



Mead & Hunt, Inc.
M & H Architecture, Inc
400 Tracy Way, Suite 200
Charleston, West Virginia 25311
304-345-6712
meadhunt.com



10 October 2017

Assistant Director for Permitting
WVDEP – DAQ
601 57th Street, SE
Charleston, WV 25304

Re: Permit Determination Form –Generators at 12 tower sites
Shentel - Various Telecommunication Tower sites
Project Number: R4461000-171903.01

Dear Assistant Director:

Shentel is submitting twelve Permit Determination Form applications for its proposed installation and operation of emergency generators at the tower locations on **Table 1**. The tower sites will have a diesel generator enclosed in a shelter or on an exterior platform/concrete pad. The generators will be utilized for reserve power during peak capacity and during power outages. It is anticipated that the generators' actual use will be between 52 and 2,000 hours per year depending upon weather conditions and power grid stability. The PTE emissions have been calculated using 8,760 hours/year, which would be only under catastrophic conditions.

Sites 67157, 67186, 67289, 68004, 68055, 68145, 68186, 68486, 68573, 68296 will utilize the Cummings generator set. Site 67182 will have a Kohler generator set; while site 69141 will have a Generac generator set.

One original of the twelve Permit Determination Forms and 2 CDs are enclosed. If you have questions, please contact me at 681-313-4617. Thank you for your attention in this matter.

Very truly yours,

Teresa A. Schuller
Sr. Environmental Project Manager

Attachment Table 1 – Tower locations
Enclosures: one original of each Permit Determination Form
2 CDs of the electronic versions

TABLE 1 - SHENTEL NEW GENERATOR SITES

| ID | Site Name | City | County | State |
|-------|-----------------|----------------|----------|-------|
| 68145 | Wesleyan | Buckhannon | Upshur | WV |
| 67289 | Kerens | Kerens | Randolph | WV |
| 67157 | Alum Creek | Alum Creek | Lincoln | WV |
| 68182 | Laurel Fork | Buckhannon | Upshur | WV |
| 68468 | Monongah #1 | Fairmont | Marion | WV |
| 68055 | Oak Hill | Oak Hill | Fayette | WV |
| 68004 | Prosperity | Prosperity | Raleigh | WV |
| 68692 | Pisgah | Bruceton Mills | Preston | WV |
| 68186 | Crystal Springs | Elkins | Randolph | WV |
| 67186 | Heath Creek | Barboursville | Cabell | WV |
| 68573 | Valley | Huntington | Wayne | WV |
| 69141 | Peterstown | Peterstown | Monroe | WV |

Cummings generators

Kohler generator

Generac generator





WEST VIRGINIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 DIVISION OF AIR QUALITY
 601 57th Street, SE
 Charleston, WV 25304
 Phone: (304) 926-0475
 www.dep.wv.gov/daq

**PERMIT DETERMINATION FORM
(PDF)**

FOR AGENCY USE ONLY: PLANT I.D. # _____
 PDF # _____ PERMIT WRITER: _____

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):
SHENTEL

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):
69141 Peterstown Tower

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (NAICS) CODE:
517312

4A. MAILING ADDRESS: **500 Summers St.**
Charleston, WV 25301

4B. PHYSICAL ADDRESS: **1109 Seneca Trail South**
Peterstown, WV 24963

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE **MAP AS ATTACHMENT A**): From Charleston, follow I-77S to Exit 9 (US460). Turn left onto US460 and enter Virginia (about 14.8 miles) to a left onto Island St, which becomes Old Virginia Ave. Turn left onto US219/Federal St. and continue about 3 miles back into WV. Turn left onto 2nd St. and tower will be ahead.

5B. NEAREST ROAD:
2nd St.

5C. NEAREST CITY OR TOWN:
Peterstown

5D. COUNTY:
Monroe

5E. UTM NORTHING (KM):
4139273

5F. UTM EASTING (KM):
519457

5G. UTM ZONE:
17S

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:
Chris Harris

6B. TITLE:
WV Manager

6C. TELEPHONE:
304-353-8917

6D. FAX:
304-353-8938

6E. E-MAIL:
Christopher.Harris@emp.shentel.com

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):
 _____ - _____

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH **THIS** PROCESS (FOR AN EXISTING FACILITY ONLY):

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST:
NO

8A. TYPE OF EMISSION SOURCE (CHECK ONE):
 NEW SOURCE **ADMINISTRATIVE UPDATE**
 MODIFICATION **OTHER (PLEASE EXPLAIN IN 11B)**

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN?
 YES **NO**

9. IS *DEMOLITION* OR PHYSICAL *RENOVATION* AT AN EXISTING FACILITY INVOLVED? **YES** **NO**

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:
10/1/2017

10B. DATE OF ANTICIPATED START-UP:
10/15/2017

11A. PLEASE PROVIDE A **DETAILED PROCESS FLOW DIAGRAM** SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS **ATTACHMENT B**.

11B. PLEASE PROVIDE A **DETAILED PROCESS DESCRIPTION** AS **ATTACHMENT C**.

12. PLEASE PROVIDE **MATERIAL SAFETY DATA SHEETS (MSDS)** FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS **ATTACHMENT D**. FOR CHEMICAL PROCESSES, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.

13A. REGULATED AIR POLLUTANT EMISSIONS:

⇒ **FOR A NEW FACILITY**, PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ **FOR AN EXISTING FACILITY**, PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.

| POLLUTANT | HOURLY PTE (LB/HR) | YEARLY PTE (TON/YR) (HOURLY PTE MULTIPLIED BY 8760 HR/YR) DIVIDED BY 2000 LB/TON |
|-------------------------|--------------------|--|
| PM | 0.01 | 0.03 |
| PM ₁₀ | 0.007 | 0.02 |
| VOCs | 0.06 | 0.26 |
| CO | 0.08 | 0.35 |
| NO _x | 0.2 | 0.9 |
| SO ₂ | 0.05 | 0.23 |
| Pb | - | - |
| HAPs (AGGREGATE AMOUNT) | Formaldehyde 0.03 | Formaldehyde 0.13 |
| TAPs (INDIVIDUALLY)* | - | - |
| OTHER (INDIVIDUALLY)* | - | - |

* ATTACH ADDITIONAL PAGES AS NEEDED

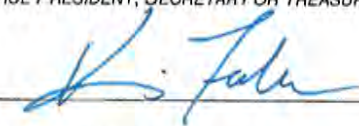
13B. PLEASE PROVIDE ALL SUPPORTING CALCULATIONS AS ATTACHMENT E.

CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112(b) OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).

14. CERTIFICATION OF DATA

I, KEVIN FOLK (TYPE NAME) ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A **RESPONSIBLE OFFICIAL**** (PRESIDENT, VICE PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: _____



TITLE: VP WIRELESS NETWORK OPERATIONS

DATE: 10 / 10 / 2017

** THE DEFINITION OF THE PHRASE 'RESPONSIBLE OFFICIAL' CAN BE FOUND AT 45CSR13, SECTION 2.23.

NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS:

- ATTACHMENT A ATTACHMENT B ATTACHMENT C ATTACHMENT D ATTACHMENT E

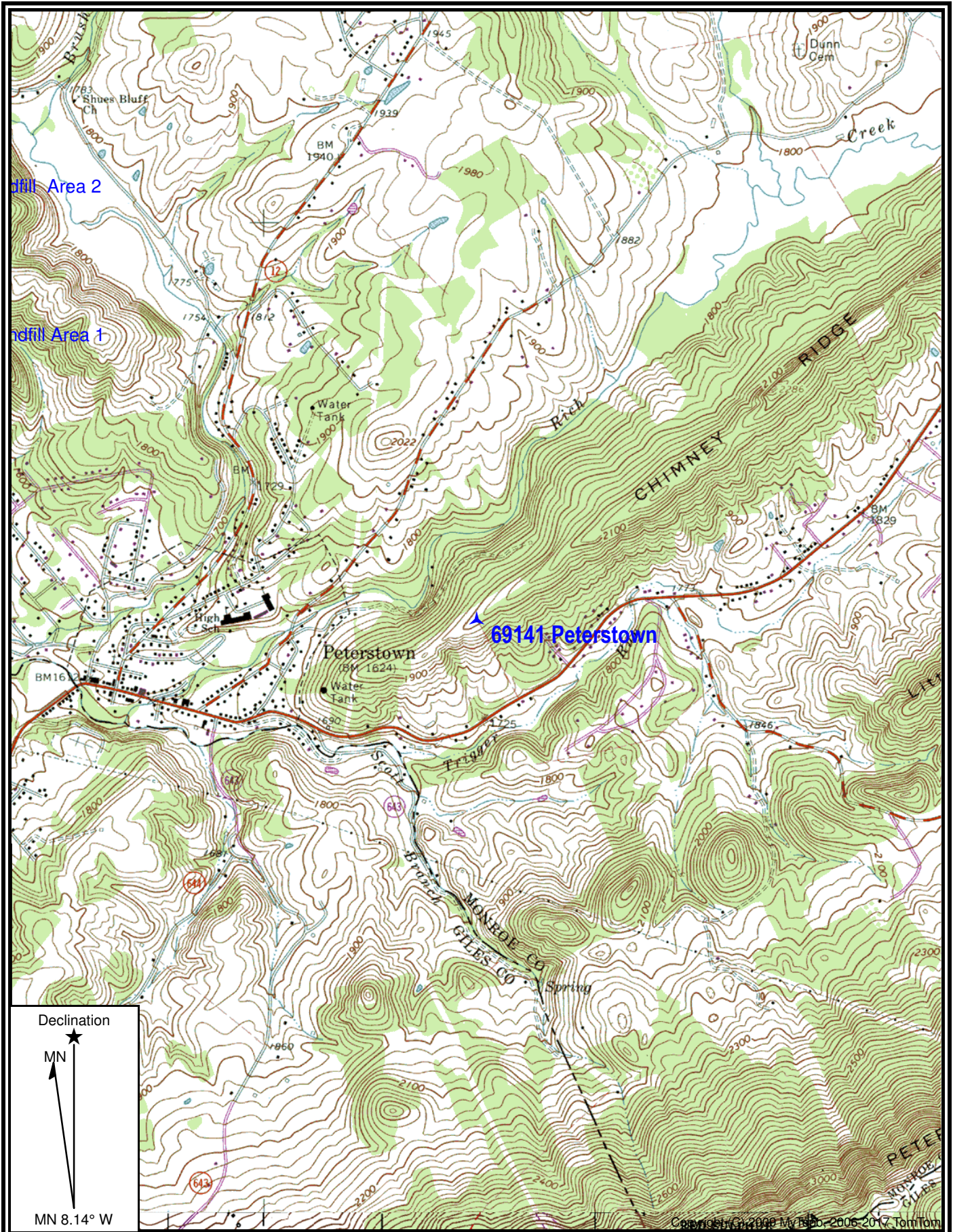
RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:

www.dep.wv.gov/daq

Attachment A

Topo Map



Map Name: PETERSTOWN
 State Name: WV
 Print Date: 08/11/17

Scale: 1 inch = 2,000 ft.
 Horizontal Datum: NAD83
 Date Photo Revised: 1984

Date Published: 1965

Attachment B

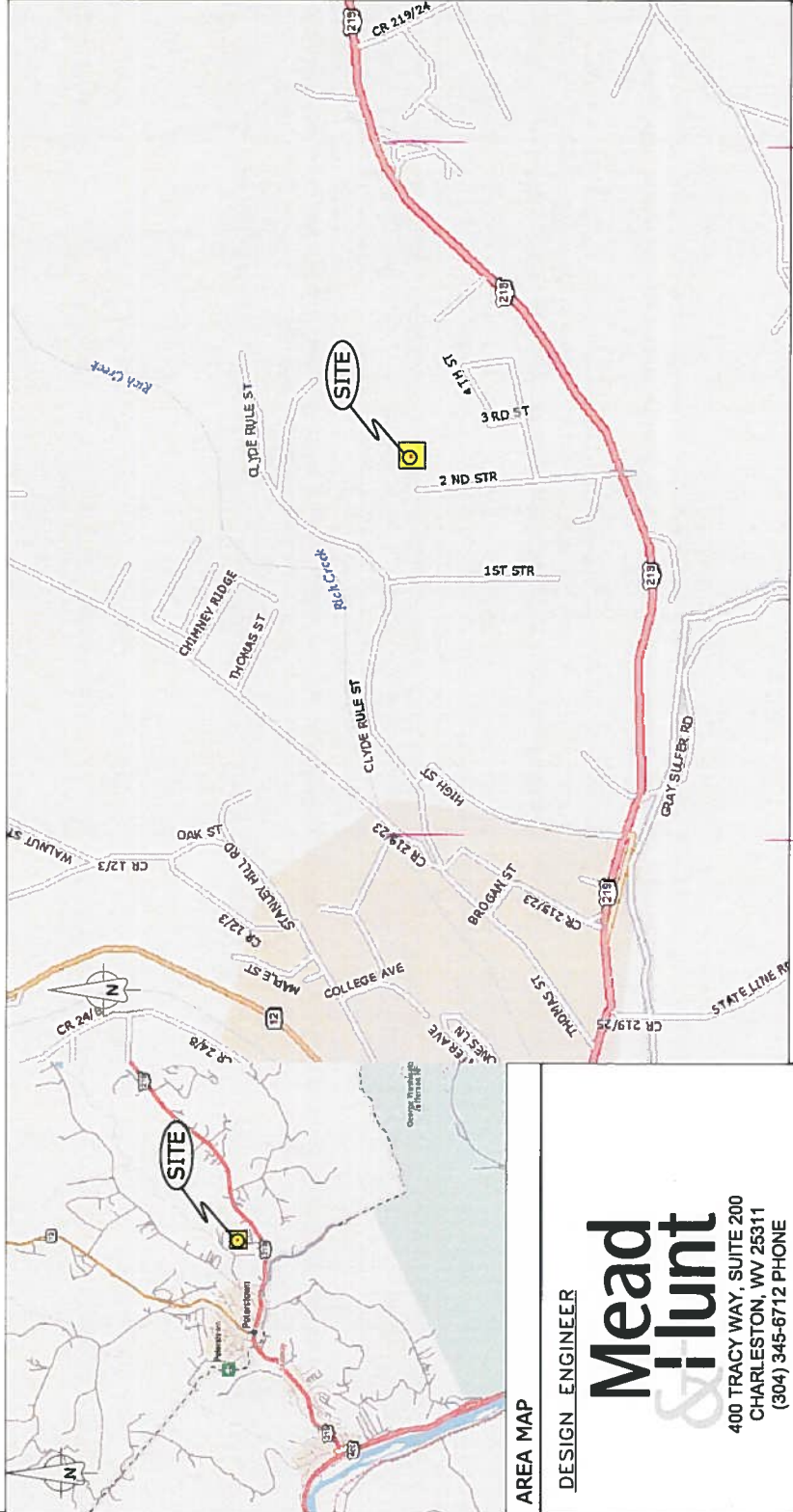
Process Flow Diagram



Always connected to you
500 SUMMERS STREET
CHARLESTON, WV 25301

PETERSTOWN
69141

**INSTALLATION OF STAND-BY 20KW GENERATOR
 AT EXISTING CO-LOCATION SITE**



VICINITY MAP

SITE DIRECTIONS
 FROM CHARLESTON WV: MERGE ONTO I-64 E/I-77 S PARTIAL TOLL ROAD (59.1 MI). KEEP RIGHT AT THE FORK TO CONTINUE ON I-77 S PARTIAL TOLL ROAD (31.6 MI). TAKE EXIT 9 FOR US-460 TOWARD PRINCETON/PEARISBURG VA (0.4 MI). TURN LEFT ONTO US-460 E ENTERING VIRGINIA (14.8 MI). TURN LEFT ONTO ISLAND ST (479 FT). ISLAND ST TURNS RIGHT AND BECOMES OLD VIRGINIA AVE (312 FT). TURN LEFT ONTO US-219 N/FEDERAL ST AND CONTINUE TO FOLLOW US-219 N ENTERING WEST VIRGINIA (2.7 MI)(N37° 22' 59.91" W80° 49' 22.96"). TURN LEFT(N37° 23' 42.61" W80° 46' 54.74") AND DESTINATION WILL BE AHEAD(0.45 MI)(N37° 23' 59.84" W80° 46' 49.19").

AREA MAP

DESIGN ENGINEER
Mead & Hunt
 400 TRACY WAY, SUITE 200
 CHARLESTON, WV 25311
 (304) 345-6712 PHONE
 (304) 345-6714 FAX

CONSULTANT TEAM

| | |
|-----------|-----------------------|
| SHEET T-1 | TITLE SHEET |
| SHEET C-1 | EXISTING SITE PLAN |
| SHEET C-2 | PROPOSED PLAN |
| SHEET C-3 | GROUNDING PLAN |
| SHEET D-1 | MISCELLANEOUS DETAILS |

SITE NAME
 PETERSTOWN

SITE NUMBER
 69141

SITE ADDRESS
 1109 SENECA TRAIL SOUTH
 PETERSTOWN, WV 24963

TOWER OWNER
 U.S. CELLULAR
 1451 CARL R. CORE ROAD
 MORGANTOWN, WV 26505
 PROJECT #757361 PETERSTOWN_USF

SITE DATA
 NAD 83 LATITUDE - N37° 24' 00.1"
 NAD 83 LONGITUDE - W80° 46' 48.6"
 ELEVATION - 2,018.4'

LEASE AREA
 400 SQUARE FEET

PROJECT DESCRIPTION
 INSTALLATION OF STAND-BY 20KW GENERATOR AT EXISTING CO-LOCATION SITE.

JURISDICTION
 MONROE COUNTY

CONTACTS

SHENTEL (CONSTRUCTION)
 SCOTT GILLIAM
 (304) 395-1394 - MOBILE
 (304) 414-2439 - OFFICE
 (304) 414-5388 - FAX

SHENTEL (LEASING)
 CHRIS HARRIS
 (304) 353-8917 - PHONE
 (304) 353-8938 - FAX

MEAD & HUNT
 CURTIS PAXTON
 (304) 553-8103 - PHONE
 400 TRACY WAY, SUITE 200
 CHARLESTON, WV 25311

PROJECT INFORMATION

SHEET INDEX

POLICE/FIRE/RESCUE
 911

ELECTRIC POWER
 AEP
 CONTACT: CUSTOMER SERVICE
 PHONE#: 800-982-4237

TELEPHONE
 AT&T
 CONTACT: CUSTOMER SERVICE
 PHONE#: 800-222-1000

SHENTEL_NOC
 (800) 566-9568 - PHONE

EMERGENCY AND UTILITY CONTACTS



500 SUMMERS STREET
 CHARLESTON, WV 25301

SITE NAME: PETERSTOWN

SITE NUMBER: 69141

SITE ADDRESS:
 1109 SENECA TRAIL SOUTH
 PETERSTOWN, WV 24963

AREA: LEASE AREA = 400 SQ. FT.

TOWER OWNER:
 U.S. CELLULAR
 1451 CARL R. CORE ROAD
 MORGANTOWN, WV 26505

COUNTY: MONROE

LATITUDE: N37° 24' 00.1"

LONGITUDE: W80° 46' 48.6"

| NO. | REVISION/ISSUE | DATE |
|-----|-------------------|----------|
| 1 | ISSUE FOR COMMENT | 07/07/17 |
| 2 | FINAL | 09/11/17 |



400 TRACY WAY, SUITE 200
 CHARLESTON, WV 25311
 (304) 345-6712 PHONE
 (304) 345-6714 FAX

PROJECT # R4461000-171638-01

TITLE SHEET

SHEET

T-1



500 SUMMERS STREET
CHARLESTON, WV 25301

SITE NAME: PETERSTOWN

SITE NUMBER: 69141

SITE ADDRESS:
1109 SENECA TRAIL SOUTH
PETERSTOWN, WV 24963

AREA: LEASE AREA = 400 SQ. FT.

TOWER OWNER:
U.S. CELLULAR
1451 CARL R. CORE ROAD
MORGANTOWN, WV 26505

COUNTY: MONROE

LATITUDE: N37° 24' 00.1"

LONGITUDE: W80° 46' 48.6"

NO. REVISION/ISSUE DATE

1 ISSUE FOR COMMENT 07/07/17

2 FINAL 09/11/17



Mead & Hunt

400 TRACY WAY, SUITE 200
CHARLESTON, WV 25311
(304) 345-6712 PHONE
(304) 345-6714 FAX

PROJECT # R4461000-171638-01

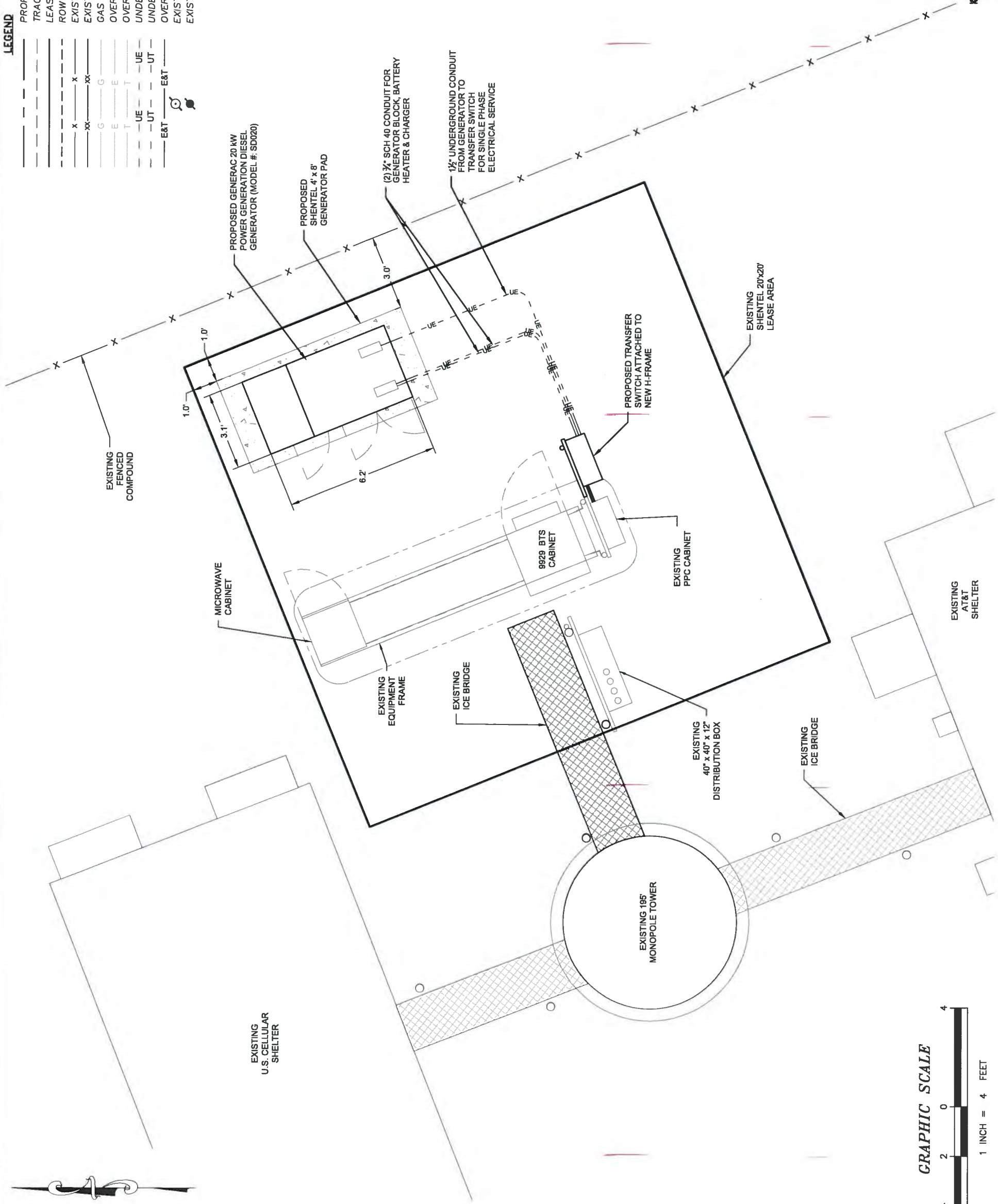
EXISTING PLAN

SHEET

C-2

LEGEND

- PROPERTY LINE
- TRACT LINE
- LEASE LINE
- ROW LINE
- x- EXISTING FENCE LINE
- xx- EXISTING FENCE LINE
- G- GAS LINE
- E- OVERHEAD POWER
- T- OVERHEAD TELEPHONE
- UE- UNDERGROUND POWER
- UT- UNDERGROUND TELCO.
- E&T- OVERHEAD POWER/TELEPHONE
- E&T- EXISTING UTILITY POLE



Know what's below.
Call before you dig.

GRAPHIC SCALE



1 INCH = 4 FEET



500 SUMMERS STREET
CHARLESTON, WV 25301

SITE NAME: PETERSTOWN

SITE NUMBER: 69141

SITE ADDRESS:
1109 SENECA TRAIL SOUTH
PETERSTOWN, WV 24963

AREA: LEASE AREA = 400 SQ. FT.

TOWER OWNER:
U.S. CELLULAR
1451 CARL R. CORE ROAD
MORGANTOWN, WV 26505

COUNTY: MONROE

LATITUDE: N37° 24' 00.1"

LONGITUDE: W80° 46' 48.6"

| NO. | REVISION/ISSUE | DATE |
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| 1 | ISSUE FOR COMMENT | 07/07/17 |
| 2 | FINAL | 09/11/17 |



400 TRACY WAY, SUITE 200
CHARLESTON, WV 25311
(304) 345-6712 PHONE
(304) 345-6714 FAX

PROJECT # R4461000-171638-01

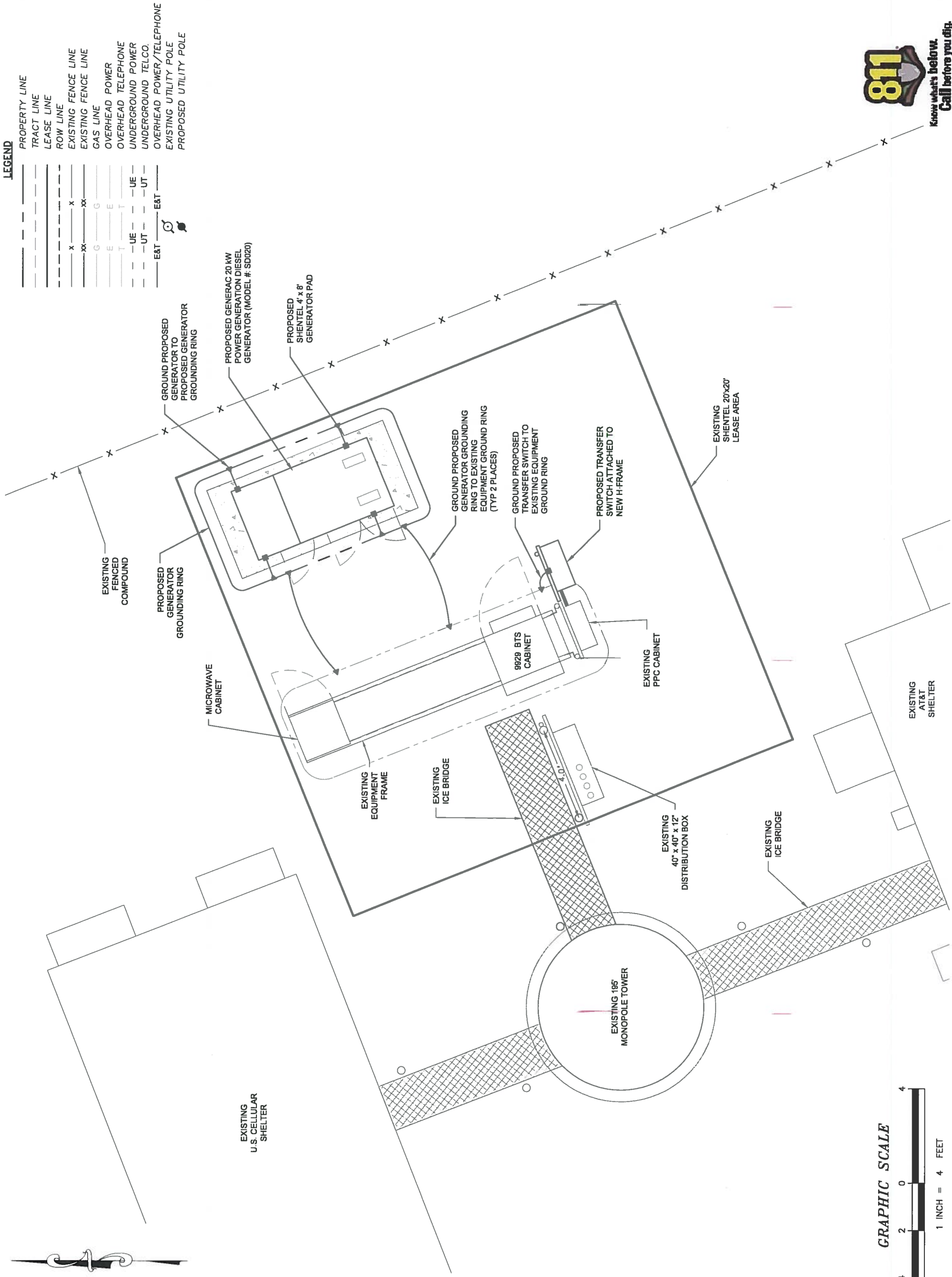
GROUNDING PLAN

SHEET

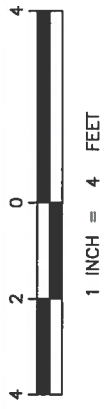
C-3

LEGEND

- PROPERTY LINE
- TRACT LINE
- LEASE LINE
- ROW LINE
- x-x- EXISTING FENCE LINE
- xx- EXISTING FENCE LINE
- G-G- GAS LINE
- E-E- OVERHEAD POWER
- T-T- OVERHEAD TELEPHONE
- UE- UNDERGROUND POWER
- UT- UNDERGROUND TELCO.
- E&T- OVERHEAD POWER/TELEPHONE
- EXISTING UTILITY POLE
- PROPOSED UTILITY POLE



GRAPHIC SCALE



Attachment C

Process Description

PROCESS DESCRIPTION

The installation will be a Generac Industrial Power Systems Diesel generator, Model SD020. This unit meets the EPA certified stationary emergency generator requirements according to the design spec sheet. The generator will be used to supply power to the wireless communications facility in case of power failure. During normal operation, the generator may be exercised weekly for approximately one hour for an annual run time of 52 hours. It is not expected that the generator will exceed 8,760 hours/year allowed by the State of West Virginia.

The generator/shelters installed on all properties have the following useful fuel safeguards:

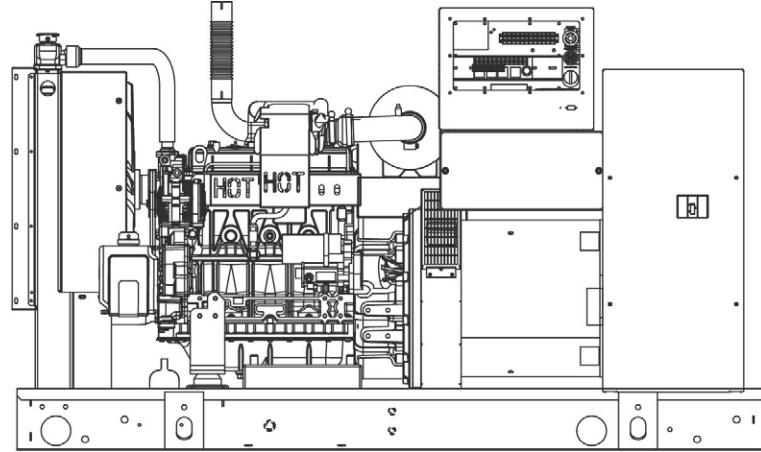
- The internal generator fuel tank is a U.L. 142 and NFPA 30 approved double wall sub-base fuel tank and meets Local, State, and Federal codes.
- The generators have remote alarms that are monitored 24 x 7. There is a fuel tank rupture sensor that reports back any spillage that occurs within the fuel containment pan. The network also monitors low-level fuel, generator on and operating in emergency mode.
- For remote generator installations (generators not installed in a shelter), the entire unit is housed in a "Crystal Quiet Enclosure" with an internally mounted silencer.

STANDBY POWER RATING

20 kW, 25 kVA, 60 Hz

PRIME POWER RATING*

18 kW, 23 kVA, 60 Hz



*Built in the USA using domestic and foreign parts

*EPA Certified Prime ratings are not available in the U.S. or its Territories.


Image used for illustration purposes only

**Certain options or customization may not hold certification valid.

CODES AND STANDARDS


Generac products are designed to the following standards:

 UL2200, UL508, UL142, UL498

 NFPA70, 99, 110, 37

 NEC700, 701, 702, 708

 ISO9001, 8528, 3046, 7637, Pluses #2b, 4

 NEMA ICS10, MG1, 250, ICS6, AB1

 **ANSI**
American National Standards Institute
ANSI C62.41

POWERING AHEAD

For over 50 years, Generac has led the industry with innovative design and superior manufacturing.

Generac ensures superior quality by designing and manufacturing most of its generator components, including alternators, enclosures and base tanks, control systems and communications software.

Generac's gensets utilize a wide variety of options, configurations and arrangements, allowing us to meet the standby power needs of practically every application.

Generac searched globally to ensure the most reliable engines power our generators. We choose only engines that have already been proven in heavy-duty industrial application under adverse conditions.

Generac is committed to ensuring our customers' service support continues after their generator purchase.

STANDARD FEATURES

ENGINE SYSTEM

General

- Oil Drain Extension
- Air Cleaner
- Fan Guard
- Stainless Steel flexible exhaust connection
- Critical Exhaust Silencer (enclosed only)
- Factory Filled Oil
- Radiator Duct Adapter (open set only)

Fuel System

- Fuel lockoff solenoid
- Primary fuel filter

Cooling System

- Closed Coolant Recovery System
- UV/Ozone resistant hoses
- Factory-Installed Radiator
- Radiator Drain Extension
- 50/50 Ethylene glycol antifreeze
- 120 VAC Coolant Heater

Engine Electrical System

- Battery charging alternator
- Battery cables
- Battery tray
- Solenoid activated starter motor
- Rubber-booted engine electrical connections

ALTERNATOR SYSTEM

- UL2200 GENprotect™
- 12 leads (3-phase, non 600 V)
- Class H insulation material
- Vented rotor
- 2/3 pitch
- Skewed stator
- Auxiliary voltage regulator power winding
- Amortisseur winding
- Brushless Excitation
- Sealed Bearings
- Automated manufacturing (winding, insertion, lacing, varnishing)
- Rotor dynamically spin balanced
- Full load capacity alternator
- Protective thermal switch

GENERATOR SET

- Internal Genset Vibration Isolation
- Separation of circuits - high/low voltage
- Separation of circuits - multiple breakers
- Silencer Heat Shield
- Wrapped Exhaust Piping
- Silencer housed in discharge hood (enclosed only)
- Standard Factory Testing
- 2 Year Limited Warranty (Standby rated Units)
- 1 Year Limited Warranty (Prime rated Units)
- Silencer mounted in the discharge hood (enclosed only)

ENCLOSURE (IF SELECTED)

- Rust-proof fasteners with nylon washers to protect finish
- High performance sound-absorbing material
- Gasketed doors
- Stamped air-intake louvers
- Air discharge hoods for radiator-upward pointing
- Stainless steel lift off door hinges
- Stainless steel lockable handles
- Rhino Coat™ - Textured polyester powder coat

TANKS (IF SELECTED)

- UL 142
- Double wall
- Vents
- Sloped top
- Sloped bottom
- Factory pressure tested (2 psi)
- Rupture basin alarm
- Fuel level
- Check valve in supply and return lines
- Rhino Coat™ - Textured polyester powder coat
- Stainless hardware

CONTROL SYSTEM



Control Panel

- Digital H Control Panel - Dual 4x20 Display
- Programmable Crank Limiter
- 7-Day Programmable Exerciser
- Special Applications Programmable PLC
- RS-232/485
- All-Phase Sensing DVR
- Full System Status
- Utility Monitoring
- Low Fuel Pressure Indication
- 2-Wire Start Compatible
- Power Output (kW)

- Power Factor
- kW Hours, Total & Last Run
- Real/Reactive/Apparent Power
- All Phase AC Voltage
- All Phase Currents
- Oil Pressure
- Coolant Temperature
- Coolant Level
- Engine Speed
- Battery Voltage
- Frequency
- Date/Time Fault History (Event Log)
- Isochronous Governor Control
- Waterproof/sealed Connectors
- Audible Alarms and Shutdowns
- Not in Auto (Flashing Light)
- Auto/Off/Manual Switch
- E-Stop (Red Mushroom-Type)
- NFPA110 Level I and II (Programmable)
- Customizable Alarms, Warnings, and Events
- Modbus protocol
- Predictive Maintenance algorithm
- Sealed Boards
- Password parameter adjustment protection

- Single point ground
- 15 channel data logging
- 0.2 msec high speed data logging
- Alarm information automatically comes up on the display

Alarms

- Oil Pressure (Pre-programmable Low Pressure Shutdown)
- Coolant Temperature (Pre-programmed High Temp Shutdown)
- Coolant Level (Pre-programmed Low Level Shutdown)
- Low Fuel Pressure Alarm
- Engine Speed (Pre-programmed Over speed Shutdown)
- Battery Voltage Warning
- Alarms & warnings time and date stamped
- Alarms & warnings for transient and steady state conditions
- Snap shots of key operation parameters during alarms & warnings
- Alarms and warnings spelled out (no alarm codes)

CONFIGURABLE OPTIONS

ENGINE SYSTEM

General

- Oil Heater
- Industrial Exhaust Silencer

Fuel System

- Flexible fuel lines
- Primary fuel filter

Engine Electrical System

- 10A UL battery charger
- 2.5A UL battery charger
- Battery Warmer

ALTERNATOR SYSTEM

- Alternator Upsizing
- Anti-Condensation Heater
- Tropical coating
- Permanent Magnet Excitation

ENGINEERED OPTIONS

ENGINE SYSTEM

- Coolant heater ball valves
- Block Heaters
- Fluid containment pans

ALTERNATOR SYSTEM

- 3rd Breaker Systems

CONTROL SYSTEM

- Spare inputs (x4) / outputs (x4) - H Panel Only
- Battery Disconnect Switch

CIRCUIT BREAKER OPTIONS

- Main Line Circuit Breaker
- 2nd Main Line Circuit Breaker
- Shunt Trip and Auxiliary Contact
- Electronic Trip Breaker

GENERATOR SET

- Gen-Link Communications Software (English Only)
- 8 Position Load Center
- 2 Year Extended Warranty
- 5 Year Warranty
- 5 Year Extended Warranty

ENCLOSURE

- Weather Protected
- Level 1 Sound Attenuation
- Level 2 Sound Attenuation
- Steel Enclosure
- Aluminum Enclosure
- 150 MPH Wind Kit
- 12 VDC Enclosure Lighting Kit
- 120 VAC Enclosure Lighting Kit
- AC/DC Enclosure Lighting Kit
- Door Alarm Switch

GENERATOR SET

- Special Testing
- IBC Seismic Certification

ENCLOSURE

- Motorized Dampers
- Door switched for intrusion alert
- Enclosure ambient heaters

TANKS (Size on last page)

- Electrical Fuel Level
- Mechanical Fuel Level
- 54 Gal (204.4 L) Usable Capacity
- 132 Gal (499.7 L) Usable Capacity
- 211 Gal (798.7 L) Usable Capacity
- 300 Gal (1135.6 L) Usable Capacity
- 8" Fill Extension
- 13" Fill Extension
- 19" Fill Extension

CONTROL SYSTEM

- 21-Light Remote Annunciator
- Remote Relay Panel (8 or 16)
- Oil Temperature Sender with Indication Alarm
- Remote E-Stop (Break Glass-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Surface Mount)
- Remote E-Stop (Red Mushroom-Type, Flush Mount)
- Remote Communication - Modem
- Remote Communication - Ethernet
- 10A Run Relay
- Ground Fault Indication and Protection Functions

TANKS

- Overfill Protection Valve
- UL2085 Tank
- ULC S-601 Tank
- Stainless Steel Tank
- Special Fuel Tanks (MIDEQ and FL DEP/DERM, etc.)
- Vent Extensions

RATING DEFINITIONS

Standby - Applicable for a varying emergency load for the duration of a utility power outage with no overload capability.

Prime - Applicable for supplying power to a varying load in lieu of utility for an unlimited amount of running time. A 10% overload capacity is available for 1 out of every 12 hours. The Prime Power option is only available on International applications. Power ratings in accordance with ISO 8528-1, Second Edition

APPLICATION AND ENGINEERING DATA

ENGINE SPECIFICATIONS

General

| | |
|--------------------------|--------------------------|
| Make | Generac |
| EPA Emissions Compliance | Stationary Emergency |
| EPA Emissions Reference | See Emissions Data Sheet |
| Cylinder # | 4 |
| Type | In-Line |
| Displacement - L (cu In) | 2.4 (146.46) |
| Bore - mm (in) | 90 (3.54) |
| Stroke - mm (in) | 94 (3.70) |
| Compression Ratio | 21.3:1 |
| Intake Air Method | Turbocharged |
| Cylinder Head Type | Cast Iron |
| Piston Type | Aluminium |

Engine Governing

| | |
|-------------------------------------|------------------------|
| Governor | Electronic Isochronous |
| Frequency Regulation (Steady State) | +/- 0.25% |

Lubrication System

| | |
|------------------------------|------------|
| Oil Pump Type | Gear |
| Oil Filter Type | Full Flow |
| Crankcase Capacity - L (qts) | 6.2 (6.52) |

Cooling System

| | |
|---------------------------------|-------------------------|
| Cooling System Type | Closed Recovery |
| Water Pump | Pre-Lubed, Self Sealing |
| Fan Type | Pusher |
| Fan Speed (rpm) | 2698 |
| Fan Diameter mm (in) | 560 (22) |
| Coolant Heater Wattage | 1500 |
| Coolant Heater Standard Voltage | 120 VAC |

Fuel System

| | |
|--------------------------|------------------------------|
| Fuel Type | Ultra Low Sulfur Diesel Fuel |
| Fuel Specifications | ASTM |
| Fuel Filtering (microns) | 5 |
| Fuel Injection | Distribution Injection Pump |
| Fuel Pump Type | Engine Driven Gear |
| Injector Type | Mechanical |
| Fuel Supply Line mm (in) | 7.94 (0.31) |
| Fuel Return Line mm (in) | 7.94 (0.31) |

Engine Electrical System

| | |
|-----------------------------|---------------------------------|
| System Voltage | 12 VDC |
| Battery Charging Alternator | Std |
| Battery Size | See Battery Index 0161970SBY |
| Battery Voltage | 12 VDC |
| Ground Polarity | Negative |

ALTERNATOR SPECIFICATIONS

| | |
|-------------------------------------|-----------|
| Standard Model | 390 |
| Poles | 4 |
| Field Type | Revolving |
| Insulation Class - Rotor | H |
| Insulation Class - Stator | H |
| Total Harmonic Distortion | <5% |
| Telephone Interference Factor (TIF) | <50 |

| | |
|------------------------------------|-------------------------|
| Standard Excitation | Synchronous |
| Bearings | Single Sealed Cartridge |
| Coupling | Direct, Flexible Disc |
| Load Capacity - Standby | 100% |
| Prototype Short Circuit Test | Yes |
| Voltage Regulator Type | Digital |
| Number of Sensed Phases | All |
| Regulation Accuracy (Steady State) | ± 0.25% |

OPERATING DATA

POWER RATINGS

| | | Standby |
|---------------------------------|-------|----------|
| Single-Phase 120/240 VAC @1.0pf | 20 kW | Amps: 83 |
| Three-Phase 120/208 VAC @0.8pf | 20 kW | Amps: 69 |
| Three-Phase 120/240 VAC @0.8pf | 20 kW | Amps: 60 |
| Three-Phase 277/480 VAC @0.8pf | 20 kW | Amps: 30 |
| Three-Phase 346/600 VAC @0.8pf | 20 kW | Amps: 24 |

STARTING CAPABILITIES (sKVA)

sKVA vs. Voltage Dip

| Alternator | kW | 480 VAC | | | | | | 208/240 VAC | | | | | |
|------------|----|---------|-----|-----|-----|-----|-----|-------------|-----|-----|-----|-----|-----|
| | | 10% | 15% | 20% | 25% | 30% | 35% | 10% | 15% | 20% | 25% | 30% | 35% |
| Standard | 25 | 16 | 25 | 33 | 41 | 49 | 57 | 12 | 19 | 25 | 31 | 37 | 43 |
| Upsize 1 | 35 | 24 | 36 | 48 | 60 | 72 | 84 | 18 | 27 | 36 | 45 | 54 | 63 |
| Upsize 2 | 40 | 27 | 41 | 54 | 68 | 81 | 95 | 20 | 31 | 41 | 51 | 61 | 71 |

FUEL CONSUMPTION RATES*

| Fuel Pump Lift - ft (m) | Diesel - gal/hr (l/hr) | |
|--|------------------------|------------|
| | Percent Load | Standby |
| 3 (1) | 25% | 0.65 (2.5) |
| Total Fuel Pump Flow (Combustion + Return) 4.5 gal/hr | 50% | 1.14 (4.3) |
| | 75% | 1.45 (5.5) |
| | 100% | 1.76 (6.7) |

* Fuel supply installation must accommodate fuel consumption rates at 100% load.

COOLING

| | | Standby |
|--|---------------------|--------------|
| Coolant Flow per Minute | gal/min (l/min) | 10 (38) |
| Coolant System Capacity | gal (L) | 2.8 (10.95) |
| Heat Rejection to Coolant | BTU/hr | 72,480 |
| Inlet Air | cfm (m³/hr) | 4,500 (7647) |
| Max. Operating Radiator Air Temp | F° (C°) | 122 (50) |
| Max. Ambient Temperature (before derate) | F° (C°) | 110 (43.3) |
| Maximum Radiator Backpressure | in H ₂ O | 0.5 |

COMBUSTION AIR REQUIREMENTS

| | Standby |
|----------------------------------|-----------|
| Flow at Rated Power cfm (m³/min) | 88 (2.49) |

ENGINE

| | | Standby |
|--------------------------|----------------|------------|
| Rated Engine Speed | rpm | 1800 |
| Horsepower at Rated kW** | hp | 49 |
| Piston Speed | ft/min (m/min) | 1110 (338) |
| BMEP | psi | 69 |

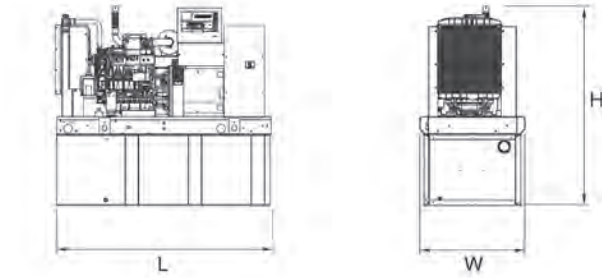
** Refer to "Emissions Data Sheet" for maximum bHP for EPA and SCAQMD permitting purposes.

EXHAUST

| | | Standby |
|-----------------------------------|--------------|------------|
| Exhaust Flow (Rated Output) | cfm (m³/min) | 193 (328) |
| Max. Backpressure (Post Silencer) | inHg (Kpa) | 1.5 (5.1) |
| Exhaust Temp (Rated Output) | °F (°C) | 725 (385) |
| Exhaust Outlet Size (Open Set) | mm (in) | 63.5 (2.5) |

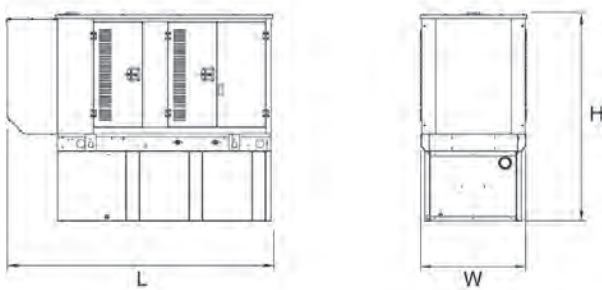
Deration – Operational characteristics consider maximum ambient conditions. Derate factors may apply under atypical site conditions. Please consult your local systems Industrial Dealer for additional details. Page 15 of 35
 Mead & Hunt, Inc. ratings in accordance with ISO3046, BS5514, ISO8528 and DIN6271 standards.

DIMENSIONS AND WEIGHTS*



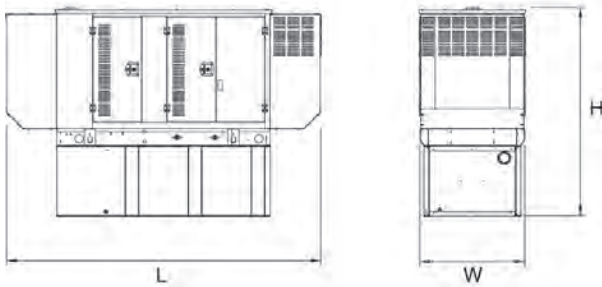
OPEN SET

| RUN TIME HOURS | USABLE CAPACITY GAL (L) | L x W x H in (mm) | WT lbs (kg) - Tank & Open Set | |
|----------------|-------------------------|--|-------------------------------|----------|
| | | | Steel | Aluminum |
| NO TANK | - | 76 (1930.4) x 37.4 (949.9) x 42.2 (1072.1) | 2060 (934) | |
| 30 | 54 (204.4) | 76 (1930.4) x 37.4 (949.9) x 55.2 (1402.1) | 2540 (1152) | |
| 75 | 132 (499.7) | 76 (1930.4) x 37.4 (949.9) x 67.2 (1706.9) | 2770 (1257) | |
| 119 | 211 (798.7) | 76 (1930.4) x 37.4 (949.9) x 79.2 (2011.7) | 2979 (1351) | |
| 170 | 300 (1135.6) | 92.9 (2360) x 37.4 (949.9) x 82.7 (2100.6) | 3042 (1380) | |



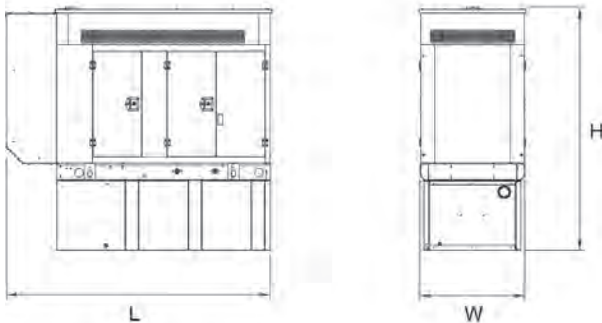
STANDARD ENCLOSURE

| RUN TIME HOURS | USABLE CAPACITY GAL (L) | L x W x H in (mm) | WT lbs (kg) - Enclosure Only | |
|----------------|-------------------------|--|------------------------------|----------|
| | | | Steel | Aluminum |
| NO TANK | - | 94.8 (2408.9) x 38 (965.2) x 49.5 (1258.1) | | |
| 30 | 54 (204.4) | 94.8 (2408.9) x 38 (965.2) x 62.5 (1587.5) | | |
| 75 | 132 (499.7) | 94.8 (2408.9) x 38 (965.2) x 74.5 (1892.3) | 302 (137) | 191 (87) |
| 119 | 211 (798.7) | 94.8 (2408.9) x 38 (965.2) x 86.5 (2197.1) | | |
| 170 | 300 (1135.6) | 94.8 (2408.9) x 38 (965.2) x 90 (2286) | | |



LEVEL 1 ACOUSTIC ENCLOSURE

| RUN TIME HOURS | USABLE CAPACITY GAL (L) | L x W x H in (mm) | WT lbs (kg) - Enclosure Only | |
|----------------|-------------------------|---|------------------------------|-----------|
| | | | Steel | Aluminum |
| NO TANK | - | 112.5 (2857.1) x 38 (965.2) x 49.5 (1258.1) | | |
| 30 | 54 (204.4) | 112.5 (2857.1) x 38 (965.2) x 62.5 (1587.5) | | |
| 75 | 132 (499.7) | 112.5 (2857.1) x 38 (965.2) x 74.5 (1892.3) | 455 (206) | 288 (131) |
| 119 | 211 (798.7) | 112.5 (2857.1) x 38 (965.2) x 86.5 (2197.1) | | |
| 170 | 300 (1135.6) | 112.5 (2857.1) x 38 (965.2) x 90 (2286) | | |



LEVEL 2 ACOUSTIC ENCLOSURE

| RUN TIME HOURS | USABLE CAPACITY GAL (L) | L x W x H in (mm) | WT lbs (kg) - Enclosure Only | |
|----------------|-------------------------|---|------------------------------|-----------|
| | | | Steel | Aluminum |
| NO TANK | - | 94.8 (2408.9) x 38 (965.2) x 62 (1573.9) | | |
| 30 | 54 (204.4) | 94.8 (2408.9) x 38 (965.2) x 75 (1905) | | |
| 75 | 132 (499.7) | 94.8 (2408.9) x 38 (965.2) x 87 (2209.8) | 460 (209) | 291 (132) |
| 119 | 211 (798.7) | 94.8 (2408.9) x 38 (965.2) x 99 (2514.6) | | |
| 170 | 300 (1135.6) | 94.8 (2408.9) x 38 (965.2) x 102.5 (2603.5) | | |

*All measurements are approximate and for estimation purposes only. Sound dBA can be found on the sound data sheet. Enclosure Only weight is added to Tank & Open Set weight to determine total weight.

YOUR FACTORY RECOGNIZED GENERAC INDUSTRIAL DEALER

Specification characteristics may change without notice. Dimensions and weights are for preliminary purposes only. Please consult a Generac Power Systems Industrial Dealer for detailed installation drawings.

Attachment D

MSDS for Diesel Fuel



SAFETY DATA SHEET

SDS ID NO.: 0290MAR019
Revision Date: 06/01/2016

1. IDENTIFICATION

Product Name: Marathon Petroleum No. 2 Ultra Low Sulfur Diesel

Synonym: #2 Diesel; No. 2 Ultra Low Sulfur Diesel 15 ppm Sulfur Max; Ultra Low Sulfur Diesel No. 2 15 ppm Sulfur Max; Ultra Low Sulfur Diesel No. 2 15 ppm Sulfur Max with Polar Plus; No. 2 Diesel, Motor Vehicle Use, Undyed; No. 2 Diesel, Motor Vehicle Use, Undyed, with Polar Plus; ULSD No. 2 Diesel 15 ppm Sulfur Max; ULSD No. 2 Diesel 15 ppm Sulfur Max with Polar Plus; No. 2 MV 15 Diesel; No. 2 MV 15 Diesel with Polar Plus; No. 2 Ultra Low Sulfur Diesel Dyed 15 ppm Sulfur Max; Ultra Low Sulfur Diesel No. 2 Dyed 15 ppm Sulfur Max; Ultra Low Sulfur Diesel No. 2 Dyed 15 ppm Sulfur Max with Polar Plus; No. 2 Diesel, Tax Exempt-Motor Vehicle Use, Dyed; No. 2 Diesel, Tax Exempt-Motor Vehicle Use, Dyed, with Polar Plus; ULSD No. 2 Diesel Dyed 15 ppm Sulfur Max; ULSD No. 2 Diesel Dyed 15 ppm Sulfur Max, with Polar Plus; No. 2 MV 15 Diesel Dyed; #2 MV 15 CFI Diesel; #2 MV 15 CFI Diesel Dyed; No. 2 Low Sulfur Diesel (TxLED); No. 2 MV 15 Diesel Dyed, with Polar Plus; No. 2 NRLM 15 Diesel Dyed; No.2 NRLM Diesel Dyed; No. 2 MV 500 ppm TxLED; No.2 Low Emission Low Sulfur Diesel; No. 2 Low Sulfur Diesel (TxLED) 500 ppm Sulfur Max; No. 2 Heating Oil 5000 NMA Unmarked; NEMA No. 2 Heating Oil; Heating Oil, No. 2 Low Sulfur 5000 ppm; No. 2 Ultra Low Sulfur Diesel Dyed with <6% Renewable Diesel Fuel; Ultra Low Sulfur No. 2 Diesel Dyed with <6% Renewable Diesel Fuel; No. 2 Diesel Dyed with <6% Renewable Diesel Fuel 15 ppm Sulfur Max; No. 2 Ultra Low Sulfur Diesel with <6% Renewable Diesel Fuel; Ultra Low Sulfur No. 2 Diesel with <6% Renewable Diesel Fuel; No. 2 Diesel with <6% Renewable Diesel Fuel 15 ppm Sulfur Max; Garyville Export Diesel; Export Diesel, Garyville; Diesel Fuel, Export Garyville; #2 Motor Vehicle ULSD 15 ppm with 0-5% Renewable Diesel; Marathon No. 2 ULSD with 0-5% Renewable Fuel with R100; Marathon No. 2 ULSD with 0-5% Renewable Fuel with R99; No. 2 Heating Oil 2000 ppm Sulfur Max, Clear (Undyed) Unmarked; Ultra Low Sulfur Heating Oil 15 ppm Sulfur Max, Clear (Undyed) Unmarked; ULS Heating Oil 15 ppm Clear (Undyed) Unmarked; ULS HO 15 ppm CLR; Ultra-Low Sulfur Heating Oil (<= 15ppm, Undyed); No. 2 Heating Oil 2000 ppm Sulfur Max, Dyed Unmarked; No. 2 Heating Oil 2000 ppm Sulfur Max, Dyed Marked; Ultra Low Sulfur Heating Oil 15 ppm Sulfur Max, Dyed Unmarked; Ultra Low Sulfur Heating Oil 15 ppm Sulfur Max, Dyed Marked; 15 ppm Sulfur Heating Oil Grade 67; 15 PPM Heating Oil; 15 PPM Dyed Heating Oil; 0291MAR019; 0306MAR019; 0308MAR019; 0334MAR019; 0335MAR019; 0336MAR019; 0337MAR019; 0340MAR019;

Chemical Family: Complex Hydrocarbon Substance

Recommended Use: Fuel.
Restrictions on Use: All others.

Manufacturer, Importer, or Responsible Party Name and Address:
MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070

Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

| | |
|--|------------|
| Flammable liquids | Category 3 |
| Acute toxicity - Inhalation (Dusts/Mists) | Category 4 |
| Skin corrosion/irritation | Category 2 |
| Carcinogenicity | Category 2 |
| Specific target organ toxicity (single exposure) | Category 3 |
| Specific target organ toxicity (repeated exposure) | Category 2 |
| Aspiration toxicity | Category 1 |
| Acute aquatic toxicity | Category 2 |
| Chronic aquatic toxicity | Category 2 |

Hazards Not Otherwise Classified (HNOC)


Static accumulating flammable liquid

Label elements

EMERGENCY OVERVIEW

Danger

FLAMMABLE LIQUID AND VAPOR
 May accumulate electrostatic charge and ignite or explode
 May be fatal if swallowed and enters airways
 Harmful if inhaled
 Causes skin irritation
 May cause respiratory irritation
 May cause drowsiness or dizziness
 Suspected of causing cancer
 May cause damage to organs (thymus, liver, bone marrow) through prolonged or repeated exposure
 Toxic to aquatic life with long lasting effects



Appearance Yellow to Red Liquid **Physical State** Liquid **Odor** Hydrocarbon

Precautionary Statements - Prevention

- Obtain special instructions before use
- Do not handle until all safety precautions have been read and understood
- Keep away from heat/sparks/open flames/hot surfaces. - No smoking
- Keep container tightly closed
- Ground/bond container and receiving equipment
- Use only non-sparking tools.
- Use explosion-proof electrical/ventilating/lighting/equipment
- Take precautionary measures against static discharge
- Do not breathe the mist/vapors/spray
- Use only outdoors or in a well-ventilated area
- Wear protective gloves/protective clothing/eye protection/face protection

Wash hands and any possibly exposed skin thoroughly after handling
Avoid release to the environment

Precautionary Statements - Response

IF exposed or concerned: Get medical attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation occurs: Get medical attention
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor if you feel unwell
IF SWALLOWED: Immediately call a POISON CENTER or doctor
Do NOT induce vomiting
In case of fire: Use water spray, fog or regular foam for extinction
Collect spillage

Precautionary Statements - Storage

Store in a well-ventilated place. Keep container tightly closed
Keep cool
Store locked up

Precautionary Statements - Disposal

Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

No. 2 Ultra Low Sulfur Diesel is a complex mixture of paraffins, cycloparaffins, olefins and aromatic hydrocarbon chain lengths predominantly in the range of eleven to twenty carbons. May contain up to 5% Renewable Diesel. May contain small amounts of dye and other additives (<0.15%) which are not considered hazardous at the concentration(s) used. May contain a trace amount of benzene (<0.01%). Contains a trace amount of sulfur (<0.0015%)

Composition Information:

| Name | CAS Number | % Concentration |
|--------------------------------------|-------------|-----------------|
| No. 2 Diesel Fuel | 68476-34-6 | 50-100 |
| Kerosine, Petroleum | 8008-20-6 | 0-50 |
| Alkanes, C10-C20 branched and linear | 928771-01-1 | 0-5 |
| Naphthalene | 91-20-3 | 0.3-2.6 |

All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES

First Aid Measures

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation: Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Skin Contact: Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear.

Eye Contact: Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion: Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking. Prolonged or repeated exposure may cause adverse effects to the thymus, liver, and bone marrow.

Indication of any immediate medical attention and special treatment needed

Notes To Physician: INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media

For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media

Do not use straight water streams to avoid spreading fire.

Specific hazards arising from the chemical

This product has been determined to be a flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the Emergency Response Guidebook 128.

Hazardous combustion products

Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data

Sensitivity to Mechanical Impact No.

Sensitivity to Static Discharge Yes.

Special protective equipment and precautions for firefighters

Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Avoid excessive water spray application. Keep surrounding area cool with water spray from a distance and prevent further ignition of combustible material. Keep run-off water out of sewers and water sources.

Additional firefighting tactics

FIRES INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

EVACUATION: Consider initial downwind evacuation for at least 1000 feet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 5280 feet (1 mile) in all directions; also, consider initial evacuation of 5280 feet (1 mile) in all directions.

NFPA Health 1 Flammability 2 Instability 0 Special Hazard -

6. ACCIDENTAL RELEASE MEASURES

- Personal precautions: Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources. All contaminated surfaces will be slippery.
Protective equipment: Use personal protection measures as recommended in Section 8.
Emergency procedures: Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.
Environmental precautions: Avoid release to the environment. Avoid subsoil penetration.
Methods and materials for containment: Contain liquid with sand or soil. Prevent spilled material from entering storm drains, sewers, and open waterways.
Methods and materials for cleaning up: Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe Handling Precautions: NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Vapors may travel along the ground or be moved by ventilation. Flashback may occur along vapor trails. No smoking. Use only non-sparking tools. Avoid breathing fumes, gas, or vapors. Use only with adequate ventilation. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists

from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions:

Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area. Do not store near an open flame, heat or other sources of ignition.

Incompatible Materials

Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

| Name | ACGIH TLV | OSHA PELS: | OSHA - Vacated PELs | NIOSH IDLH |
|---|---|--|--|------------|
| No. 2 Diesel Fuel 68476-34-6 | 100 mg/m ³ TWA Skin - potential significant contribution to overall exposure by the cutaneous route | - | - | - |
| Kerosine, Petroleum 8008-20-6 | 200 mg/m ³ TWA Skin - potential significant contribution to overall exposure by the cutaneous route | - | - | - |
| Alkanes, C10-C20 branched and linear 928771-01-1 | - | - | - | - |
| Naphthalene 91-20-3 | 10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route | TWA: 10 ppm TWA: 50 mg/m ³ | 10 ppm TWA 50 mg/m ³ TWA 15 ppm STEL 75 mg/m ³ STEL | 250 ppm |

Notes:

The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures:

Local or general exhaust required in an enclosed area or with inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

- Eye protection:** Use goggles or face-shield if the potential for splashing exists.
- Skin and body protection:** Wear neoprene, nitrile or PVA gloves to prevent skin contact. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.
- Respiratory protection:** Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.
- Hygiene measures:** Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

| | |
|-----------------------|----------------------|
| Physical State | Liquid |
| Appearance | Yellow to Red Liquid |
| Color | Yellow to Red |
| Odor | Hydrocarbon |
| Odor Threshold | No data available. |

| <u>Property</u> | <u>Values (Method)</u> |
|--|------------------------------------|
| Melting Point / Freezing Point | No data available. |
| Initial Boiling Point / Boiling Range | 154-366 °C / 310-691 °F (ASTM D86) |
| Flash Point | 58-76 °C / 136-168 °F (ASTM D93) |
| Evaporation Rate | No data available. |
| Flammability (solid, gas) | Not applicable. |
| Flammability Limit in Air (%): | |
| Upper Flammability Limit: | No data available. |
| Lower Flammability Limit: | No data available. |
| Explosion limits: | No data available. |
| Vapor Pressure | No data available. |
| Vapor Density | No data available. |
| Specific Gravity / Relative Density | 0.82-0.86 (ASTM D4052) |
| Water Solubility | No data available. |
| Solubility in other solvents | No data available. |
| Partition Coefficient | No data available. |
| Decomposition temperature | No data available. |
| pH: | Not applicable |
| Autoignition Temperature | No data available. |
| Kinematic Viscosity | 1.90-3.32 cSt @ 40°C (ASTM D445) |
| Dynamic Viscosity | No data available. |
| Explosive Properties | No data available. |
| VOC Content (%) | No data available. |
| Density | No data available. |
| Bulk Density | Not applicable. |

10. STABILITY AND REACTIVITY

- Reactivity** The product is non-reactive under normal conditions.
- Chemical stability** The material is stable at 70°F, 760 mmHg pressure.

| | |
|--|--|
| <u>Possibility of hazardous reactions</u> | None under normal processing. |
| <u>Hazardous polymerization</u> | Will not occur. |
| <u>Conditions to avoid</u> | Excessive heat, sources of ignition, open flame. |
| <u>Incompatible Materials</u> | Strong oxidizing agents. |
| <u>Hazardous decomposition products</u> | None known under normal conditions of use. |

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

| | |
|---------------------|--|
| Inhalation | Harmful if inhaled. May cause irritation of respiratory tract. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death. |
| Eye contact | Exposure to vapor or contact with liquid may cause mild eye irritation, including tearing, stinging, and redness. |
| Skin contact | Causes skin irritation. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts. |
| Ingestion | May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract. |

Acute toxicological data

| Name | Oral LD50 | Dermal LD50 | Inhalation LC50 |
|---|--------------------|-----------------------|-----------------------------------|
| No. 2 Diesel Fuel 68476-34-6 | > 5000 mg/kg (Rat) | > 2000 mg/kg (Rabbit) | >1 - <5 mg/L (Rat) 4 h |
| Kerosine, Petroleum 8008-20-6 | > 5000 mg/kg (Rat) | > 2000 mg/kg (Rabbit) | > 5.28 mg/L (Rat) 4 h |
| Alkanes, C10-C20 branched and linear 928771-01-1 | - | - | >1 - <5 mg/l (Rat) 4 h |
| Naphthalene 91-20-3 | 490 mg/kg (Rat) | > 2000 mg/kg (Rabbit) | > 340 mg/m ³ (Rat) 1 h |

Delayed and immediate effects as well as chronic effects from short and long-term exposure

MIDDLE DISTILLATES, PETROLEUM: Long-term repeated (lifetime) skin exposure to similar materials has been reported to result in an increase in skin tumors in laboratory rodents. The relevance of these findings to humans is not clear at this time. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

MIDDLE DISTILLATES WITH CRACKED STOCKS: Light cracked distillates have been shown to be carcinogenic in animal tests and have tested positive with in vitro genotoxicity tests. Repeated dermal exposures to high concentrations in test animals resulted in reduced litter size and litter weight, and increased fetal resorptions at maternally toxic doses. Dermal exposure to high concentrations resulted in severe skin irritation with weight loss and some mortality. Inhalation exposure to high concentrations resulted in respiratory tract irritation, lung changes/infiltration/accumulation, and reduction in lung function.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

DIESEL EXHAUST: The combustion of diesel fuels produces gases including carbon monoxide, carbon dioxide, oxides of nitrogen and/or sulfur, and hydrocarbons that can be irritating and hazardous with overexposure. Long-term occupational overexposure to diesel exhaust and diesel exhaust particulate matter has been associated with an increased risk of respiratory disease, including lung cancer, and is characterized as a “known human carcinogen” by the International Agency for Research on Cancer (IARC), as “a reasonably anticipated human carcinogen” by the National Toxicology Program, and as “likely to be carcinogenic to humans” by the EPA, based upon animal and occupational exposure studies. However, uncertainty exists with these classifications because of deficiencies in the supporting occupational exposure/epidemiology studies, including reliable exposure estimates. Lifetime animal inhalation studies with pulmonary overloading exposure concentrations of diesel exhaust emissions have produced tumors and other adverse health effects. However, in more recent long-term animal inhalation studies of diesel exhaust emissions, no increase in tumor incidence and in fact a substantial reduction in adverse health effects along with significant reductions in the levels of hazardous material emissions were observed and are associated with fuel composition alterations coupled with new technology diesel engines.

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and Symptoms Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking. Prolonged or repeated exposure may cause damage to organs.

Sensitization Not expected to be a skin or respiratory sensitizer.

Mutagenic effects None known.

Carcinogenicity Suspected of causing cancer.

Cancer designations are listed in the table below

| Name | ACGIH (Class) | IARC (Class) | NTP | OSHA |
|---|----------------------------------|---------------------------|---------------------------|------------|
| No. 2 Diesel Fuel 68476-34-6 | Confirmed animal carcinogen (A3) | Not Classifiable (3) | Not Listed | Not Listed |
| Kerosine, Petroleum 8008-20-6 | Confirmed animal carcinogen (A3) | Not Classifiable (3) | Not Listed | Not Listed |
| Alkanes, C10-C20 branched and linear 928771-01-1 | Not Listed | Not Listed | Not Listed | Not Listed |
| Naphthalene | Confirmed animal | Possible human carcinogen | Reasonably anticipated to | Not Listed |

| | | | |
|---------|-----------------|------|-----------------------|
| 91-20-3 | carcinogen (A3) | (2B) | be a human carcinogen |
|---------|-----------------|------|-----------------------|

Reproductive toxicity None known.

Specific Target Organ Toxicity (STOT) - single exposure Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) - repeated exposure Thymus. Liver. Bone marrow.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

| Name | Algae/aquatic plants | Fish | Toxicity to Microorganisms | Crustacea |
|--|-----------------------------------|--|----------------------------|---|
| No. 2 Diesel Fuel 68476-34-6 | - | 96-hr LC50 = 35 mg/l Fathead minnow (flow-through) | - | 48-hr EL50 = 6.4 mg/l Daphnia magna |
| Kerosine, Petroleum 8008-20-6 | 72-hr EL50 = 5.0-11 mg/l Algae | 96-hr LL50 = 18-25 mg/l Fish | - | 48-hr EL50 = 1.4-21 mg/l Invertebrates |
| Alkanes, C10-C20 branched and linear 928771-01-1 | - | - | - | - |
| Naphthalene 91-20-3 | - | 96-hr LC50 = 0.91-2.82 mg/l Rainbow trout (static) 96-hr LC50 = 1.99 mg/l Fathead minnow (static) | - | 48-hr LC50 = 1.6 mg/l Daphnia magna |

Persistence and degradability Expected to be inherently biodegradable.

Bioaccumulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues
This material may be a flammable liquid waste.

Safe Handling of Wastes
Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes / Methods of Disposal
The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal
Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper Shipping Name: Fuel Oil, No. 2
UN/Identification No: NA 1993
Transport Hazard Class(es): 3
Packing Group: III

TDG (Canada):

UN Proper Shipping Name: Diesel Fuel
UN/Identification No: UN 1202
Transport Hazard Class(es): 3
Packing Group: III

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

| Name | CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs |
|--------------------------------------|---|
| No. 2 Diesel Fuel | NA |
| Kerosine, Petroleum | NA |
| Alkanes, C10-C20 branched and linear | NA |
| Naphthalene | NA |

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

| Name | Hazardous Substances RQs |
|--------------------------------------|-------------------------------------|
| No. 2 Diesel Fuel | NA |
| Kerosine, Petroleum | NA |
| Alkanes, C10-C20 branched and linear | NA |
| Naphthalene | 100 lb final RQ 45.4 kg final RQ |

SARA: The following EPA hazard categories apply to this product:

- Acute Health Hazard
- Fire Hazard
- Chronic Health Hazard

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

| Name | CERCLA/SARA 313 Emission reporting: |
|--------------------------------------|-------------------------------------|
| No. 2 Diesel Fuel | None |
| Kerosine, Petroleum | None |
| Alkanes, C10-C20 branched and linear | None |
| Naphthalene | 0.1 % de minimis concentration |

State and Community Right-To-Know Regulations:

The following component(s) of this material are identified on the regulatory lists below:

No. 2 Diesel Fuel

| | |
|---|---|
| Louisiana Right-To-Know: | Not Listed |
| California Proposition 65: | Not Listed |
| New Jersey Right-To-Know: | SN 2444 |
| Pennsylvania Right-To-Know: | Not Listed |
| Massachusetts Right-To Know: | Not Listed |
| Florida Substance List: | Not Listed |
| Rhode Island Right-To-Know: | Not Listed |
| Michigan Critical Materials Register List: | Not Listed |
| Massachusetts Extraordinarily Hazardous Substances: | Not Listed |
| California - Regulated Carcinogens: | Not Listed |
| Pennsylvania RTK - Special Hazardous Substances: | Not Listed |
| New Jersey - Special Hazardous Substances: | Not Listed |
| New Jersey - Environmental Hazardous Substances List: | SN 2444 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories) |
| Illinois - Toxic Air Contaminants: | Not Listed |
| New York - Reporting of Releases Part 597 - List of Hazardous Substances: | Not Listed |
| Kerosine, Petroleum | |
| Louisiana Right-To-Know: | Not Listed |
| California Proposition 65: | Not Listed |
| New Jersey Right-To-Know: | SN 1091 |
| Pennsylvania Right-To-Know: | Present |
| Massachusetts Right-To Know: | Present |
| Florida Substance List: | Not Listed |
| Rhode Island Right-To-Know: | Not Listed |
| Michigan Critical Materials Register List: | Not Listed |
| Massachusetts Extraordinarily Hazardous Substances: | Not Listed |
| California - Regulated Carcinogens: | Not Listed |
| Pennsylvania RTK - Special Hazardous Substances: | Not Listed |
| New Jersey - Special Hazardous Substances: | Not Listed |
| New Jersey - Environmental Hazardous Substances List: | SN 1091 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories) |
| Illinois - Toxic Air Contaminants: | Not Listed |
| New York - Reporting of Releases Part 597 - List of Hazardous Substances: | Not Listed |
| Alkanes, C10-C20 branched and linear | |
| Louisiana Right-To-Know: | Not Listed |
| California Proposition 65: | Not Listed |
| New Jersey Right-To-Know: | Not Listed |
| Pennsylvania Right-To-Know: | Not Listed |
| Massachusetts Right-To Know: | Not Listed |
| Florida Substance List: | Not Listed |
| Rhode Island Right-To-Know: | Not Listed |
| Michigan Critical Materials Register List: | Not Listed |
| Massachusetts Extraordinarily Hazardous Substances: | Not Listed |
| California - Regulated Carcinogens: | Not Listed |
| Pennsylvania RTK - Special Hazardous Substances: | Not Listed |
| New Jersey - Special Hazardous Substances: | Not Listed |
| New Jersey - Environmental Hazardous Substances List: | Not Listed |
| Illinois - Toxic Air Contaminants: | Not Listed |
| New York - Reporting of Releases Part 597 - List of Hazardous Substances: | Not Listed |
| Naphthalene | |
| Louisiana Right-To-Know: | Not Listed |
| California Proposition 65: | Carcinogen, initial date 4/19/02 |

| | |
|---|--|
| New Jersey Right-To-Know: | SN 1322 SN 3758 |
| Pennsylvania Right-To-Know: | Environmental hazard Present (particulate) |
| Massachusetts Right-To Know: | Present |
| Florida Substance List: | Not Listed |
| Rhode Island Right-To-Know: | Toxic; Flammable |
| Michigan Critical Materials Register List: | Not Listed |
| Massachusetts Extraordinarily Hazardous Substances: | Not Listed |
| California - Regulated Carcinogens: | Not Listed |
| Pennsylvania RTK - Special Hazardous Substances: | Not Listed |
| New Jersey - Special Hazardous Substances: | Carcinogen |
| New Jersey - Environmental Hazardous Substances List: | SN 1322 TPQ: 500 lb (Reportable at the de minimis quantity of >0.1%) |
| Illinois - Toxic Air Contaminants: | Present |
| New York - Reporting of Releases Part 597 - List of Hazardous Substances: | 100 lb RQ (air); 1 lb RQ (land/water) |

Canada DSL/NDL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations.

| Name | Canada - WHMIS: Classifications of Substances: | Canada - WHMIS: Ingredient Disclosure: |
|--------------------------------------|--|--|
| No. 2 Diesel Fuel | B3,D2A,D2B | 0.1% |
| Kerosine, Petroleum | B3,D2B | 1% |
| Alkanes, C10-C20 branched and linear | B3,D2A,D2B | 0.1% |
| Naphthalene | B4,D2A | 0.1% |



Note: Not applicable.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety

Revision Date: 06/01/2016

Revision Note:

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Attachment E

Calculations and Supporting Documents

Emissions Definitions Regarding Generac SD020 Generator
20 KW Stationary Gen Application Operation at 75% Capacity
ACTUAL Emissions Rates given by Technical Specs in lb/hr

Certified Values for this specific engine were used in the below calculations. Carb Certification in Appendix C. The generator meets EPA Tier 4i Emission requirements they emit no more than what is specified in **40 CFR §89.112. For annual ACTUAL calculations, 500 hrs/year was used. The generator will be tested periodically and utilized only during power outages.**

Nox and NMHC - on the attached EPA Engine Certification

Hourly NO_x = 4.3 g/kW-hr * 20 kW * 1 lb/453.592g = 0.2 lb/hr

Annual NO_x = 0.2 lb/hr * 500 hr/yr * 1 ton /2000lbs = 0.05 ton/yr

CO - on the attached EPA Engine Certification

Hourly CO = 1.80 g/kW-hr * 20 kW * 1 lb/453.592g = 0.08 lb/hr

Annual CO = 0.08 lb/hr * 500 hr/yr * 1ton/2000lbs = 0.02 ton/yr

PM - on the attached EPA Engine Certification

Hourly PM = 0.25 g/kW-hr * 20 kW * 1 lb/453.592g = 0.01 lb/hr

Annual PM = 0.01 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.002 ton/yr

HC - included with Nox calc.

Hourly HC

Annual HC

VOC - AP42

Per AP-42 Table 3.3-1, the emission factor of #2 Diesel Fuel is 0.00247 lb/hp-hr

Hourly VOC = 0.00247 lb/hp-hr * 26 bhp = 0.06 lb/hr

Yearly VOC = 0.06 lb/hr * 500 hr/yr * 1 ton/2000 lb = 0.02 ton/yr

SO_x - AP42

Per AP-42 Table 3.3-1, the emission factor of #2 Diesel Fuel is 0.00205 lb/hp-hr

Hourly SO₂ = 0.00205 lb/hp-hr * 26 bhp = 0.05 lb/hr

Yearly SO₂ = 0.05 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.01 ton/yr

Formaldehyde - AP42

Per AP-42 Table 3.3-2, the emission factor of #2 Diesel Fuel is 0.00118 lb/hp-hr

Hourly VOC = 0.00118 lb/hp-hr * 26 bhp = 0.03 lb/hr

Yearly formaldehyde = 0.03 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.01 ton/yr

Emissions Definitions Regarding Generac SD020 Generator
20 KW Stationary Gen Application Operation at 75% Capacity
POTENTIAL Emissions Rates given by Technical Specs in lb/hr

Certified Values for this specific engine were used in the below calculations. Carb Certification in Appendix A. The generator meets EPA Tier 4i Emission requirements they emit no more than what is specified in 40 CFR §89.112. **For annual POTENTIAL calculations, 8760 hrs/year was used. The generator will be used intermittently (<500 hrs/yr).**

Nox and NMHC - on the attached EPA Engine Certification

Hourly NO_x = 4.3 g/kW-hr * 20 kW * 1 lb/453.592g = 0.2 lb/hr

Annual NO_x = 0.2 lb/hr * 8760 hr/yr * 1 ton /2000lbs = 0.9 ton/yr

CO - on the attached EPA Engine Certification

Hourly CO = 1.80 g/kW-hr * 20 kW * 1 lb/453.592g = 0.08 lb/hr

Annual CO = 0.08 lb/hr * 8760 hr/yr * 1ton/2000lbs = 0.35 ton/yr

PM - on the attached EPA Engine Certification

Hourly PM = 0.25 g/kW-hr * 20 kW * 1 lb/453.592g = 0.01 lb/hr

Annual PM = 0.01 lb/hr * 8760 hr/yr * 1ton/2000 lb = 0.03 ton/yr

HC - included with Nox calc.

Hourly HC

Annual HC

VOC - AP42

Per AP-42 Table 3.3-1, the emission factor of #2 Diesel Fuel is 0.00247 lb/hp-hr

Hourly VOC = 0.00247 lb/hp-hr * 26 bhp = 0.06 lb/hr

Yearly VOC = 0.06 lb/hr * 8760 hr/yr * 1 ton/2000 lb = 0.26 ton/yr

SO_x - AP42

Per AP-42 Table 3.3-1, the emission factor of #2 Diesel Fuel is 0.00205 lb/hp-hr

Hourly SO₂ = 0.00205 lb/hp-hr * 26 bhp = 0.05 lb/hr

Yearly SO₂ = 0.05 lb/hr * 8760 hr/yr * 1ton/2000 lb = 0.23 ton/yr

Formaldehyde - AP42

Per AP-42 Table 3.3-2, the emission factor of #2 Diesel Fuel is 0.00118 lb/hp-hr

Hourly VOC = 0.00118 lb/hp-hr * 26 bhp = 0.03 lb/hr

Yearly formaldehyde = 0.03 lb/hr * 8760 hr/yr * 1ton/2000 lb = 0.13 ton/yr

STATEMENT OF EXHAUST EMISSIONS

2017 GENERAC DIESEL FUELED GENERATOR

The measured emissions values provided here are proprietary to Generac and its authorized dealers. This information may only be disseminated upon request, to regulatory governmental bodies for emissions permitting purposes or to specifying organizations as submittal data when expressly required by project specifications, and shall remain confidential and not open to public viewing. This information is not intended for compilation or sales purposes and may not be used as such, nor may it be reproduced without the expressed written permission of Generac Power Systems, Inc. The data provided shall not be meant to include information made public by Generac.

| | | | |
|-----------------------------|--------------------------|-----------------------------|--------------------------------------|
| Generator Model: | SD020 | EPA Certificate Number: | HKMCL2.39A45-010 |
| kW _e Rating: | 20 | CARB Certificate Number: | Not Required |
| Engine Family: | HKMCL2.39A45 | SCAQMD CEP Number: | Not Required |
| Engine Model: | A2400T-Gen1 | Emission Standard Category: | Tier 4 Interim |
| Rated Engine Power (BHP)*: | 49 | Certification Type: | Stationary Emergency CI |
| Fuel Consumption (gal/hr)*: | 2.74 | | (40 CFR Part 60 Subpart IIII) |
| Aspiration: | Turbo/Aftercooled | | |
| Rated RPM: | 1800 | | |

*Engine Power and Fuel Consumption are declared by the Engine Manufacturer of Record and the U.S. EPA.

Emissions based on engine power of specific Engine Model.
(These values are actual composite weighted exhaust emissions results over the EPA 5-mode test cycle.)

| CO | NOx + NMHC | PM | |
|-------------|-------------|-------------|--------------|
| 1.80 | 4.30 | 0.25 | Grams/kW-hr |
| 1.34 | 3.21 | 0.19 | Grams/bhp-hr |

- The stated values are actual exhaust emission test measurements obtained from an engine representative of the type described above.
- Values based on 5mode testing are official data of record as submitted to regulatory agencies for certification purposes. Testing was conducted in accordance with prevailing EPA protocol, which is typically accepted by SCAQMD and other regional authorities.
- No emissions values provided above are to be construed as guarantees of emission levels for any given Generac generator unit.
- Generac Power Systems, Inc. reserves the right to revise this information without prior notice.
- Consult state and local regulatory agencies for specific permitting requirements.
- The emission performance data supplied by the equipment manufacturer is only one element required toward completion of the permitting and installation process. State and local regulations may vary on a case-by-case basis and local agencies must be consulted by the permit application/equipment owner prior to equipment purchase or installation. The data supplied herein by Generac Power Systems cannot be construed as a guarantee of installability of the generating set.



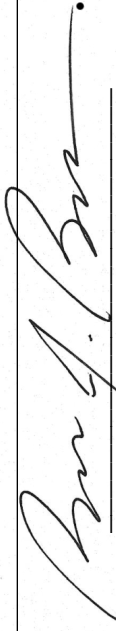
**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2017 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT**

**OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105**

Mead & Hunt Inc.

Certificate Issued To: **KUKJE MACHINERY CO., LTD**
(U.S. Manufacturer or Importer)
Certificate Number: **HKMCL2.28A46-007**

Effective Date:
10/25/2016
Expiration Date:
12/31/2017


Byron J. Bunker, Division Director
Compliance Division

Issue Date:
10/25/2016
Revision Date:
N/A

Model Year: 2017
Manufacturer Type: Original Engine Manufacturer
Engine Family: HKMCL2.28A46

Mobile/Stationary Indicator: Stationary
Emissions Power Category: 19<=kW<37
Fuel Type: Diesel
After Treatment Devices: No After Treatment Devices Installed
Non-after Treatment Devices: No Non-After Treatment Devices Installed

Pursuant to Section 111 and Section 213 of the Clean Air Act (42 U.S.C. sections 7411 and 7547) and 40 CFR Part 60, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 60 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 60 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 60.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 60. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 60.

This certificate does not cover engines sold, offered for sale, or introduced, or delivered for introduction, into commerce in the U.S. prior to the effective date of the certificate.

