 5"		Steam Line to Existing Deaerator	Steam to New Deaerator	140	360	200	388	300	420					35
18	COND	H-4	05	6	CS		Glass Fiber - 2"		Condensate Return Line	New Condensate Tanks	20	180	125	227	140	360					20
19	COND	H-4	06	8	CS		Glass Fiber - 2"		Condensate to / from New / Old Tanks New / Old Pumps	Condensate to / from New / Old Tanks New / Old Pumps	20	180	125	227	140	360					30
20	SW	H-5	03	3	316				Water Softener	Carbon Filters	60	60	100	100	125	100					10
21	ROW	H-5	04	3	316				New RO	RO Storage Tank	60	60	100	100	125	100					100
22	ROW	H-5	05	2	316				New RO	RO Storage Tank Bypass	60	60	100	100	125	100					5
23	ROW	H-5	06	3	316				RO Storage Tanks	New RO Water Pumps	60	60	100	100	125	100					10
24	ROW	H-5	07	2	316				Old RO Water Pumps	2"-ROW-H5-316-08	60	60	100	100	125	100					5
25	ROW	H-5	08	2	316				New RO Water Pumps	New Deaerator	60	60	100	100	125	100					80
26	BFW	H-13	11	6	CS		Glass Fiber - 3"		BFW Pumps	Lines to Boilers	175	227	200	295	300	420					20
27	BFW	H-13	12	8	CS		Glass Fiber - 3"		New Deaerator	BFW Pumps	175	227	200	295	300	420					5
28	COND	H-13	13	6	316		Glass Fiber - 2"		New Condensate Pumps & 2"-ROW-H5-316-06	New Deaerator	20	180	125	227	140	360					10
29	COND	H-13	14	6	CS		Glass Fiber - 2"		New Condensate Tanks	New Condensate Pumps	20	180	125	227	140	360					5
30	Additive	H-14	11	1/2	316				Oxygen Scavenger Tote & Pump	Deaerators	75	60	200	100	300	150					100
31	Additive	H-14	12	1/2	316				Oxygen Scavenger Tote & Pump	New Deaerator	75	60	200	100	300	150					10



**PROJECT LINE LIST**

**PROJECT TITLE:** NIU Boiler Replacement  
**CLIENT:** NIU / CDB 822-010-127  
**MIDDOUGH PROJ. NO.:** ILC1801



IFR	A	9/13/19	RAK		
IFR	B	10/7/19	RAK		
IFR	C	10/31/19	RAK	MJT	
IFP	D	1/10/20	RAK	EPW	
<b>STATUS</b>	<b>REVISION</b>	<b>DATE</b>	<b>BY</b>	<b>CHK'D</b>	

LINE NUMBER							INSULATION / TRACING		PROCESS/MECHANICAL															
ITEM NO.	UTILITY CODE	SOURCE P&ID	SEQUENTIAL NUMBER	-	SIZE (IN)	-	PIPE SPEC	TRACING SPEC	INSULATED	P&ID NO.	FROM	TO	OPERATING				DESIGN		STRESS ANALYSIS REQUIRED (Y/N)	GAS FLOW (SCFM)	REV.	NOTES / COMMENTS	ESTIMATED TAKE-OFF FEET	
													P NORM. (PSIG)	T NORM (F)	P MAX. (PSIG)	T MAX. (F)	P (PSIG)	TEMP (F)						
32	Additive	H-14	13		1/2		316				Scale Inhibitor Tote & Pump	Deaerators	75	60	200	100	300	150						100
33	Additive	H-14	14		1/2		316				Scale Inhibitor Tote & Pump	New Deaerator	75	60	200	100	300	150						10
34	Additive	H-14	15		1/2		316				BFW pH Control Tote & Pump	Deaerators	75	60	200	100	300	150						100
35	Additive	H-14	16		1/2		316				BFW pH Control Tote & Pump	New Deaerator	75	60	200	100	300	150						10
36	SW	H-5	09		3		316				Carbon Filters	New RO	60	60	100	100	125	100						60
37	SW	H-5	10		3		316				Carbon Filters	Old RO	60	60	100	100	125	100						30
38	COND	H-9	03		6		CS		Glass Fiber - 2"		12" Line from Condinsate Receiver	New Condensate Pumps	20	180	125	227	140	360						10
39	COND	H-9	04		5		CS		Glass Fiber - 2"		New Condensate Pumps	Condensate Line between EHP & WHP	20	180	125	227	140	360						15
40	Additive	H-14	20		1/2		316				Steam pH Control Tote & Pump	Steam Header	175	60	200	100	300	420						150
41	HPS	H-2	03		12		CS		Calsil - 5"		Steam Header	Reroute steam to New Res Hall	140	360	200	388	300	420						70





 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-BOD</b>		
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**APPENDIX I – PROPOSED PROJECT COST BUDGET**

**State of Illinois  
CAPITAL DEVELOPMENT BOARD  
PROPOSED PROJECT COST BUDGET NOTES**

CDB project No.: 822-010-127  
 Building Inventory No.: 051/001A  
 Project: Campus Boiler Replacement  
 A/E: Middough Inc.  
 CDB Project Manager: Dan Bielski

This estimate has been revised to include cost estimates for eight **Add Alternates**, the following is a key for the **Add Alternate** designations as they appear on the design documents in relation to **Alternate #** heading on sheet 2 of the PPCB.

PPCB Heading	Document Designation	Description	
Alternate #1	Add Alternate C-1	Additional pavement	
Alternate #2	Add Alternate C-2	Storm Water Detention	
Alternate #3	Add Alternate S-1	Foundations for future building expansion	
Alternate #4	Add Alternate H-1	Removal of existing boiler #5E	
Alternate #5	Add Alternate H-2	Relocation of underground CHWS & CHWR lines	
Alternate #6	Add Alternate A-1	Additional windows in new building	
Alternate #7	Add Alternate E-1	Natural Gas Stand-by generator in lieu of Diesel Stand-by generator	
Alternate #8	Add Alternate G-1	Construction of future building expansion	

Alternate estimated costs include:

- Contractors Overheads and Fees
- Design fees

The resulting dollars per gross square foot are based on the square footage of new construction only. These resulting costs are skewed by the work performed in the existing East Heating Plant.

State of Illinois  
CAPITAL DEVELOPMENT BOARD

**PROPOSED PROJECT  
COST BUDGET**

FOR CDB USE ONLY	
Name:	
Project No:	
Contract No:	
C.F. Locale	Design Phase

CDB PROJECT NUMBER:	822-010-127	DATE PREPARED:	9-Mar-21
BLDG. INVENTORY NO:	051/001A	PROJECT STATUS:	Revised Bridging Documents
PROJECT:	Campus Boiler Replacements	GSF:	13,404 NSF:
LOCATION:	Northern Illinois University, DeKalb	SITE ACREAGE:	
A/E:	Middough Inc.	PREPARED BY:	Ken Putnam/KR, Middough
CDB PROJECT MANAGER:	Dan Bielski		

1.	LAND ACQUISITION COST	\$0.00
2.	MOVABLE EQUIPMENT	\$0.00
3.	ART-IN ARCHITECTURE	\$0.00
4.	OTHER	\$0.00
5.	A/E Basic Service Fee	\$332,200.00
6.	Additional Services	\$114,148.00
7.	Construction Admin. Fee	\$13,300.00
8.	On-Site Representative	\$68,352.00
9.	<b>Subtotal (1 thru 8)</b>	<b>\$528,000.00</b>
10.	A/E REIMBURSABLES	
a.	Subsoil Investigation	\$4,600.00
b.	Design Ph. Material Testing	\$4,370.00
c.	Construction Ph Material Test	
d.	Printing	
e.	Laser Scanning	\$13,445.00
f.	Survey / Topography	\$8,400.00
g.	Rendering	\$15,000.00
h.	ACM Sampling	\$3,555.00
i.	Air Permitting / Emissions	\$5,000.00

RECAP OF CONSTRUCTION COSTS (Base Bid)  
(From Page 2 Worksheet)

TRADE ESTIMATES (Column H)	
General	\$3,953,100.00
Plumbing	\$142,300.00
Heating	\$6,980,400.00
Ventilating	\$173,300.00
Electrical	\$1,416,300.00
Asbestos	\$20,600.00
Sprinkler	\$0.00
	\$0.00
	\$0.00
	\$0.00
Contingency (Column D Total)	\$1,230,000.00
<b>13. TOTAL BASE BID BUDGET</b>	<b>\$13,916,000.00</b>
(Trade estimates plus contingency)	

11.	<b>Subtotal (10a thru 10i)</b>	<b>\$54,370.00</b>
12.	<b>TOTAL (9 plus 11)</b>	<b>\$582,370.00</b>



14.	<b>TOTAL BUDGET ( 12 plus 13)</b>	<b>\$14,498,370.00</b>
15.	<b>Total Project Funds</b>	<b>\$15,422,000.00</b>
	<b>(From Project Scope)</b>	
	<b>Available Funds for Construction</b>	
16.	<b>(15 minus 12)</b>	<b>\$14,839,630.00</b>
17.	<b>Alternates (Total from Page 2)</b>	<b>\$557,400.00</b>
18.	<b>Base Bid plus Alternates (13 plus 17)</b>	<b>\$14,473,400.00</b>

**Worksheets**

TRADE	A Building (Base Bid Estimate)	B Site Work (Base Bid Estimate)	C Subtotal (A + B)	D Contingency (Cx10%)	E Alternates	F Subtotal (C+E)	G CAF (Fx3%) Round up to next \$100	H Subtotal (C+G)	I Total (D+ F +G)	J /GSF
General	\$2,685,000.00	\$1,145,000.00	\$3,830,000.00	383,000.00	\$271,100.00	\$4,101,100.00	\$123,100.00	\$3,953,100.00	\$4,607,200.00	\$343.72
Plumbing	\$138,000.00		\$138,000.00	13,800.00	\$3,700.00	\$141,700.00	\$4,300.00	\$142,300.00	\$159,800.00	\$11.92
Heating	\$6,771,000.00		\$6,771,000.00	677,100.00	\$207,100.00	\$6,978,100.00	\$209,400.00	\$6,980,400.00	\$7,864,600.00	\$586.74
Ventilating	\$168,000.00		\$168,000.00	16,800.00	\$7,300.00	\$175,300.00	\$5,300.00	\$173,300.00	\$197,400.00	\$14.73
Electrical	\$1,373,000.00		\$1,373,000.00	137,300.00	\$68,200.00	\$1,441,200.00	\$43,300.00	\$1,416,300.00	\$1,621,800.00	\$120.99
Asbestos	\$20,000.00		\$20,000.00	2,000.00	\$0.00	\$20,000.00	\$600.00	\$20,600.00	\$22,600.00	\$1.69
Sprinkler			\$0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
			\$0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
			\$0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
			\$0.00	0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	
Column Totals	\$11,155,000.00	\$1,145,000.00	\$12,300,000.00	\$1,230,000.00	\$557,400.00	\$12,857,400.00	\$386,000.00	\$12,686,000.00	\$14,473,400.00	\$1,079.78

TRADE	Alternate #1	Alternate #2	Alternate #3	Alternate #4	Alternate #5	Alternate #6	Alternate #7	Alternate #8	Totals
General	\$3,000.00	\$5,000.00	\$32,100.00			\$36,500.00		\$194,500.00	\$271,100.00
Plumbing								\$3,700.00	\$3,700.00
Heating				\$175,000.00	\$3,000.00			\$29,100.00	\$207,100.00
Ventilating								\$7,300.00	\$7,300.00
Electrical							\$50,000.00	\$18,200.00	\$68,200.00
Asbestos									\$0.00
Sprinkler									\$0.00
									\$0.00
									\$0.00
Column Totals	\$3,000.00	\$5,000.00	\$32,100.00	\$175,000.00	\$3,000.00	\$36,500.00	\$0.00	\$252,800.00	\$557,400.00

**E-MAIL THIS FORM**  
This form may be submitted to CDB electronically. Attach a completed form to an e-mail addressed to the CDB Project Manager. All CDB e-mail addresses are available on our website: [www.cdb.state.il](http://www.cdb.state.il).

 Northern Illinois University	<b>Program Analysis /Schematic Design Basis of Design</b>	PROJECT NO. <b>822-010-127</b>		
		DOCUMENT NO. <b>ILC1801-BOD</b>		
		Rev. 1	Date: 03/09/2021	Appendix J

**APPENDIX J – PRELIMINARY PROJECT / CONSTRUCTION SCHEDULE**

