



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

20 January 2016

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

Re: Permit Determination Form – CH159 Jim Ridge Tower
Ntelos Wireless
Given, WV
Project Number: R4022000-160367.01

Dear Assistant Director:

Ntelos Wireless is submitting a Permit Determination Form application for its existing CH159 Jim Ridge tower site (ID#: 079-00176) near Given, Putnam County, West Virginia. The tower site has a diesel generator enclosed in a shelter, which was permitted under G65-C415. The generator is utilized for reserve power during peak capacity and emergency power losses. It is anticipated that the generator's 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.

Once the emissions levels in this PDF submittal are accepted, Ntelos would like to terminate permit G65-C415.

One hard copy and two disc copies of the Permit Determination Form are enclosed. If you have questions, please contact me at 681-313-4617. Thank you for your attention in this matter.

Very truly yours,

A handwritten signature in blue ink, reading 'Teresa A. Schuller', on a yellow rectangular background.

Teresa A. Schuller
Sr. Environmental Project Manager

Enclosure: one hard copy and two CDs of Permit Determination Form

**AIR PERMIT DETERMINATION
CH159 JIM RIDGE TOWER
Given, Putnam County, WV**



Prepared For:
Ntelos
500 Summer Street
Charleston, WV 25301

Date: 20 January 2016



Prepared By:
Mead & Hunt, Inc
400 Tracy Way, Suite 200
Charleston, West Virginia 25311



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):

WV Alliance, LC, dba Ntelos

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

CH159 Jim Ridge Tower

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

36630104

4A. MAILING ADDRESS:

500 Summers Street
Charleston, WV 25301

4B. PHYSICAL ADDRESS:

5286 Jim Ridge Road
Given, WV 25245

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE MAP AS ATTACHMENT A):

From Charleston WV: I-64 West to North I-77 to exit 119 (CR 21) toward Goldtown. Turn left onto CR21 to a left onto WV34 south; then a slight right onto CR 23/14. Continue onto 18 Mile Right Fork (CR 11/8) until it becomes David Ridge Road (CR 1/1). Turn right onto CR5/1 (Riffe Ridge Road) for 2.1 miles and then a left turn onto Jim Ridge Road (CR 5). After one mile, turn left onto existing dirt road (N 38-40-0.63; W 81-47-01.12). Access begins at the beginning of existing dirt road.

5B. NEAREST ROAD:

Jim Ridge Road

5C. NEAREST CITY OR TOWN:

Given

5D. COUNTY:

Putnam

5E. UTM NORTHING (KM):

4280147

5F. UTM EASTING (KM):

431873

5G. UTM ZONE:

17S

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

Stacey Dreyer

6B. TITLE:

Manager RF Performance and
Operations

6C. TELEPHONE:

304-415-6711

6D. FAX:

6E. E-MAIL:

dreyers@nrtelos.com

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

079 - 00176

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

G65-C415

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:

1/4/16

10B. DATE OF ANTICIPATED START-UP:

1/4/16

11A. PLEASE PROVIDE A DETAILED PROCESS FLOW DIAGRAM SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS ATTACHMENT B. **Diesel generator set at the tower site, see Attachment B.**

11B. PLEASE PROVIDE A DETAILED PROCESS DESCRIPTION AS ATTACHMENT C. **Terminate permit G65-C415 due to PDF emission limits.**

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	0.0097	0.042
PM ₁₀	0.073	0.031
VOCs	0.09	0.39
CO	0.37	1.62
NO _x	0.23	1.01
SO ₂	0.08	0.35
Pb	-	-
HAPs (AGGREGATE AMOUNT)	Formaldehyde 0.04	Formaldehyde 0.17
TAPs (INDIVIDUALLY)*	-	-
OTHER (INDIVIDUALLY)*		

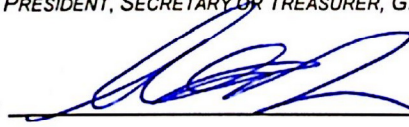
* ATTACH ADDITIONAL PAGES AS NEEDED

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, STACEY DREYER 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: Manager RF Performance and Operations

DATE: 1 / 19 / 2016

** 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

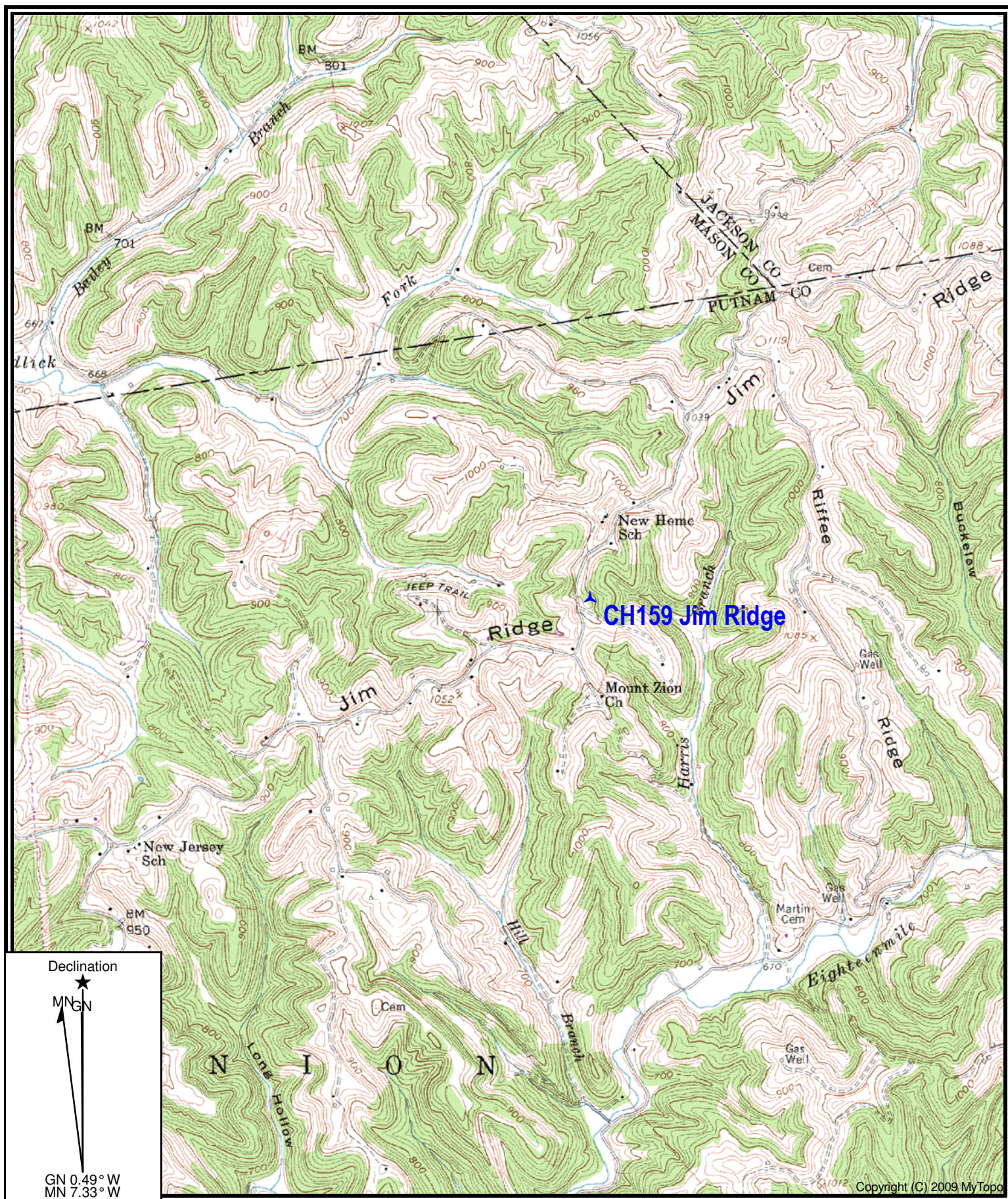
RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

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: ELMWOOD
Print Date: 10/1/11

Scale: 1 inch = 2,000 ft.
Horizontal Datum: NAD83

Date Photo Revised: 1975
Date Published: 10/1/2016

Attachment B

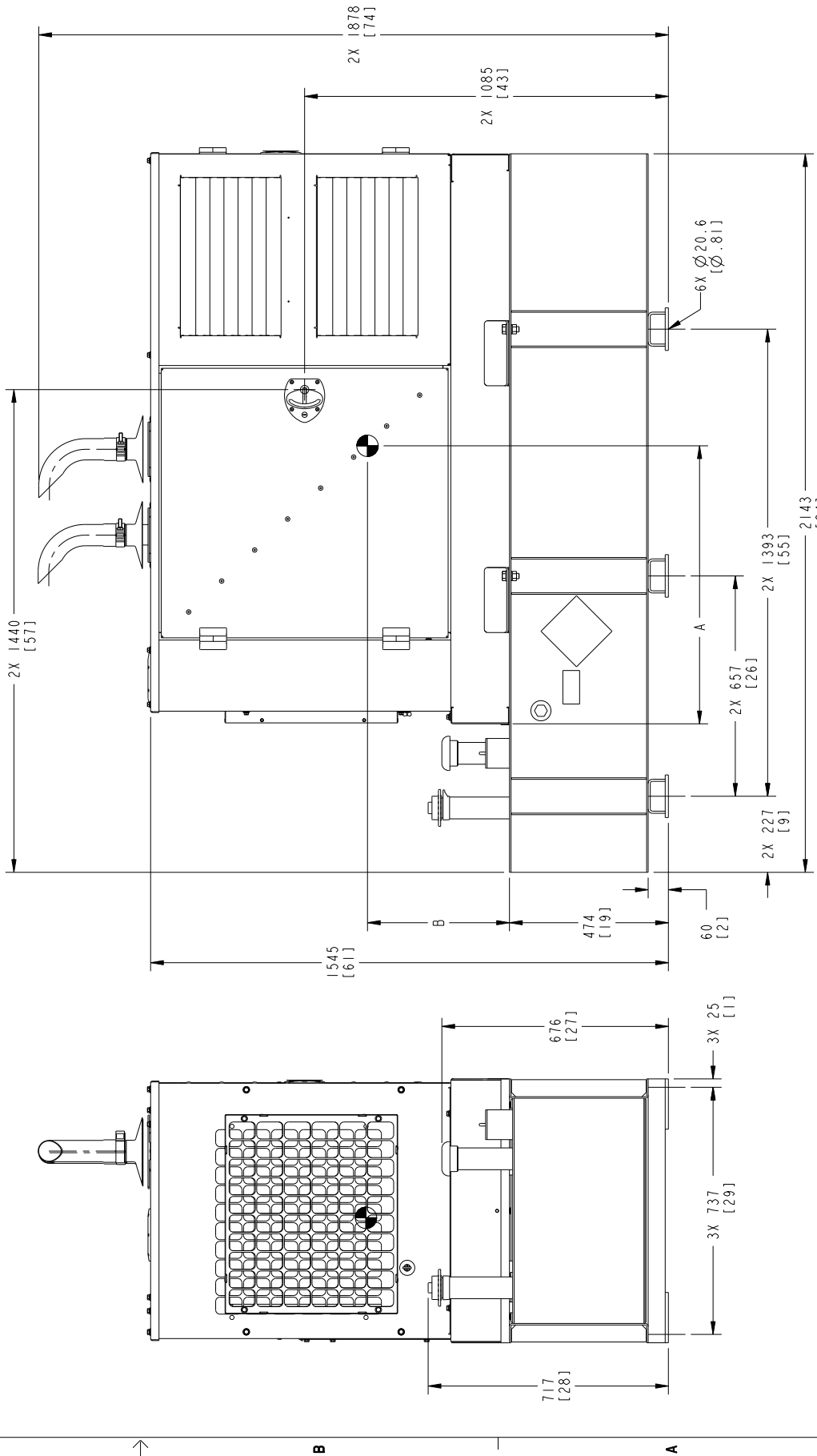
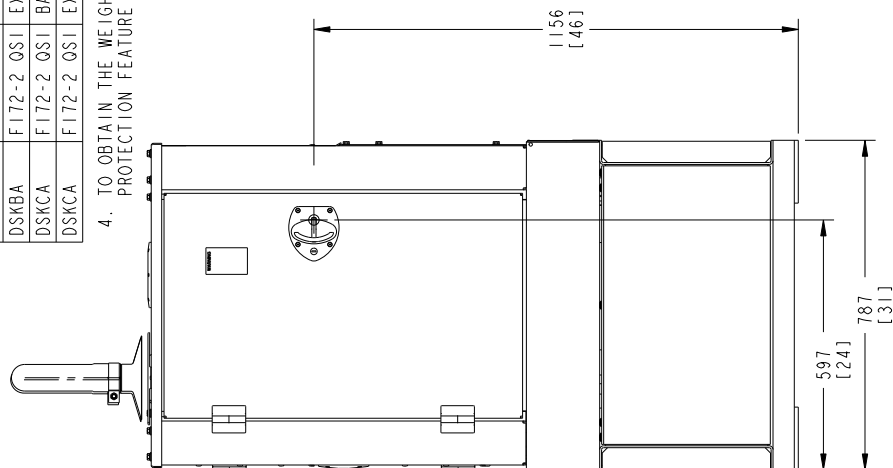
Process Flow Diagram

REF. NO.	LTR	NO	REVISION	OWN	CAD	APPRO.	DATE
ECO-106777	G	1	UPDATE DRAWING TO REFLECT NEW TANK	TLD	ZM	Z MOGES	11SEP9

1. DIMENSIONS IN [] ARE IN INCHES.

-

TABULATION						
MODEL	FEATURE CODE	COMPLETE GENSET	WEIGHT kgs [LBS]	CENTER OF GRAVITY		
				DIM A	DIM B	
DSKAA/AB	F182-2	BASE GENERATOR	801 [1766]	784 [30.9]	277 [10.9]	
	F182-2	EXTENDED STACK	820 [1808]	797 [31.4]	279 [11.0]	
	F182-2	BASE GENERATOR	860 [1896]	796 [31.3]	276 [10.9]	
	F182-2	EXTENDED STACK	881 [1942]	814 [32.0]	278 [10.9]	
DSKBA	F182-2	BASE GENERATOR	883 [1947]	742 [29.2]	283 [11.1]	
	F182-2	EXTENDED STACK	910 [2006]	772 [30.4]	285 [11.2]	
	F216-2	BASE GENERATOR	739 [1629]	777 [30.6]	244 [9.6]	
	F216-2	EXTENDED STACK	758 [1671]	791 [31.1]	247 [9.7]	
DSKAA/AB	F216-2	BASE GENERATOR	798 [1759]	791 [31.1]	246 [9.7]	
	F216-2	EXTENDED STACK	819 [1806]	810 [31.9]	249 [9.8]	
	F216-2	BASE GENERATOR	821 [1810]	732 [28.8]	254 [10.0]	
	F216-2	EXTENDED STACK	848 [1870]	765 [30.1]	258 [10.2]	
DSKCA	F172-2 OSI	BASE GENERATOR	814 [1794]	780 [30.7]	292 [11.5]	
	F172-2 OSI	EXTENDED STACK	833 [1836]	793 [31.2]	294 [11.6]	
	F172-2 OSI	BASE GENERATOR	873 [1925]	792 [31.2]	291 [11.4]	
	F172-2 OSI	EXTENDED STACK	894 [1971]	810 [31.9]	292 [11.5]	
DSKBA	F172-2 OSI	BASE GENERATOR	896 [1975]	738 [29.0]	297 [11.7]	
	F172-2 OSI	EXTENDED STACK	923 [2035]	769 [30.3]	299 [11.8]	

[illegible]

Part A014X645 G

Description	Legacy Name	External Regulations	Application Status	Release Phase Code	Security Classification	Alternates
OUTLINE,TANK	0500-4952	None	Production & Service	Production	Proprietary	

Part Specifications :A014X645 G

Name	Description	Legacy Name
A018E168	DRAWING,INSTALLATION	0500-4952

Attachment C

Process Description

ATTACHMENT C: PROCESS DESCRIPTION

The installation will be a Cummins, Tier 4 Diesel generator set, Model DSKBA. 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 not 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 generator room has a spill containment pan that is rated at 125% of the fuel stored in the diesel generator.
- 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.

Attachment D

MSDS for Diesel Fuel

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 1 of 14

SAFETY DATA SHEET

SECTION 1 PRODUCT AND COMPANY IDENTIFICATION

PRODUCT

Product Name: NO. 2 DIESEL FUEL**Product Description:** Hydrocarbons and Additives**Product Code:** 123455-22, 123455-29, 152017-00**Intended Use:** Diesel engine fuel, Heating Oil

COMPANY IDENTIFICATION

Supplier: EXXON MOBIL CORPORATION

3225 GALLOWS RD.

FAIRFAX, VA. 22037

USA

24 Hour Health Emergency

609-737-4411

Transportation Emergency Phone

800-424-9300 or 703-527-3887 CHEMTREC

Product Technical Information

800-662-4525

MSDS Internet Address<http://www.exxon.com>, <http://www.mobil.com>

SECTION 2 HAZARDS IDENTIFICATION

This material is hazardous according to regulatory guidelines (see (M)SDS Section 15).

CLASSIFICATION:

Flammable liquid: Category 3.

Acute inhalation toxicant: Category 4. Skin irritation: Category 2. Carcinogen: Category 2. Specific target organ toxicant (repeated exposure): Category 2. Aspiration toxicant: Category 1.

LABEL:

Pictogram:**Signal Word:** Danger

Hazard Statements:

H226: Flammable liquid and vapor. H304: May be fatal if swallowed and enters airways. H315: Causes skin irritation. H332: Harmful if inhaled. H351: Suspected of causing cancer. H373: May cause damage to organs through prolonged or repeated exposure. Liver, Bone marrow, Thymus

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 2 of 14

Precautionary Statements:

P101: If medical advice is needed, have product container or label at hand. P102: Keep out of reach of children. P103: Read label before use. P201: Obtain special instructions before use. P202: Do not handle until all safety precautions have been read and understood. P210: Keep away from heat/sparks/open flames/hot surfaces. -- No smoking. P233: Keep container tightly closed. P240: Ground / bond container and receiving equipment. P241: Use explosion-proof electrical, ventilating, and lighting equipment. P242: Use only non-sparking tools. P243: Take precautionary measures against static discharge. P260: Do not breathe mist / vapours. P264: Wash skin thoroughly after handling. P271: Use only outdoors or in a well-ventilated area. P273: Avoid release to the environment. P280: Wear protective gloves/protective clothing/eye protection/face protection. P301 + P310: IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P302 + P352: IF ON SKIN: Wash with plenty of soap and water. P304 + P340: IF INHALED: Remove person to fresh air and keep comfortable for breathing. P308 + P313: IF exposed or concerned: Get medical advice/ attention. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P331: Do NOT induce vomiting. P332 + P313: If skin irritation occurs: Get medical advice/ attention. P362 + P364: Take off contaminated clothing and wash it before reuse. P370 + P378: In case of fire: Use water fog, foam, dry chemical or carbon dioxide (CO2) to extinguish. P391: Collect spillage. P403 + P235: Store in a well-ventilated place. Keep cool. P405: Store locked up. P501: Dispose of contents and container in accordance with local regulations.

Contains: DIESEL OIL..C9-20

Other hazard information:

HAZARD NOT OTHERWISE CLASSIFIED (HNOC): None as defined under 29 CFR 1900.1200.

PHYSICAL / CHEMICAL HAZARDS

Material can accumulate static charges which may cause an ignition. Material can release vapors that readily form flammable mixtures. Vapor accumulation could flash and/or explode if ignited.

HEALTH HAZARDS

May cause central nervous system depression. High-pressure injection under skin may cause serious damage. Under conditions of poor personal hygiene and prolonged repeated contact, some polycyclic aromatic compounds (PACs) have been suspected as a cause of skin cancer in humans. May be irritating to the eyes, nose, throat, and lungs.

ENVIRONMENTAL HAZARDS

Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

NFPA Hazard ID:	Health: 2	Flammability: 2	Reactivity: 0
HMIS Hazard ID:	Health: 2*	Flammability: 2	Reactivity: 0

NOTE: This material should not be used for any other purpose than the intended use in Section 1 without expert advice. Health studies have shown that chemical exposure may cause potential human health risks which may vary from person to person.

SECTION 3	COMPOSITION / INFORMATION ON INGREDIENTS
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This material is defined as a mixture.

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 3 of 14

Hazardous Substance(s) or Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
DIESEL OIL..C9-20	68334-30-5	80 - > 99%	H226, H304, H332, H351, H315, H373, H401, H411

Hazardous Constituent(s) Contained in Complex Substance(s) required for disclosure

Name	CAS#	Concentration*	GHS Hazard Codes
ETHYL BENZENE	100-41-4	0.1 - 1%	H225, H332, H351
NAPHTHALENE	91-20-3	0.1 - 1%	H302, H351, H400(M factor 1), H410(M factor 1)

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

NOTE: Composition may contain up to 0.5% performance additives and / or dyes.

As per paragraph (i) of 29 CFR 1910.1200, formulation is considered a trade secret and specific chemical identity and exact percentage (concentration) of composition may have been withheld. Specific chemical identity and exact percentage composition will be provided to health professionals, employees, or designated representatives in accordance with applicable provisions of paragraph (i).

SECTION 4

FIRST AID MEASURES

INHALATION

Remove from further exposure. For those providing assistance, avoid exposure to yourself or others. Use adequate respiratory protection. If respiratory irritation, dizziness, nausea, or unconsciousness occurs, seek immediate medical assistance. If breathing has stopped, assist ventilation with a mechanical device or use mouth-to-mouth resuscitation.

SKIN CONTACT

Remove contaminated clothing. Dry wipe exposed skin and cleanse with waterless hand cleaner and follow by washing thoroughly with soap and water. For those providing assistance, avoid further skin contact to yourself or others. Wear impervious gloves. Launder contaminated clothing separately before reuse. Discard contaminated articles that cannot be laundered. If product is injected into or under the skin, or into any part of the body, regardless of the appearance of the wound or its size, the individual should be evaluated immediately by a physician as a surgical emergency. Even though initial symptoms from high pressure injection may be minimal or absent, early surgical treatment within the first few hours may significantly reduce the ultimate extent of injury.

EYE CONTACT

Flush thoroughly with water. If irritation occurs, get medical assistance.

INGESTION

Seek immediate medical attention. Do not induce vomiting.

NOTE TO PHYSICIAN

If ingested, material may be aspirated into the lungs and cause chemical pneumonitis. Treat appropriately.

PRE-EXISTING MEDICAL CONDITIONS WHICH MAY BE AGGRAVATED BY EXPOSURE

Contains hydrocarbon solvent/petroleum hydrocarbons; skin contact may aggravate an existing dermatitis.

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 4 of 14

SECTION 5 FIRE FIGHTING MEASURES

EXTINGUISHING MEDIA

Appropriate Extinguishing Media: Use water fog, foam, dry chemical or carbon dioxide (CO₂) to extinguish flames.

Inappropriate Extinguishing Media: Straight Streams of Water

FIRE FIGHTING

Fire Fighting Instructions: Evacuate area. Prevent runoff from fire control or dilution from entering streams, sewers, or drinking water supply. Firefighters should use standard protective equipment and in enclosed spaces, self-contained breathing apparatus (SCBA). Use water spray to cool fire exposed surfaces and to protect personnel.

Unusual Fire Hazards: Hazardous material. Firefighters should consider protective equipment indicated in Section 8.

Hazardous Combustion Products: Sulfur oxides, Oxides of carbon, Incomplete combustion products, Smoke, Fume, Aldehydes

FLAMMABILITY PROPERTIES

Flash Point [Method]: >38 °C (100 °F) [ASTM D-93]

Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0

Autoignition Temperature: >200 °C (392 °F)

SECTION 6 ACCIDENTAL RELEASE MEASURES

NOTIFICATION PROCEDURES

In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations. US regulations require reporting releases of this material to the environment which exceed the applicable reportable quantity or oil spills which could reach any waterway including intermittent dry creeks. The National Response Center can be reached at (800)424-8802.

PROTECTIVE MEASURES

Avoid contact with spilled material. Warn or evacuate occupants in surrounding and downwind areas if required due to toxicity or flammability of the material. See Section 5 for fire fighting information. See the Hazard Identification Section for Significant Hazards. See Section 4 for First Aid Advice. See Section 8 for advice on the minimum requirements for personal protective equipment. Additional protective measures may be necessary, depending on the specific circumstances and/or the expert judgment of the emergency responders.

For emergency responders: Respiratory protection: half-face or full-face respirator with filter(s) for organic vapor and, when applicable, H₂S, or Self Contained Breathing Apparatus (SCBA) can be used depending on the size of spill and potential level of exposure. If the exposure cannot be completely characterized or an oxygen deficient atmosphere is possible or anticipated, SCBA is recommended. Work gloves that are resistant to aromatic hydrocarbons are recommended. Note: gloves made of polyvinyl acetate (PVA) are not water-resistant and are not suitable for emergency use. Chemical goggles are recommended if splashes or contact with eyes is possible. Small spills: normal antistatic work clothes are usually adequate. Large spills: full body suit of chemical resistant, antistatic material is recommended.

SPILL MANAGEMENT

Land Spill: Eliminate all ignition sources (no smoking, flares, sparks or flames in immediate area). Stop leak

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 5 of 14

if you can do it without risk. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Prevent entry into waterways, sewer, basements or confined areas. A vapor suppressing foam may be used to reduce vapors. Use clean non-sparking tools to collect absorbed material. Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers. Large Spills: Water spray may reduce vapor; but may not prevent ignition in closed spaces.

Water Spill: Stop leak if you can do it without risk. Eliminate sources of ignition. Warn other shipping. If the Flash Point exceeds the Ambient Temperature by 10 degrees C or more, use containment booms and remove from the surface by skimming or with suitable absorbents when conditions permit. If the Flash Point does not exceed the Ambient Air Temperature by at least 10C, use booms as a barrier to protect shorelines and allow material to evaporate. Seek the advice of a specialist before using dispersants.

Water spill and land spill recommendations are based on the most likely spill scenario for this material; however, geographic conditions, wind, temperature, (and in the case of a water spill) wave and current direction and speed may greatly influence the appropriate action to be taken. For this reason, local experts should be consulted. Note: Local regulations may prescribe or limit action to be taken.

ENVIRONMENTAL PRECAUTIONS

Large Spills: Dike far ahead of liquid spill for later recovery and disposal. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7

HANDLING AND STORAGE

HANDLING

Avoid all personal contact. Do not siphon by mouth. Do not use as a cleaning solvent or other non-motor fuel uses. For use as a motor fuel only. It is dangerous and/or unlawful to put fuel into unapproved containers. Do not fill container while it is in or on a vehicle. Static electricity may ignite vapors and cause fire. Place container on ground when filling and keep nozzle in contact with container. Do not use electronic devices (including but not limited to cellular phones, computers, calculators, pagers or other electronic devices, etc.) in or around any fueling operation or storage area unless the devices are certified intrinsically safe by an approved national testing agency and to the safety standards required by national and/or local laws and regulations. Prevent small spills and leakage to avoid slip hazard. Material can accumulate static charges which may cause an electrical spark (ignition source). Use proper bonding and/or ground procedures. However, bonding and grounds may not eliminate the hazard from static accumulation. Consult local applicable standards for guidance. Additional references include American Petroleum Institute 2003 (Protection Against Ignitions Arising out of Static, Lightning and Stray Currents) or National Fire Protection Agency 77 (Recommended Practice on Static Electricity) or CENELEC CLC/TR 50404 (Electrostatics - Code of practice for the avoidance of hazards due to static electricity).

Static Accumulator: This material is a static accumulator. A liquid is typically considered a nonconductive, static accumulator if its conductivity is below 100 pS/m (100×10^{-12} Siemens per meter) and is considered a semiconductive, static accumulator if its conductivity is below 10,000 pS/m. Whether a liquid is nonconductive or semiconductive, the precautions are the same. A number of factors, for example liquid temperature, presence of contaminants, anti-static additives and filtration can greatly influence the conductivity of a liquid.

STORAGE

The container choice, for example storage vessel, may effect static accumulation and dissipation. Keep container closed. Handle containers with care. Open slowly in order to control possible pressure release. Store in a cool, well-ventilated area. Storage containers should be grounded and bonded. Fixed storage containers, transfer containers and associated equipment should be grounded and bonded to prevent accumulation of static charge. Keep away from incompatible materials.

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 6 of 14

SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE LIMIT VALUES

Exposure limits/standards (Note: Exposure limits are not additive)

Substance Name	Form	Limit / Standard			NOTE	Source
DIESEL OIL..C9-20	Stable Aerosol.	TWA	5 mg/m3		N/A	ExxonMobil
DIESEL OIL..C9-20	Vapor.	TWA	200 mg/m3		N/A	ExxonMobil
DIESEL OIL..C9-20 [total hydrocarb, vapor&aerosol]	Inhalable fraction and vapor	TWA	100 mg/m3		Skin	ACGIH
ETHYL BENZENE		TWA	435 mg/m3	100 ppm	N/A	OSHA Z1
ETHYL BENZENE		TWA	20 ppm		N/A	ACGIH
NAPHTHALENE		TWA	50 mg/m3	10 ppm	N/A	OSHA Z1
NAPHTHALENE		TWA	10 ppm		Skin	ACGIH

NOTE: Limits/standards shown for guidance only. Follow applicable regulations.

Biological limits

Substance	Specimen	Sampling Time	Limit	Determinant	Source
ETHYL BENZENE	Creatinine in urine	End of shift	0.15 g/g	Sum of mandelic acid and phenylglyoxylic acid	ACGIH BELs (BELs)
NAPHTHALENE	No Biological Specimen provided	End of shift	Not Assigned	1-Naphthol, with hydrolysis + 2-Naphthol, with hydrolysis	ACGIH BELs (BELs)

ENGINEERING CONTROLS

The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Control measures to consider:

Use explosion-proof ventilation equipment to stay below exposure limits.

PERSONAL PROTECTION

Personal protective equipment selections vary based on potential exposure conditions such as applications, handling practices, concentration and ventilation. Information on the selection of protective equipment for use with this material, as provided below, is based upon intended, normal usage.

Respiratory Protection: If engineering controls do not maintain airborne contaminant concentrations at a level which is adequate to protect worker health, an approved respirator may be appropriate. Respirator selection, use, and maintenance must be in accordance with regulatory requirements, if applicable. Types of respirators to be considered for this material include:

Half-face filter respirator

For high airborne concentrations, use an approved supplied-air respirator, operated in positive pressure mode. Supplied air respirators with an escape bottle may be appropriate when oxygen levels are inadequate, gas/vapor warning properties are poor, or if air purifying filter capacity/rating may be exceeded.

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 7 of 14

Hand Protection: Any specific glove information provided is based on published literature and glove manufacturer data. Glove suitability and breakthrough time will differ depending on the specific use conditions. Contact the glove manufacturer for specific advice on glove selection and breakthrough times for your use conditions. Inspect and replace worn or damaged gloves. The types of gloves to be considered for this material include:

Chemical resistant gloves are recommended. If contact with forearms is likely wear gauntlet style gloves.

Eye Protection: If contact with material is likely, chemical goggles are recommended.

Skin and Body Protection: Any specific clothing information provided is based on published literature or manufacturer data. The types of clothing to be considered for this material include:

Chemical/oil resistant clothing is recommended.

Specific Hygiene Measures: Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping.

ENVIRONMENTAL CONTROLS

Comply with applicable environmental regulations limiting discharge to air, water and soil. Protect the environment by applying appropriate control measures to prevent or limit emissions.

SECTION 9

PHYSICAL AND CHEMICAL PROPERTIES

Note: Physical and chemical properties are provided for safety, health and environmental considerations only and may not fully represent product specifications. Contact the Supplier for additional information.

GENERAL INFORMATION

Physical State: Liquid

Color: Clear (May Be Dyed)

Odor: Petroleum/Solvent

Odor Threshold: N/D

IMPORTANT HEALTH, SAFETY, AND ENVIRONMENTAL INFORMATION

Relative Density (at 15 °C): 0.81 - 0.87

Density (at 15 °C): 810 kg/m³ (6.76 lbs/gal, 0.81 kg/dm³) - 876 kg/m³ (7.31 lbs/gal, 0.88 kg/dm³)

Flammability (Solid, Gas): N/A

Flash Point [Method]: >38°C (100°F) [ASTM D-93]

Flammable Limits (Approximate volume % in air): LEL: 0.6 UEL: 7.0

Autoignition Temperature: >200°C (392°F)

Boiling Point / Range: 145°C (293°F) - 370°C (698°F)

Decomposition Temperature: N/D

Vapor Density (Air = 1): > 2 at 101 kPa

Vapor Pressure: 0.067 kPa (0.5 mm Hg) at 20 °C

Evaporation Rate (n-butyl acetate = 1): N/D

pH: N/A

Log Pow (n-Octanol/Water Partition Coefficient): > 3.5

Solubility in Water: Negligible

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 8 of 14

Viscosity: 1.7 cSt (1.7 mm²/sec) at 40 °C - 4.1 cSt (4.1 mm²/sec) at 40 °C

Oxidizing Properties: See Hazards Identification Section.

OTHER INFORMATION

Freezing Point: N/D

Melting Point: N/A

Pour Point: < -6°C (21 °F)

SECTION 10 STABILITY AND REACTIVITY

REACTIVITY: See sub-sections below.

STABILITY: Material is stable under normal conditions.

CONDITIONS TO AVOID: Open flames and high energy ignition sources.

MATERIALS TO AVOID: Halogens, Strong Acids, Strong Bases, Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS: Material does not decompose at ambient temperatures.

POSSIBILITY OF HAZARDOUS REACTIONS: Hazardous polymerization will not occur.

SECTION 11 TOXICOLOGICAL INFORMATION

INFORMATION ON TOXICOLOGICAL EFFECTS

Hazard Class	Conclusion / Remarks
Inhalation	
Acute Toxicity (Rat): 4 hour(s) LC50 4100 mg/m ³ (Vapor and aerosol)	Moderately toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 403
Irritation: No end point data for material.	Elevated temperatures or mechanical action may form vapors, mist, or fumes which may be irritating to the eyes, nose, throat, or lungs.
Ingestion	
Acute Toxicity (Rat): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 401
Skin	
Acute Toxicity (Rabbit): LD50 > 5000 mg/kg	Minimally Toxic. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 434
Skin Corrosion/Irritation (Rabbit): Data available.	Irritating to the skin. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 404
Eye	
Serious Eye Damage/Irritation (Rabbit): Data available.	May cause mild, short-lasting discomfort to eyes. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 405
Sensitization	
Respiratory Sensitization: No end point data for material.	Not expected to be a respiratory sensitizer.
Skin Sensitization: Data available.	Not expected to be a skin sensitizer. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 406
Aspiration: Data available.	May be fatal if swallowed and enters airways. Based on physico-chemical properties of the material.

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 9 of 14

Germ Cell Mutagenicity: Data available.	Not expected to be a germ cell mutagen. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 471 475
Carcinogenicity: Data available.	Caused cancer in laboratory animals, but the relevance to humans is uncertain. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 451
Reproductive Toxicity: Data available.	Not expected to be a reproductive toxicant. Test(s) equivalent or similar to OECD Guideline 414
Lactation: No end point data for material.	Not expected to cause harm to breast-fed children.
Specific Target Organ Toxicity (STOT)	
Single Exposure: No end point data for material.	Not expected to cause organ damage from a single exposure.
Repeated Exposure: Data available.	Concentrated, prolonged or deliberate exposure may cause organ damage. Based on test data for structurally similar materials. Test(s) equivalent or similar to OECD Guideline 410 413

TOXICITY FOR SUBSTANCES

NAME	ACUTE TOXICITY
ETHYL BENZENE	Inhalation Lethality: 4 hour(s) LC50 17.8 mg/l (Vapor) (Rat); Oral Lethality: LD50 3.5 g/kg (Rat)
NAPHTHALENE	Inhalation Lethality: 4 hour(s) LC50 > 0.4 mg/l (Max attainable vapor conc.) (Rat); Oral Lethality: LD50 533 mg/kg (Mouse)

OTHER INFORMATION

For the product itself:

Target Organs Repeated Exposure: Liver, Bone marrow, Thymus

Vapor concentrations above recommended exposure levels are irritating to the eyes and the respiratory tract, may cause headaches and dizziness, are anesthetic and may have other central nervous system effects. Small amounts of liquid aspirated into the lungs during ingestion or from vomiting may cause chemical pneumonitis or pulmonary edema.

Diesel fuel: Caused cancer in animal tests. Caused mutations in vitro. 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.

Diesel exhaust fumes: Carcinogenic in animal tests. Inhalation exposures to exhaust for 2 years in test animals resulted in lung tumors and lymphoma. Extract of particulate produced skin tumors in test animals. Caused mutations in vitro.

Contains:

NAPHTHALENE: Exposure to high concentrations of naphthalene may cause destruction of red blood cells, anemia, and cataracts. Naphthalene caused cancer in laboratory animal studies, but the relevance of these findings to humans is uncertain.

ETHYLBENZENE: Caused cancer in laboratory animal studies. The relevance of these findings to humans is uncertain.

The following ingredients are cited on the lists below:

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 10 of 14

Chemical Name	CAS Number	List Citations
ETHYL BENZENE	100-41-4	5
NAPHTHALENE	91-20-3	2, 5

--REGULATORY LISTS SEARCHED--

1 = NTP CARC

3 = IARC 1

5 = IARC 2B

2 = NTP SUS

4 = IARC 2A

6 = OSHA CARC

SECTION 12 ECOLOGICAL INFORMATION

The information given is based on data available for the material, the components of the material, and similar materials.

ECOTOXICITY

Material -- Expected to be toxic to aquatic organisms. May cause long-term adverse effects in the aquatic environment.

MOBILITY

More volatile component -- Highly volatile, will partition rapidly to air. Not expected to partition to sediment and wastewater solids.

High molecular wt. component -- Low solubility and floats and is expected to migrate from water to the land. Expected to partition to sediment and wastewater solids.

PERSISTENCE AND DEGRADABILITY

Biodegradation:

Material -- Expected to be inherently biodegradable

Atmospheric Oxidation:

More volatile component -- Expected to degrade rapidly in air

ECOLOGICAL DATA

Ecotoxicity

Test	Duration	Organism Type	Test Results
Aquatic - Acute Toxicity	96 hour(s)	Fish	LL50 1 - 100 mg/l: data for similar materials
Aquatic - Acute Toxicity	48 hour(s)	Daphnia magna	EL50 1 - 1000 mg/l: data for similar materials
Aquatic - Acute Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	EL50 1 - 100 mg/l: data for similar materials
Aquatic - Chronic Toxicity	72 hour(s)	Pseudokirchneriella subcapitata	NOELR 1 - 10 mg/l: data for similar materials

Persistence, Degradability and Bioaccumulation Potential

Media	Test Type	Duration	Test Results
Water	Ready Biodegradability	28 day(s)	Percent Degraded < 60 :

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 11 of 14

		similar material
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SECTION 13

DISPOSAL CONSIDERATIONS

Disposal recommendations based on material as supplied. Disposal must be in accordance with current applicable laws and regulations, and material characteristics at time of disposal.

DISPOSAL RECOMMENDATIONS

Product is suitable for burning in an enclosed controlled burner for fuel value or disposal by supervised incineration at very high temperatures to prevent formation of undesirable combustion products.

REGULATORY DISPOSAL INFORMATION

RCRA Information: Disposal of unused product may be subject to RCRA regulations (40 CFR 261). Disposal of the used product may also be regulated due to ignitability, corrosivity, reactivity or toxicity as determined by the Toxicity Characteristic Leaching Procedure (TCLP). Potential RCRA characteristics: IGNITABILITY.

Empty Container Warning Empty Container Warning (where applicable): Empty containers may contain residue and can be dangerous. Do not attempt to refill or clean containers without proper instructions. Empty drums should be completely drained and safely stored until appropriately reconditioned or disposed. Empty containers should be taken for recycling, recovery, or disposal through suitably qualified or licensed contractor and in accordance with governmental regulations. DO NOT PRESSURISE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IGNITION. THEY MAY EXPLODE AND CAUSE INJURY OR DEATH.

SECTION 14

TRANSPORT INFORMATION

LAND (DOT)

Proper Shipping Name: DIESEL FUEL

Hazard Class & Division: COMBUSTIBLE LIQUID

ID Number: NA1993

Packing Group: III

Marine Pollutant: Yes

ERG Number: 128

Label(s): NONE

Transport Document Name: NA1993, DIESEL FUEL, COMBUSTIBLE LIQUID, PG III, MARINE POLLUTANT

Footnote: The flash point of this material is greater than 100 F. Regulatory classification of this material varies. DOT: Flammable liquid or combustible liquid. OSHA: Combustible liquid. IATA/IMO: Flammable liquid.

LAND (TDG)

Proper Shipping Name: GAS OIL

Hazard Class & Division: 3

UN Number: 1202

Packing Group: III

SEA (IMDG)

Proper Shipping Name: GAS OIL

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 12 of 14

Hazard Class & Division: 3
EMS Number: F-E, S-E
UN Number: 1202
Packing Group: III
Marine Pollutant: Yes
Label(s): 3
Transport Document Name: UN1202, GAS OIL, 3, PG III, (55°C c.c.), MARINE POLLUTANT

AIR (IATA)

Proper Shipping Name: GAS OIL
Hazard Class & Division: 3
UN Number: 1202
Packing Group: III
Label(s) / Mark(s): 3
Transport Document Name: UN1202, GAS OIL, 3, PG III

SECTION 15 REGULATORY INFORMATION

OSHA HAZARD COMMUNICATION STANDARD: This material is considered hazardous in accordance with OSHA HazCom 2012, 29 CFR 1910.1200.

Listed or exempt from listing/notification on the following chemical inventories: AICS, DSL, IECSC, KECI, PICCS, TSCA

EPCRA SECTION 302: This material contains no extremely hazardous substances.

CERCLA: This material is not subject to any special reporting under the requirements of the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Contact local authorities to determine if other reporting requirements apply.

SARA (311/312) REPORTABLE HAZARD CATEGORIES: Fire. Immediate Health. Delayed Health.

SARA (313) TOXIC RELEASE INVENTORY:

Chemical Name	CAS Number	Typical Value
NAPHTHALENE	91-20-3	0.1 - 1%
ETHYL BENZENE	100-41-4	0.1 - 1%

The following ingredients are cited on the lists below:

Chemical Name	CAS Number	List Citations
DIESEL OIL..C9-20	68334-30-5	1, 18
ETHYL BENZENE	100-41-4	1, 4, 10, 17, 19
NAPHTHALENE	91-20-3	1, 4, 10, 17, 19

Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 13 of 14

--REGULATORY LISTS SEARCHED--

1 = ACGIH ALL	6 = TSCA 5a2	11 = CA P65 REPRO	16 = MN RTK
2 = ACGIH A1	7 = TSCA 5e	12 = CA RTK	17 = NJ RTK
3 = ACGIH A2	8 = TSCA 6	13 = IL RTK	18 = PA RTK
4 = OSHA Z	9 = TSCA 12b	14 = LA RTK	19 = RI RTK
5 = TSCA 4	10 = CA P65 CARC	15 = MI 293	

Code key: CARC=Carcinogen; REPRO=Reproductive

SECTION 16	OTHER INFORMATION
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This warning is given to comply with California Health and Safety Code 25249.6 and does not constitute an admission or a waiver of rights. This product contains a chemical known to the State of California to cause cancer, birth defects, or other reproductive harm. Chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm are created by the combustion of this product.

N/D = Not determined, N/A = Not applicable

KEY TO THE H-CODES CONTAINED IN SECTION 3 OF THIS DOCUMENT (for information only):

H225: Highly flammable liquid and vapor; Flammable Liquid, Cat 2
H226: Flammable liquid and vapor; Flammable Liquid, Cat 3
H302: Harmful if swallowed; Acute Tox Oral, Cat 4
H304: May be fatal if swallowed and enters airways; Aspiration, Cat 1
H315: Causes skin irritation; Skin Corr/Irritation, Cat 2
H332: Harmful if inhaled; Acute Tox Inh, Cat 4
H351: Suspected of causing cancer; GHS Carcinogenicity, Cat 2
H373: May cause damage to organs through prolonged or repeated exposure; Target Organ, Repeated, Cat 2
H400: Very toxic to aquatic life; Acute Env Tox, Cat 1
H401: Toxic to aquatic life; Acute Env Tox, Cat 2
H410: Very toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 1
H411: Toxic to aquatic life with long lasting effects; Chronic Env Tox, Cat 2

THIS SAFETY DATA SHEET CONTAINS THE FOLLOWING REVISIONS:

Updates made in accordance with implementation of GHS requirements.

THIS MSDS COVERS THE FOLLOWING MATERIALS: DIESEL NO. 2 | ESSO DIESEL FUEL | EXXON DIESEL FUEL | LOW SULFUR DIESEL | MARINE DIESEL FUEL | MOBIL DIESEL FUEL | ULTRA LOW SULFUR DIESEL | WINTERIZED DIESEL FUEL

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Product Name: NO. 2 DIESEL FUEL

Revision Date: 09 Jan 2015

Page 14 of 14

Internal Use Only

MHC: 1A, 0B, 2, 0, 4, 1

PPEC: C

DGN: 7079307XUS (1012398)

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Attachment E

Calculations and Supporting Documents

Emissions Definitions Regarding Diesel Genset 20DSKBA Used in Cummins Power Generation
20 kW Stationary Gen Application Operation at 70% 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 attached
Since the motor meets Tier 3 requirements they emit no more than what is specified in
40 CFR §89.112, Table 1. For annual ACTUAL calculations, 500 hrs/year was used. The generator will be used intermittently.

NO_x + NHMC - on the attached EPA Engine Certification

Hourly NO_x = 5.2 g/kW-hr * 20 kW * 1 lb/453.592g = 0.23 lb/hr

Annual NO_x = 0.23 lb/hr * 500 hr/yr * 1 ton /2000lbs = 0.06 ton/yr

CO - on the attached EPA Engine Certification

Hourly CO = 1.0 g/kW-hr * 20 kW * 1 lb/453.592g = 0.37 lb/hr

Annual CO = 0.37 lb/hr * 500 hr/yr * 1ton/2000lbs = 0.09 ton/yr

PM - on the attached EPA Engine Certification

Hourly PM = 0.22 g/kW-hr * 20 kW * 1 lb/453.592g = 0.0097 lb/hr

Annual PM = 0.0097 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.0024 ton/yr

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 * 37.1 bhp = 0.09 lb/hr

Yearly VOC = 0.09 lb/hr * 500 hr/yr * 1 ton/2000 lb = 0.022 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 * 37.1 bhp = 0.08 lb/hr

Yearly SO₂ = 0.08 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.02 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 * 37.1 bhp = 0.04 lb/hr

Yearly formaldehyde = 0.04 lb/hr * 500 hr/yr * 1ton/2000 lb = 0.01 ton/yr

Emissions Definitions Regarding Diesel Genset 20DSKBA Used in Cummins Power Generation
20 kW Stationary Gen Application Operation at 70% 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 attached on Page 27. Since the motor meets Tier 3 requirements they emit no more than what is specified in 40 CFR §89.112, Table 1. **For annual POTENTIAL calculations, 8760 hrs/year was used. The generator will be used intermittently (<500 hrs/yr).**

NO_x + NHMC - on the attached EPA Engine Certification

Hourly NO_x = 5.2 g/kW-hr * 20 kW * 1 lb/453.592g = 0.23 lb/hr

Annual NO_x = 0.23 lb/hr * 8760 hr/yr * 1 ton /2000lbs = 1.01 ton/yr

CO - on the attached EPA Engine Certification

Hourly CO = 1.0 g/kW-hr * 20 kW * 1 lb/453.592g = 0.37 lb/hr

Annual CO = 0.37 lb/hr * 8760 hr/yr * 1ton/2000lbs = 1.62 ton/yr

PM - on the attached EPA Engine Certification

Hourly PM = 0.22 g/kW-hr * 20 kW * 1 lb/453.592g = 0.0097 lb/hr

Annual PM = 0.0097 lb/hr * 8760 hr/yr * 1ton/2000 lb= 0.042 ton/yr

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 * 37.1 bhp = 0.09 lb/hr

Yearly VOC = 0.165 lb/hr * 8760 hr/yr * 1 ton/2000 lb= 0.39 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 * 37.1 bhp = 0.08 lb/hr

Yearly SO₂ = 0.08 lb/hr * 8760 hr/yr * 1ton/2000 lb= 0.35 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 * 37.1 bhp = 0.04 lb/hr

Yearly formaldehyde = 0.04 lb/hr * 8760 hr/yr * 1ton/2000 lb= 0.17 ton/yr



**2013 EPA Tier 4i Exhaust Emission
Compliance Statement
20DSKBA
Stationary Emergency
60 Hz Diesel Generator Set**

Compliance Information:

The engine used in this generator set complies with Tier 4i emissions limit of U.S. EPA New Source Performance Standards for stationary emergency engines under the provisions of 40 CFR 60 Subpart IIII when tested per ISO8178 D2

Engine Manufacturer:	Kubota Corporation
EPA Certificate Number:	DKBXL02.2FCC-033
Effective Date:	12/14/2012
Date Issued:	12/14/2012
EPA Engine Family (Cummins Emissions Family):	DKBXL02.2FCC

Engine Information:

Model:	V2203-M	Bore:	3.43 in. (87 mm)
Engine Nameplate HP:	36	Stroke:	3.64 in. (92 mm)
Type:	4 Cycle, In-line, 4 Cylinder Diesel	Displacement:	100 cu. in. (1.65 liters)
Aspiration:	Natural	Compression Ratio:	23.0:1
Emission Control Device:	Engine Design Modification	Exhaust Stack Diameter:	2 in.

Diesel Fuel Emission Limits

D2 Cycle Exhaust Emissions

	Grams per BHP-hr			Grams per kWm-hr		
	<u>NOx + NMHC</u>	<u>CO</u>	<u>PM</u>	<u>NOx + NMHC</u>	<u>CO</u>	<u>PM</u>
Test Results - Diesel Fuel (300-4000 ppm Sulfur)	3.9	0.7	0.16	5.2	1.0	0.22
EPA Emissions Limit	5.6	4.1	0.22	7.5	5.5	0.30
Test Results - CARB Diesel Fuel (<15 ppm Sulfur)	3.6	0.7	0.14	4.8	1.0	0.19
CARB Emissions Limit	5.6	4.1	0.22	7.5	5.5	0.30

The CARB emission values are based on CARB approved calculations for converting EPA (500 ppm) fuel to CARB (15 ppm) fuel.

Test Methods: EPA/CARB Nonroad emissions recorded per 40CFR89 (ref. ISO8178-1) and weighted at load points prescribed in Subpart E, Appendix A for Constant Speed Engines (ref. ISO8178-4, D2)

Diesel Fuel Specifications: Cetane Number: 40-48. Reference: ASTM D975 No. 2-D.

Reference Conditions: Air Inlet Temperature: 25°C (77°F), Fuel Inlet Temperature: 40°C (104°F). Barometric Pressure: 100 kPa (29.53 in Hg), Humidity: 10.7 g/kg (75 grains H₂O/lb) of dry air; required for NO_x correction, Restrictions: Intake Restriction set to a maximum allowable limit for clean filter; Exhaust Back Pressure set to a maximum allowable limit.

Tests conducted using alternate test methods, instrumentation, fuel or reference conditions can yield different results.

Engine operation with excessive air intake or exhaust restriction beyond published maximum limits, or with improper maintenance, may result in elevated emission levels.

Diesel generator set

V2203-M series engine

EPA emissions



> Specification sheet

20 kW 60 Hz

Our energy working for you.™



Description

Cummins Power Generation commercial generator sets are fully integrated power generation systems providing optimum performance, reliability and versatility for stationary standby and prime power applications. Codes or standards compliance may not be available with all model configurations – consult factory for availability.



This generator set is designed in facilities certified to ISO 9001 and manufactured in facilities certified to ISO 9001 or ISO 9002.



The Prototype Test Support (PTS) program verifies the performance integrity of the generator set design. Cummins Power Generation products bearing the PTS symbol meet the prototype test requirements of NFPA 110 for Level 1 systems.



All low voltage models are CSA certified to product class 4215-01.



The generator set is available Listed to UL2200, Stationary Engine Generator Assemblies.

U.S. EPA

Engine certified to U.S. EPA Nonroad Source Emissions Standards, 40 CFR 1039, Tier 4.

Features

Kubota heavy-duty engine - Rugged 4-cycle, liquid-cooled, industrial diesel delivers reliable power, low emissions and fast response to load changes.

Alternator - Several alternator sizes offer selectable motor starting capability with low reactance 2/3 pitch windings, low waveform distortion with non-linear loads and fault clearing short-circuit capability.

Control system - The PowerCommand® 1.1 electronic control is standard equipment and provides total genset system integration including automatic remote starting/stopping, precise frequency and voltage regulation, alarm and status message display, output metering, auto-shutdown at fault detection and NFPA 110 Level 1 compliance.

Cooling system - Standard integral set-mounted radiator system, designed and tested for rated ambient temperatures, simplifies facility design requirements for rejected heat.

Enclosures - Optional weather protective and sound attenuated enclosures are available.

Fuel tanks - Dual wall sub-base fuel tanks are also available.

NFPA - The genset accepts full rated load in a single step in accordance with NFPA 110 for Level 1 systems.

Warranty and service - Backed by a comprehensive warranty and worldwide distributor network.

Model	Standby rating		Prime rating		Continuous rating		Data sheets	
	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz kW (kVA)	50 Hz kW (kVA)	60 Hz	50 Hz
DSKBA	20 (25)		18.2 (22.7)				D-3373	

Generator set specifications

Governor regulation class	
Voltage regulation, no load to full load	± 1%
Random voltage variation	± 1%
Frequency regulation	Isochronous
Random frequency variation	± 0.25%
Radio frequency emissions compliance	

Engine specifications

Bore	87.0 mm (3.43 in)
Stroke	92.4 mm (3.64 in)
Displacement	2.20 litres (134.1 in ³)
Configuration	Cast iron, in-line, 4 cylinder
Battery capacity	350 amps minimum at ambient temperature of -18 °C to 0 °C (0 °F to 32 °F)
Battery charging alternator	40 amps
Starting voltage	12 volt, negative ground
Fuel system	Indirect injection: low or ultra low sulfur, number 2 diesel fuel
Fuel filter	Single element, spin-on fuel filter with water separator
Air cleaner type	Dry replaceable element
Lube oil filter type(s)	Spin-on, full flow
Standard cooling system	High ambient radiator

Alternator specifications

Design	Brushless, 4 pole, drip proof revolving field
Stator	2/3 pitch
Rotor	Single bearing, flexible discs
Insulation system	Class H
Standard temperature rise	125 °C standby at 40 °C ambient
Exciter type	Torque match (shunt)
Phase rotation	A (U), B (V), C (W)
Alternator cooling	Direct drive centrifugal blower fan
AC waveform total harmonic distortion	< 7% no load to full linear load, < 3% for any single harmonic
Telephone influence factor (TIF)	< 40 per NEMA MG1-22.43
Telephone harmonic factor (THF)	< 3

Available voltages

60 Hz Three phase line-neutral/line-line	60 Hz Single phase line-neutral/line-line
<ul style="list-style-type: none"> • 120/208 • 139/240 • 240/416 • 347/600 	<ul style="list-style-type: none"> • 120/240
<ul style="list-style-type: none"> • 120/240 Delta • 220/380 • 277/480 	

* Note: Consult factory for other voltages.

Generator set options and accessories

Engine	Alternator	Generator set	PowerCommand Network Communications Module (NCM)
<ul style="list-style-type: none"> .. 120 V 1000 W coolant heater 	<ul style="list-style-type: none"> .. 105 °C rise .. 120 V 100 W anti-condensation heater .. Single phase 	<ul style="list-style-type: none"> .. Battery .. Battery charger .. Enclosure: aluminum, steel, weather protective or sound attenuated .. Export box packaging .. Main line circuit breaker 	<ul style="list-style-type: none"> .. Remote annunciator panel .. Spring isolators .. 2 year prime power warranty .. 2 year standby power warranty .. 5 year basic power warranty
Fuel System	Exhaust system		
<ul style="list-style-type: none"> .. 24 hour sub-base tank (dual wall) .. Regional fuel tank code kits 	<ul style="list-style-type: none"> .. Engine exhaust muffler (mounted) 		

* Note: Some options may not be available on all models - consult factory for availability.

Control system PCC 1302



PowerCommand control is an integrated generator set control system providing voltage regulation, engine protection, operator interface and isochronous governing (optional). Major features include:

- Battery monitoring and testing features and smart starting control system.
- Standard PCCNet interface to devices such as remote annunciator for NFPA 110 applications.
- Control boards potted for environmental protection.
- Control suitable for operation in ambient temperatures from -40 °C to +70 °C (-40 °F to +158 °F) and altitudes to 5000 meters (13,000 feet).
- Prototype tested; UL, CSA, and CE compliant.
- InPower™ PC-based service tool available for detailed diagnostics.

Operator/display panel

- Manual off switch
- Alpha-numeric display with pushbutton access for viewing engine and alternator data and providing setup, controls and adjustments (English or international symbols)
- LED lamps indicating genset running, not in auto, common warning, common shutdown, manual run mode and remote start
- Suitable for operation in ambient temperatures from -20 °C to +70 °C
- Bargraph display (optional)

AC protection

- Over current warning and shutdown
- Over and under voltage shutdown
- Over and under frequency shutdown
- Over excitation (loss of sensing) fault
- Field overload

Engine protection

- Overspeed shutdown
- Low oil pressure warning and shutdown
- High coolant temperature warning and shutdown
- Low coolant level warning or shutdown
- Low coolant temperature warning
- High, low and weak battery voltage warning
- Fail to start (overcrank) shutdown
- Fail to crank shutdown
- Redundant start disconnect
- Cranking lockout
- Sensor failure indication
- Low fuel level warning or shutdown
- Fuel-in-rupture-basin warning or shutdown

Alternator data

- Line-to-line and Line-to-neutral AC volts
- 3-phase AC current
- Frequency
- Total kVa

Engine data

- DC voltage
- Lube oil pressure
- Coolant temperature
- Engine speed

Other data

- Genset model data
- Start attempts, starts, running hours
- Fault history
- RS485 Modbus® interface
- Data logging and fault simulation (requires InPower service tool)

Digital governing (optional)

- Integrated digital electronic isochronous governor
- Temperature dynamic governing

Digital voltage regulation

- Integrated digital electronic voltage regulator
- 2-phase line-to-line sensing
- Configurable torque matching

Control functions

- Time delay start and cooldown
- Cycle cranking
- PCCNet interface
- (2) Configurable inputs
- (2) Configurable outputs
- Remote emergency stop
- Glow plug control (some models)

Options

- Auxiliary output relays (2)
- 120/240 V, 100 W anti-condensation heater
- Remote annunciator with (3) configurable inputs and (4) configurable outputs
- PMG alternator excitation
- PowerCommand iWatch web server for remote monitoring and alarm notification (loose)
- Auxiliary, configurable signal inputs (8) and configurable relay outputs (8)
- Digital governing
- AC output analog meters (bargraph)
 - Color-coded graphical display of:
 - 3-phase AC voltage
 - 3-phase current
 - Frequency
 - kVa
- Remote operator panel
- PowerCommand 2.2 control with AmpSentry protection

For further detail see document S-1531.

Ratings definitions

Emergency standby power (ESP):

Applicable for supplying power to varying electrical load for the duration of power interruption of a reliable utility source. Emergency Standby Power (ESP) is in accordance with ISO 8528. Fuel Stop power in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Limited-time running power (LTP):

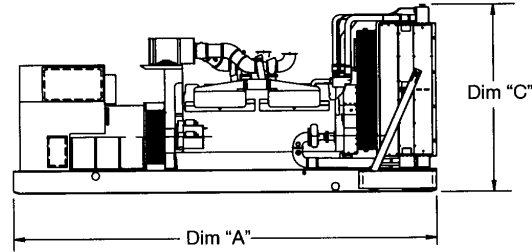
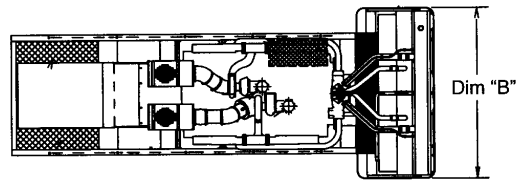
Applicable for supplying power to a constant electrical load for limited hours. Limited Time Running Power (LTP) is in accordance with ISO 8528.

Prime power (PRP):

Applicable for supplying power to varying electrical load for unlimited hours. Prime Power (PRP) is in accordance with ISO 8528. Ten percent overload capability is available in accordance with ISO 3046, AS 2789, DIN 6271 and BS 5514.

Base load (continuous) power (COP):

Applicable for supplying power continuously to a constant electrical load for unlimited hours. Continuous Power (COP) in accordance with ISO 8528, ISO 3046, AS 2789, DIN 6271 and BS 5514.



This outline drawing is for reference only. See respective model data sheet for specific model outline drawing number.

Do not use for installation design

Model	Dim "A" mm (in.)	Dim "B" mm (in.)	Dim "C" mm (in.)	Set Weight* dry kg (lbs)	Set Weight* wet kg (lbs)
DSKBA	1700 (66.9)	787 (31.0)	928 (36.5)		568 (1252)

* Note: Weights represent a set with standard features. See outline drawings for weights of other configurations.

Cummins Power Generation
1400 73rd Avenue N.E.
Minneapolis, MN 55432 USA
Telephone: 763 574 5000
Fax: 763 574 5298

Warning: Back feed to a utility system can cause electrocution and/or property damage. Do not connect to any building's electrical system except through an approved device or after building main switch is open.