December 30, 2019

Mr. Daniel Guthrie
Manager – Energy New Source Review Permits Section
Texas Commission on Environmental Quality (TCEQ) – MC 163
12100 Park 35 Circle
Austin, TX 78753

Re: QuikTrip/PowerSecure, Inc.
Midlothian, TX
RN106208655/CN600241673
Minor New Source Review Permit Application

Dear Mr. Guthrie:

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit the operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project.

Application

This Application is submitted in accordance with the provisions of 30 Texas Administrative Code (TAC) Chapter 116, Subchapter B: *NSR Permits* and consists of the following information:

- Project Description
- Facility Location Map and Plot Plan
- Process Flow Diagram
- Summary of Emissions and Emissions Calculations
- TCEQ Forms
  - TCEQ 20833a: PI-1 – *General Application, Version 4.0*
  - TCEQ 10166: Table 7(b) – *Horizontal Fixed Roof Storage Tank Summary*
  - TCEQ 10169: Table 7(e) – *Chemical Data Information*
  - TCEQ 10195: Table 29 – *Reciprocating Engines*
- Regulatory Applicability Analyses
- Best Available Control Technology (BACT) Determinations
- Electronic Modeling Evaluation Workbook (EMEW)
- Engine and Fuel Specifications
- Sample Calculations
- ALL4 Quality Professional (AQP) Seal
- Fee Receipt

Project Description

QuikTrip is seeking approval to permit the operation of three gensets driven by diesel fuel-fired RICE [referred to as Engine Generators (EG)-1, EG-2, and EG-3] for both emergency and non-emergency use at the Facility. Although the Application is to permit non-emergency operation, the intent of the engines is to serve in both emergency and non-emergency situations as described in the following paragraph. The proposed EG-1, EG-2, and EG-3 are placed onsite, and while this Application for non-emergency service is being processed, the gensets would operate for emergency use only under the conditions of a permit by rule (PBR). In accordance with 30 TAC §106.4: Requirements for Permitting by Rule and §106.511: Portable and Emergency Engines and Turbines, this emergency operation does not require registration or fees. As applicable, QuikTrip will maintain records required pursuant to 30 TAC §106.8.

The proposed genset engines are Volvo TWD1673GE model certified Tier 4 Final (i.e., Tier 4f) units rated at 931 brake horsepower (bhp) each. The engines receive fuel from one, dedicated and integrated, 3,000-gallon ultra-low sulfur diesel (ULSD) storage tank (TK-1). Each engine is equipped with selective catalytic reduction (SCR) to control emissions of nitrogen oxides (NO_X) as part of its Tier 4f configuration. Once permitted, the engines will operate for the following emergency and non-emergency purposes:

- Emergency situations, for example but not limited to unstable grid conditions, power outages, and similar events.

- Emergency Response Service (ERS) managed by the Electric Reliability Council of Texas (ERCOT). ERCOT is the non-profit corporation that oversees the Texas power grid. As such, ERCOT selects qualified loads and generators to make themselves available for deployment in an electric grid emergency.

- Non-emergency situations, for example, participation in the 4 Coincident Peak (4CP) program, maintenance, readiness testing, demand response program participation and electric power for the Facility.

Each engine will operate no more than 500 hours per year in emergency and non-emergency situations. Therefore, QuikTrip is proposing a federally enforceable permit limit of 500 hours per rolling 12-month period for each engine.

Should you have any questions related to this submittal or require additional information, please contact Tanner Henson at thenson@all4inc.com or 281-937-7553 x308 or me at Krudd@quiktrip.com or 918-615-7233.

Sincerely,
QuikTrip/PowerSecure, Inc.

Kyla Rudd
Environmental Project Manager

cc: Trisha Victor, PowerSecure
Kristin Gordon, P.E. – ALL4
Tanner Henson – ALL4

Executive Summary

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit the operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project. The Facility details are provided below.

QuikTrip Corporation
Midlothian, TX
RN106208655/CN600241673

Introduction

This Application is submitted via the State of Texas Environmental Electronic Reporting System (STEERS) in accordance with the provisions of 30 Texas Administrative Code (TAC) Chapter 116, Subchapter B: *NSR Permits* and consists of the following information. The bolded items are included in this section:

- **Process Description**
- **ALL4 Quality Professional (AQP) Seal**
- TCEQ 20833a: PI-1 – *General Application, Version 4.0*
- Electronic Modeling Evaluation Workbook (EMEW)
- Figures
  - Facility Location Map
  - Plot Plan
  - Process Flow Diagram
- Regulatory Applicability Analyses
- Best Available Control Technology (BACT) Determinations
- Summary of Emissions and Emissions Calculations
- Sample Calculations
- Equipment Tables
  - TCEQ 10166: Table 7(b) – *Horizontal Fixed Roof Storage Tank Summary*
  - TCEQ 10169: Table 7(e) – *Chemical Data Information*
  - TCEQ 10195: Table 29 – *Reciprocating Engines*
- Engine and Fuel Specifications

Should you have any questions related to this submittal or require additional information, please contact Tanner Henson at thenson@all4inc.com or 281-937-7553 x308 or me at Krudd@quiktrip.com or 918-615-7233.

Process Description

QuikTrip is seeking approval to permit the operation of three gensets driven by diesel fuel-fired RICE [referred to as Engine Generators (EG)-1, EG-2, and EG-3] for both emergency and non-emergency use at the Facility. Although the Application is to permit non-emergency operation, the intent of the engines is to serve in both emergency and non-emergency situations as described in the following paragraph. The proposed EG-1, EG-2, and EG-3 are placed onsite, and while this Application for non-emergency service is being processed, the gensets would operate for emergency use only under the conditions of a permit by rule (PBR). In accordance with 30 TAC §106.4: Requirements for Permitting by Rule and §106.511: Portable and Emergency Engines and Turbines, this emergency operation does not require registration or fees. As applicable, QuikTrip will maintain records required pursuant to 30 TAC §106.8.

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Emergency situations, for example but not limited to unstable grid conditions, power outages, and similar events.

Emergency Response Service (ERS) managed by the Electric Reliability Council of Texas (ERCOT). ERCOT is the non-profit corporation that oversees the Texas power grid. As such, ERCOT selects qualified loads and generators to make themselves available for deployment in an electric grid emergency.

Non-emergency situations, for example, maintenance, readiness testing, demand response program participation and electric power for the Facility.

Each engine will operate no more than 500 hours per year in emergency and non-emergency situations. Therefore, QuikTrip is proposing a federally enforceable permit limit of 500 hours per rolling 12-month period for each engine.

ALL4 Quality Professional (AQP) Seal

Texas Commission on Environmental Quality

Case-by-Case New Permit

Site Information (Regulated Entity)

What is the name of the site to be authorized?	QUIKTRIP DISTRIBUTION
Does the site have a physical address?	Yes
Physical Address	
Number and Street	4200 RAILPORT PKWY
City	MIDLOTHIAN
State	TX
ZIP	76065
County	ELLIS
Latitude (N) (##.######)	
Longitude (W) (-###.######)	
Primary SIC Code	
Secondary SIC Code	
Primary NAICS Code	311812
Secondary NAICS Code	
Regulated Entity Site Information	
What is the Regulated Entity's Number (RN)?	RN106208655
What is the name of the Regulated Entity (RE)?	QUIKTRIP DISTRIBUTION
Does the RE site have a physical address?	Yes
Physical Address	
Number and Street	4200 RAILPORT PKWY
City	MIDLOTHIAN
State	TX
ZIP	76065
County	ELLIS
Latitude (N) (##.######)	
Longitude (W) (-###.######)	
Facility NAICS Code	311812
What is the primary business of this entity?	FLEET REFUELING

Customer (Applicant) Information

How is this applicant associated with this site?	Operator
What is the applicant's Customer Number (CN)?	CN600241673
Type of Customer	Corporation
Full legal name of the applicant:	
Legal Name	Quiktrip Corporation

Texas SOS Filing Number	12299906
Federal Tax ID	730675375
State Franchise Tax ID	17306753751
State Sales Tax ID	
Local Tax ID	
DUNS Number	
Number of Employees	501+
Independently Owned and Operated?	Yes
I certify that the full legal name of the entity applying for this permit has been provided and is legally authorized to do business in Texas.	Yes
Responsible Authority Contact	
Organization Name	Quiktrip Corporation
Prefix	MS
First	Kyla
Middle	
Last	Rudd
Suffix	
Credentials	
Title	Environmental Project Manager
Responsible Authority Mailing Address	
Enter new address or copy one from list:	RE Physical Address
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	4705 S 129TH EAST AVE
Routing (such as Mail Code, Dept., or Attn:)	
City	TULSA
State	OK
ZIP	74134
Phone (###-###-####)	9186157233
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	krudd@quiktrip.com

Responsible Official Contact

Person TCEQ should contact for questions about this application:	
Same as another contact?	CN600241673, Quiktrip Corporation
Organization Name	Quiktrip Corporation
Prefix	MS
First	Kyla
Middle	

Last	Rudd
Suffix	
Credentials	
Title	Environmental Project Manager
Enter new address or copy one from list:	
Mailing Address	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	4705 S 129TH EAST AVE
Routing (such as Mail Code, Dept., or Attn:)	
City	TULSA
State	OK
ZIP	74134
Phone (###-###-####)	9186157233
Extension	
Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	krudd@quiktrip.com

Technical Contact

Person TCEQ should contact for questions about this application:	
Same as another contact?	
Organization Name	PowerSecure, Inc.
Prefix	MRS
First	Trisha
Middle	
Last	Victor
Suffix	
Credentials	
Title	Manager of Environmental Compliance
Enter new address or copy one from list:	
Mailing Address	
Address Type	Domestic
Mailing Address (include Suite or Bldg. here, if applicable)	1609 HERITAGE COMMERCE CT
Routing (such as Mail Code, Dept., or Attn:)	
City	WAKE FOREST
State	NC
ZIP	27587
Phone (###-###-####)	2025037455
Extension	

Alternate Phone (###-###-####)	
Fax (###-###-####)	
E-mail	tvictor@powersecure.com

Case by Case General Information-New Sites

1.	Is this application a re-submittal of a project voided within the last six months?	No
2.	What type of new authorization are you applying for?	CONSTRUCT
2.1	Are there any associated federal Prevention of Significant Deterioration (PSD), Nonattainment (NA), or major source hazardous pollutants Federal Clean Air Act § 112(g) permits?	No
2.2	Are there any Permits by Rule (PBR) or standard exemptions associated to be incorporated?	No
2.3	List any PBR or standard exemptions with date claimed that need to be referenced that the TCEQ was previously not required to be notified of (unregistered PBR and standard exemptions).	PBR 106.511
2.4	List any PBR or standard exemptions with date claimed that need to be consolidated that the TCEQ was previously not required to be notified of (unregistered PBR and standard exemptions).	None
2.5	Are there any standard permits associated with this permit to be incorporated?	No
2.6	Are there any other permits to be consolidated into this permit?	No

Case by Case Application Requirements

1.	Is a completed Form PI-1 General Application attached with all supporting documentation?	Yes
3.	Is an air quality impacts demonstration required?	Yes
3.1	Is the application for a major New Source Review (federal or PSD) permit?	No
4.	Do the emissions from the proposed facility comply with all rules and regulations of the commission and with the intent of the Texas Clean Air Act (TCAA), including protection of the health and property of the public?	Yes
5.	Do the emissions from the proposed facility, group of facilities, or account as determined under 30 TAC 116.716 comply with all rules and regulations of the commission and with the intent of the Texas Clean Air Act (TCAA), including protection of the health and property of the public?	
6.	Does the application contain provisions for measuring emissions of significant air contaminants?	Yes
7.	Does the application contain a best available control technology (BACT) evaluation for all facilities subject to the TCAA?	Yes
8.	Is the proposed facility subject to a New Source Performance Standard (Title 40 Code of Federal Regulation (CFR) Part 60	Yes

	(NSPS)?	
8.1	If yes, does the application contain a NSPS evaluation for all facilities subject to the TCAA, as listed in Title 40 CFR Part 60?	Yes
9.	Is the proposed facility subject to a National Emission Standard for Hazardous Air Pollutants (Title 40 CFR Part 61) (NESHAP)?	No
10.	Is the proposed facility subject to National Emission Standard for Hazardous Air Pollutants (Title 40 CFR Part 63) (MACT) evaluation required?	Yes
10.1	If yes, does the application contain a MACT evaluation for all facilities subject to the TCAA, as listed in Title 40 CFR Part 63?	Yes
11.	Is a nonattainment review (NA) and/or prevention of significant deterioration (PSD) evaluation required?	No
12.	Does the application contain information to demonstrate that the proposed facility will achieve the performance specified in its permit?	Yes
13.	If subject to Chapter 101, Subchapter H, Division 3 (relating to Mass Emissions Cap and Trade Program), the proposed facility, group of facilities, or account must obtain allowances to operate. Have the allowances been identified for the facilities contained in the application?	NA
14.	Is the facility an affected source (as defined in 116.15(1)) for hazardous air pollutants?	No

Case by Case Table 30

1.	Do nonattainment permitting requirements apply to this application?	No
2.	Do prevention of significant deterioration permitting requirements apply to this application?	No
3.	Do Hazardous Air Pollutant Major Source [FCAA § 112(g)] requirements apply to this application?	No
4.	Is a Plant-wide Applicability Limit permit being requested?	No
5.	Enter estimated capital cost for process and control equipment not previously owned by the applicant and not currently authorized under this chapter.	690000
6.	Enter estimated capital cost for Auxiliary equipment, including hoods, ducting, fans, pumps, piping, conveyors, stacks, storage tanks, wasted disposal facilities, and air pollution control equipment specifically needed to meet permit and regulation requirements.	0
7.	Enter estimated capital cost for freight charges	0
8.	Enter estimated capital cost for Site preparation, including demolition, construction of fences, outdoor lighting, road, and parking areas.	0
9.	Enter estimated capital cost for installation, including foundations, erection of supporting structures, enclosures or weather protection, insulation and painting, utilities and connections, process integration, and process control equipment.	20000

10.	Enter estimated capital cost for auxiliary buildings, including material storage, employee facilities, and changes to existing structures.	0
11.	Enter estimated capital cost for ambient air monitoring network.	0
12.	Enter estimated capital cost for final engineering design and supervision, and administrative overhead.	0
13.	Enter estimated capital cost for construction expense, including construction liaison, securing local building permits, insurance, temporary construction facilities, and construction clean-up.	382000
14.	Enter Estimated capital cost for Contractor's fee and overhead.	0

Expedite Case by Case

1.	Per Texas Health and Safety Code, Section 382.05155, does the applicant want to expedite the processing of this application?	No

Case by Case Attachments

If the file size for any attachment is greater than 50MB, then combine all non-excel files into one PDF document and use the FTP process to create an account at https://ftps.tceq.texas.gov/ut.php, upload files, and share to APIRT@tceq.texas.gov. Detailed instructions can be found at https://ftps.tceq.texas.gov/help/.

Attach Form PI-1 General Application.

[File Properties]

File Name	NSR_WORKBOOK_20191230_010852.xlsx
Hash	A5EF1C8E29D2DF11EE760BFA5ECBECE3C7EBB928DB82AED007113219DB0F02C5
MIME-Type	application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
Confidential	No

Attach Electronic Modeling Evaluation Workbook (EMEW), MERA, or Protocol.

[File Properties]

File Name	EMEW_MERA_20191230_011134.xlsx
Hash	0F54E61155318DF4B9AFAEA1AAFDCD82FF7FEDDE7C702A33AD9C40BBAE300640
MIME-Type	application/vnd.openxmlformats-officedocument.spreadsheetml.sheet
Confidential	No

Attach executive summary, introduction, and process description documents.

[File Properties]

File Name	EXEC_SUMMARY_20191230_012446.pdf

Hash	948DD0372946D6825BC209EDA9C365DA3BAB9306FB467A9280BFC2190582151A
MIME-Type	application/pdf
Confidential	No
[File Properties]	
File Name	EXEC_SUMMARY_20191230_012438.pdf
Hash	A1471752DF51460835C34A55A9D4C98F569A418E7B94B292A679081F5C150B55
MIME-Type	application/pdf
Confidential	No

Attach area map, plot plan, and process flow diagram.

[File Properties]	
File Name	AREA_MAP_20191230_012506.pdf
Hash	978670F38D2DC5A4CFD173941B90F460F9CD22A9B01286ACFE931F9C601AA5DF
MIME-Type	application/pdf
Confidential	No

Attach federal applicability description.

[File Properties]	
File Name	FEDERAL_APPLICABILITY_20191230_012621.pdf
Hash	91C24ED0198D80DA03A000052B14FF52995EE6D960F6FE05CFEB9B47E50359C1
MIME-Type	application/pdf
Confidential	No

Attach the Best Available Control Technology (BACT) demonstration.

[File Properties]	
File Name	BACT_20191230_012729.pdf
Hash	EC811E3FDA1F9CC35C92D8FBDAD8B0F4CE88A108A9A6D37A0F02A90096BE54AE
MIME-Type	application/pdf
Confidential	No

Attach Emission Calculation.

[File Properties]	
File Name	EMISSIONS_CALCULATIONS_20191230_012830.pdf
Hash	E6C35D7609C733E3479782C71E57D10686D4CFF4B92A7E373F0C87B57294ACFD
MIME-Type	application/pdf
Confidential	No

Attach Material balance documentation.

Attach all equipment tables.

[File Properties]

File Name	EQUIPMENT_TABLES_20191230_012849.pdf
Hash	5AFE47289ECC7F99DB0D332451EDC68347A85EA522A08B922DC93487F957952B
MIME-Type	application/pdf
Confidential	No

Attach netting forms (1F, 2F, 3F, and 4F).

Attach any other necessary information needed to complete the permit.

[File Properties]

File Name	OTHER_INFORMATION_20191230_012914.pdf
Hash	48ECB0A2E34597235B2521AF28E3C0A82457BE2A02607BEBA51D5B27EA17EE2A
MIME-Type	application/pdf
Confidential	No

An additional space to attach any other necessary information needed to complete the permit.

I. Applicant Information

I acknowledge that I am submitting an authorized TCEQ application workbook and any necessary attachments. Except for inputting the requested data and adjusting row height and column width, I have not changed the TCEQ application workbook in any way, including but not limited to changing formulas, formatting, content, or protections.	I agree

A. Company Information

Company or Legal Name:	QuikTrip Corporation

Permits are issued to either the facility owner or operator, commonly referred to as the applicant or permit holder. List the legal name of the company, corporation, partnership, or person who is applying for the permit. We will verify the legal name with the Texas Secretary of State at (512) 463-5555 or at:

https://www.sos.state.tx.us

Texas Secretary of State Charter/Registration Number (if given):	12299906

B. Company Official Contact Information: must not be a consultant

Prefix (Mr., Ms., Dr., etc.):	Ms.
First Name:	Kyla
Last Name:	Rudd
Title:	Environmental Project Manager
Mailing Address:	4705 South 129th East Ave
Address Line 2:	
City:	Tulsa
State:	Oklahoma
ZIP Code:	74134
Telephone Number:	918-615-7233
Fax Number:	N/A
Email Address:	krudd@quiktrip.com

C. Technical Contact Information: This person must have the authority to make binding agreements and representations on behalf of the applicant and may be a consultant. **Additional technical contact(s) can be provided in a cover letter.**

Prefix (Mr., Ms., Dr., etc.):	Mrs.
First Name:	Trisha
Last Name:	Victor
Title:	Manager of Environmental Compliance
Company or Legal Name:	PowerSecure, Inc.
Mailing Address:	1609 Heritage Commerce Court
Address Line 2:	
City:	Wake Forest
State:	North Carolina
ZIP Code:	27587
Telephone Number:	202-503-7455
Fax Number:	N/A
Email Address:	tvictor@powersecure.com

D. Assigned Numbers

The CN and RN below are assigned when a Core Data Form is initially submitted to the Central Registry. The RN is also assigned if the agency has conducted an investigation or if the agency has issued an enforcement action. If these numbers have not yet been assigned, leave these questions blank and include a Core Data Form with your application submittal. See Section VI.B. below for additional information.

Enter the CN. The CN is a unique number given to each business, governmental body, association, individual, or other entity that owns, operates, is responsible for, or is affiliated with a regulated entity.	CN600241673

Enter the RN. The RN is a unique agency assigned number given to each person, organization, place, or thing that is of environmental interest to us and where regulated activities will occur. The RN replaces existing air account numbers. The RN for portable units is assigned to the unit itself, and that same RN should be used when applying for authorization at a different location.	RN106208655

II. Delinquent Fees and Penalties

Does the applicant have unpaid delinquent fees and/or penalties owed to the TCEQ? This form will not be processed until all delinquent fees and/or penalties owed to the TCEQ or the Office of the Attorney General on behalf of the TCEQ are paid in accordance with the Delinquent Fee and Penalty Protocol. For more information regarding Delinquent Fees and Penalties, go to the TCEQ Web site at: https://www.tceq.texas.gov/agency/financial/fees/delin	No

III. Permit Information

A. Permit and Action Type (multiple may be selected, leave no blanks)

Additional information regarding the different NSR authorizations can be found at:
https://www.tceq.texas.gov/permitting/air/guidance/authorize.html

Select from the drop-down the type of action being requested for each permit type. **If that permit type does not apply, you MUST select "Not applicable".**

Provide all assigned permit numbers relevant for the project. Leave blank if the permit number has not yet been assigned.

Permit Type	Action Type Requested (do not leave blank)	Permit Number (if assigned)
Minor NSR (can be a Title V major source): *Not applicable, Initial, Amendment, Renewal, Renewal Certification, Renewal/Amendment, Relocation/Alteration, Change of Location, Alteration, Extension to Start of Construction*	Initial	N/A
Special Permit: *Not applicable, Amendment, Renewal, Renewal Certification, Renewal/Amendment, Alteration, Extension to Start of Construction*	Not applicable	
De Minimis: *Not applicable, Initial*	Not applicable	
Flexible: *Not applicable, Initial, Amendment, Renewal, Renewal Certification, Renewal/Amendment, Alteration, Extension to Start of Construction*	Not applicable	
PSD: *Not applicable, Initial, Major Modification*	Not applicable	
Nonattainment: *Not applicable, Initial, Major Modification*	Not applicable	
HAP Major Source [FCAA § 112(g)]: *Not applicable, Initial, Major Modification*	Not applicable	
PAL: *Not applicable, Initial, Amendment, Renewal, Renewal/Amendment, Alteration*	Not applicable	
GHG PSD: *Not applicable, Initial, Major Modification, Voluntary Update*	Not applicable	

B. MSS Activities

How are/will MSS activities for sources associated with this project be authorized?	This permit

C. Consolidating NSR Permits

Will this permit be consolidated into another NSR permit with this action?	No
Will NSR permits be consolidated into this permit with this action?	No

D. Incorporation of Standard Permits, Standard Exemptions, and/or Permits By Rule (PBR)

To ensure protectiveness, previously issued authorizations (standard permits, standard exemptions, or PBRs) including those for MSS, are incorporated into a permit either by consolidation or by reference. At the time of renewal and/or amendment, consolidation (in some cases) may be voluntary and referencing is mandatory. More guidance regarding incorporation can be found in 30 TAC § 116.116(d)(2), 30 TAC § 116.615(3) and in this memo:

https://www.tceq.texas.gov/assets/public/permitting/air/memos/pbr_spc06.pdf

Are there any standard permits, standard exemptions, or PBRs to be incorporated by reference?	Yes
If yes, list any PBR, standard exemptions, or standard permits that need to be referenced:	PBR 106.511
Are there any PBR, standard exemptions, or standard permits associated to be incorporated by consolidation? **Note:** Emission calculations, a BACT analysis, and an impacts analysis must be attached to this application at the time of submittal for any authorization to be incorporated by consolidation.	No

E. Associated Federal Operating Permits

Is this facility located at a site required to obtain a **site operating permit (SOP)** or **general operating permit (GOP)?**	No

IV. Facility Location and General Information

A. Location

County: Enter the county where the facility is physically located.	Ellis
TCEQ Region	Region 4
County attainment status as of Sept. 23, 2019	Serious Ozone nonattainment
Street Address:	4200 Railport Pkwy
City: If the address is not located in a city, then enter the city or town closest to the facility, even if it is not in the same county as the facility.	Midlothian
ZIP Code: Include the ZIP Code of the physical facility site, not the ZIP Code of the applicant's mailing address.	76065
Site Location Description: If there is no street address, provide written driving directions to the site. Identify the location by distance and direction from well-known landmarks such as major highway intersections.	N/A

Use USGS maps, county maps prepared by the Texas Department of Transportation, or an online software application such as Google Earth to find the latitude and longitude.

Latitude (in degrees, minutes, and nearest second (DDD:MM:SS)) for the street address or the destination point of the driving directions. Latitude is the angular distance of a location north of the equator and will always be between 25 and 37 degrees north (N) in Texas.	32.436887

Longitude (in degrees, minutes, and nearest second (DDD:MM:SS)) for the street address or the destination point of the driving directions. Longitude is the angular distance of a location west of the prime meridian and will always be between 93 and 107 degrees west (W) in Texas.	-97.048632
Is this a project for a lead smelter, concrete crushing facility, and/or a hazardous waste management facility?	No
B. General Information	
Site Name:	QuikTrip Distribution
Area Name: Must indicate the general type of operation, process, equipment or facility. Include numerical designations, if appropriate. Examples are Sulfuric Acid Plant and No. 5 Steam Boiler. Vague names such as Chemical Plant are not acceptable.	Emergency and standby electric power generation at the distribution center for a North Texas gas station used for storage and transport of various goods.
Are there any schools located within 3,000 feet of the site boundary?	No
C. Portable Facility	
Permanent or portable facility?	Permanent
D. Industry Type	
Principal Company Product/Business:	Electric Power Generation
A list of SIC codes can be found at: https://www.naics.com/sic-codes-industry-drilldown/	
Principal SIC code:	4225
NAICS codes and conversions between NAICS and SIC Codes are available at: https://www.census.gov/eos/www/naics/	
Principal NAICS code:	493110
E. State Senator and Representative for this site	
This information can be found at (note, the website is not compatible to Internet Explorer): https://wrm.capitol.texas.gov/	
State Senator:	Brian Birdwell
District:	22
State Representative:	John Wray
District:	10

V. Project Information

A. Description	
Provide a brief description of the project that is requested. (Limited to 500 characters).	QuikTrip is seeking authorization to operate three generator sets (gensets) for both emergency and non-emergency use. The proposed genset engines are driven by 931 bhp Volvo TWD1673GE model certified Tier 4f engines (EG-1, EG-2, and EG-3), which receive fuel from one 3,000-gallon ULSD storage tank (TK-1). Refer to the Cover Letter of the Minor NSR Application for additional information.
B. Project Timing	
Authorization must be obtained for many projects before beginning construction. Construction is broadly interpreted as anything other than site clearance or site preparation. Enter the date as "Month Date, Year" (e.g. July 4, 1776).	
Projected Start of Construction:	Upon Approval
Projected Start of Operation:	Upon Approval
C. Enforcement Projects	

Is this application in response to, or related to, an agency investigation, notice of violation, or enforcement action?	No
D. Operating Schedule	
Will sources in this project be authorized to operate 8760 hours per year?	No
If no, provide details in your permit application materials.	
Does this facility operate seasonally?	No

VI. Application Materials	
All representations regarding construction plans and operation procedures contained in the permit application shall be conditions upon which the permit is issued. (30 TAC § 116.116)	
A. Confidential Application Materials	
Is confidential information submitted with this application?	No
B. Is the Core Data Form (Form 10400) attached?	No
https://www.tceq.texas.gov/assets/public/permitting/centralregistry/10400.docx	
C. Is a current area map attached?	Yes
Is the area map a current map with a true north arrow, an accurate scale, the entire plant property, the location of the property relative to prominent geographical features including, but not limited to, highways, roads, streams, and significant landmarks such as buildings, residences, schools, parks, hospitals, day care centers, and churches?	Yes
Does the map show a 3,000-foot radius from the property boundary?	Yes
D. Is a plot plan attached?	Yes
Does your plot plan clearly show a north arrow, an accurate scale, all property lines, all emission points, buildings, tanks, process vessels, other process equipment, and two bench mark locations?	Yes
Does your plot plan identify all emission points on the affected property, including all emission points authorized by other air authorizations, construction permits, PBRs, special permits, and standard permits?	Yes
Did you include a table of emission points indicating the authorization type and authorization identifier, such as a permit number, registration number, or rule citation under which each emission point is currently authorized?	Yes
E. Is a process flow diagram attached?	Yes
Is the process flow diagram sufficiently descriptive so the permit reviewer can determine the raw materials to be used in the process; all major processing steps and major equipment items; individual emission points associated with each process step; the location and identification of all emission abatement devices; and the location and identification of all waste streams (including wastewater streams that may have associated air emissions)?	Yes
F. Is a process description attached?	Yes
Does the process description emphasize where the emissions are generated, why the emissions must be generated, what air pollution controls are used (including process design features that minimize emissions), and where the emissions enter the atmosphere?	Yes
Does the process description also explain how the facility or facilities will be operating when the maximum possible emissions are produced?	Yes
G. Are detailed calculations attached? Calculations must be provided for each source with new or changing emission rates. For example, a new source, changing emission factors, decreasing emissions, consolidated sources, etc. You do not need to submit calculations for sources which are not changing emission rates with this project. Please note: the preferred format is an electronic workbook (such as Excel) with all formulas viewable for review. It can be emailed with the submittal of this application workbook.	Yes
Are emission rates and associated calculations for planned MSS facilities and related activities attached?	N/A
H. Is a material balance (Table 2, Form 10155) attached?	N/A
I. Is a list of MSS activities attached?	N/A

J. Is a discussion of state regulatory requirements attached, addressing 30 TAC Chapters 101, 111, 112, 113, 115, and 117?	Yes
For all applicable chapters, does the discussion include how the facility will comply with the requirements of the chapter?	Yes
For all not applicable chapters, does the discussion include why the chapter is not applicable?	Yes
K. Are all other required tables, calculations, and descriptions attached?	Yes

VII. Signature

The owner or operator of the facility must apply for authority to construct. The appropriate company official (owner, plant manager, president, vice president, or environmental director) must sign all copies of the application. The applicant's consultant cannot sign the application. **Important Note: Signatures must be original in ink, not reproduced by photocopy, fax, or other means, and must be received before any permit is issued.**

The signature below confirms that I have knowledge of the facts included in this application and that these facts are true and correct to the best of my knowledge and belief. I further state that to the best of my knowledge and belief, the project for which application is made will not in any way violate any provision of the Texas Water Code (TWC), Chapter 7; the Texas Health and Safety Code, Chapter 382; the Texas Clean Air Act (TCAA); the air quality rules of the Texas Commission on Environmental Quality; or any local governmental ordinance or resolution enacted pursuant to the TCAA. I further state that I understand my signature indicates that this application meets all applicable nonattainment, prevention of significant deterioration, or major source of hazardous air pollutant permitting requirements. The signature further signifies awareness that intentionally or knowingly making or causing to be made false material statements or representations in the application is a criminal offense subject to criminal penalties.

Name:	Kyla Rudd
Signature:	
Original signature is required.	
Date:	

I. Additional Questions for Specific NSR Minor Permit Actions	
E. Concrete Batch Plants	
Is this a project for a concrete batch plant?	No

VIII. Federal Regulatory Questions	
Indicate if any of the following requirements apply to the proposed facility. Note that some federal regulations apply to minor sources. Enter all applicable Subparts.	
A. Title 40 CFR Part 60	
Do NSPS subpart(s) apply to a facility in this application?	Yes
List applicable subparts you will demonstrate compliance with (e.g. Subpart M)	Subpart IIII
B. Title 40 CFR Part 61	
Do NESHAP subpart(s) apply to a facility in this application?	No
C. Title 40 CFR Part 63	
Do MACT subpart(s) apply to a facility in this application?	Yes
List applicable subparts you will demonstrate compliance with (e.g. Subpart VVVV)	Subpart ZZZZ

IX. Emissions Review	
A. Impacts Analysis	
Any change that results in an increase in off-property concentrations of air contaminants requires an air quality impacts demonstration. Information regarding the air quality impacts demonstration must be provided with the application and show compliance with all state and federal requirements. Detailed requirements for the information necessary to make the demonstration are listed on the Impacts sheet of this workbook.	
Does this project require an impacts analysis?	Yes
B. Disaster Review	
If the proposed facility will handle sufficient quantities of certain chemicals which, if released accidentally, would cause off-property impacts that could be immediately dangerous to life and health, a disaster review analysis may be required as part of the application. Contact the appropriate NSR permitting section for assistance at (512) 239-1250. Additional Guidance can be found at: https://www.tceq.texas.gov/assets/public/permitting/air/Guidance/NewSourceReview/disrev-factsheet.pdf	
Does this application involve any air contaminants for which a disaster review is required?	No
C. Air Pollutant Watch List	
Certain areas of the state have concentrations of specific pollutants that are of concern. The TCEQ has designated these portions of the state as watch list areas. Location of a facility in a watch list area could result in additional restrictions on emissions of the affected air pollutant(s) or additional permit requirements. The location of the areas and pollutants of interest can be found at: https://www.tceq.texas.gov/toxicology/apwl/apwl.html	
Is the proposed facility located in a watch list area?	No
D. Mass Emissions Cap and Trade	
Is this facility located at a site within the Houston/Galveston nonattainment area (Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties)?	No

X. Additional Requirements	
A. Bulk Fuel Terminals	
Is this project for a bulk fuel terminal?	No
B. Plant Fuel Gas Facilities	
Does this site utilize plant fuel gas?	No

Texas Commission on Environmental Quality
Form PI-1 General Application
Unit Types - Emission Rates

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

Permit primary industry (must be selected for workbook to function)	Chemical / Energy

Action Requested (only 1 action per FIN)	Include these emissions in annual (tpy) summary?	Facility ID Number (FIN)	Emission Point Number (EPN)	Source Name	Pollutant	Current Short-Term (lb/hr)	Current Long-Term (tpy)	Consolidated Current Short-Term (lb/hr)	Consolidated Current Long-Term (tpy)	Proposed Short-Term (lb/hr)	Proposed Long-Term (tpy)	Short-Term Difference (lb/hr)	Long-Term Difference (tpy)	Unit Type (Used for reviewing BACT and Monitoring Requirements)	Unit Type Notes (only if "other" unit type in Column O)
New/Modified	Yes	EG-1	EG-1	Engine-Generator 1	PM					0.03	0.01	*0.034*	*0.0085*	Other	Engine Generator
					PM10					0.03	0.01	*0.034*	*0.0085*		
					PM2.5					0.03	0.01	*0.034*	*0.0085*		
					NOx					0.59	0.15	*0.5852*	*0.1463*		
					VOC					0.01	0.00	*0.0057*	*0.0015*		
					CO					0.17	0.04	*0.1699*	*0.0425*		
					SO2					0.01	0.00	*0.0114*	*0.0029*		
					H2SO4					0.00	0.00	*0.0018*	*0.0005*		
					NH3					0.08	0.02	*0.0753*	*0.0189*		
					HAPs					0.01	0.00	*0.0088*	*0.0022*		
New/Modified	Yes	EG-2	EG-2	Engine-Generator 2	PM					0.03	0.01	*0.034*	*0.0085*	Other	Engine Generator
					PM10					0.03	0.01	*0.034*	*0.0085*		
					PM2.5					0.03	0.01	*0.034*	*0.0085*		
					NOx					0.59	0.15	*0.5852*	*0.1463*		
					VOC					0.01	0.00	*0.0057*	*0.0015*		
					CO					0.17	0.04	*0.1699*	*0.0425*		
					SO2					0.01	0.00	*0.0114*	*0.0029*		
					H2SO4					0.00	0.00	*0.0018*	*0.0005*		
					NH3					0.08	0.02	*0.0753*	*0.0189*		
					HAPs					0.01	0.00	*0.0088*	*0.0022*		
New/Modified	Yes	EG-3	EG-3	Engine-Generator 3	PM					0.03	0.01	*0.034*	*0.0085*	Other	Engine Generator
					PM10					0.03	0.01	*0.034*	*0.0085*		
					PM2.5					0.03	0.01	*0.034*	*0.0085*		
					NOx					0.59	0.15	*0.5852*	*0.1463*		
					VOC					0.01	0.00	*0.0057*	*0.0015*		
					CO					0.17	0.04	*0.1699*	*0.0425*		
					SO2					0.01	0.00	*0.0114*	*0.0029*		
					H2SO4					0.00	0.00	*0.0018*	*0.0005*		
					NH3					0.08	0.02	*0.0753*	*0.0189*		
					HAPs					0.01	0.00	*0.0088*	*0.0022*		
New/Modified	Yes	TK-1	TK-1	Diesel Storage Tank 1	VOC					0.17	0.00	*0.1665*	*0.0024*	Storage Tank (1): Fixed roof with capacity < 25 Mgal or TVP < 0.50 psia	

Texas Commission on Environmental Quality
Form PI-1 General Application
Stack Parameters

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

Emission Point Discharge Parameters												
EPN	Included in EMEW?	UTM Coordinates Zone	East (Meters)	North (Meters)	Building Height (ft)	Height Above Ground (ft)	Stack Exit Diameter (ft)	Velocity (FPS)	Temperature (°F)	Fugitives - Length (ft)	Fugitives - Width (ft)	Fugitives - Axis Degrees
EG-1	Yes											
EG-2	Yes											
EG-3	Yes											
TK-1	Yes											

Texas Commission on Environmental Quality
Form PI-1 General Application
Public Notice

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

I. Public Notice Applicability

A. Application Type

Is this an application for an initial permit?	Yes

B. Project Increases and Public Notice Thresholds (for Initial and Amendment Projects)

Pollutant			Proposed Long-Term (tpy)			
VOC			0.01			
PM			0.03			
PM_{10}			0.03			
$PM_{2.5}$			0.03			
NO_x			0.44			
CO			0.13			
SO_2			0.01			
Pb			0.00			
H2SO4			0.001298988			
NH3			0.0564375			
HAPs			0.006593384			

* Notice is required for PM, PM10, and PM2.5 if one of these pollutants is above the threshold.

** Notice of a GHG action is determined by action type. Initial and major modification always require notice. Voluntary updates require a consolidated notice if there is a change to BACT. Project emission increases of CO2e (CO2 equivalent) are not relevant for determining public notice of GHG permit actions.

C. Is public notice required for this project as represented in this workbook? If no, proceed to Section III Small Business Classification. Note: public notice applicability for this project may change throughout the technical review.	Yes
D. Are any HAPs to be authorized/re-authorized with this project? The category "HAPs" must be specifically listed in the public notice if the project authorizes (reauthorizes for renewals) any HAP pollutants.	Yes

II. Public Notice Information

Complete this section if public notice is required (determined in the above section) or if you are not sure if public notice is required.

A. Contact Information

Enter the contact information for the **person responsible for publishing.** This is a designated representative who is responsible for ensuring public notice is properly published in the appropriate newspaper and signs are posted at the facility site. This person will be contacted directly when the TCEQ is ready to authorize public notice for the application.

Prefix (Mr., Ms., Dr., etc.):	Mrs.
First Name:	Trisha
Last Name:	Victor

Title:	Manager of Environmental Compliance
Company Name:	PowerSecure, Inc.
Mailing Address:	1609 Heritage Commerce Court
Address Line 2:	
City:	Wake Forest
State:	North Carolina
ZIP Code:	27587
Telephone Number:	202-503-7455
Fax Number:	N/A
Email Address:	tvictor@powersecure.com

Enter the contact information for the **Technical Contact.** This is the designated representative who will be listed in the public notice as a contact for additional information.

Prefix (Mr., Ms., Dr., etc.):	Mr.
First Name:	Tanner
Last Name:	Henson
Title:	Staff Engineer
Company Name:	ALL4 LLC
Mailing Address:	10107 Corporate Dr.
Address Line 2:	Suite 170
City:	Stafford
State:	Texas
ZIP Code:	77477
Telephone Number:	281-937-7553ext308
Fax Number:	N/A
Email Address:	thenson@all4inc.com

B. Public place

Place a copy of the full application (including all of this workbook and all attachments) at a public place in the county where the facilities are or will be located. You must state where in the county the application will be available for public review and comment. The location must be a public place and described in the notice. A public place is a location which is owned and operated by public funds (such as libraries, county courthouses, city halls) and cannot be a commercial enterprise. You are required to pre-arrange this availability with the public place indicated below. The application must remain available from the first day of publication through the designated comment period.

If this is an application for a PSD, nonattainment, or FCAA §112(g) permit, the public place must have internet access available for the public as required in 30 TAC § 39.411(f)(3).

If the application is submitted to the agency with information marked as Confidential, you are required to indicate which specific portions of the application are not being made available to the public. These portions of the application must be accompanied with the following statement: ***Any request for portions of this application that are marked as confidential must be submitted in writing, pursuant to the Public Information Act, to the TCEQ Public Information Coordinator, MC 197, P.O. Box 13087, Austin, Texas 78711-3087.***

Name of Public Place:	Nicholas P Sims Library
Physical Address:	515 W. Main St.
Address Line 2:	
City:	Waxahachie
ZIP Code:	75165
County:	Ellis
Has the public place granted authorization to place the application for public viewing and copying?	Yes

C. Alternate Language Publication

In some cases, public notice in an alternate language is required. If an elementary or middle school nearest to the facility is in a school district required by the Texas Education Code to have a bilingual program, a bilingual notice will be required. If there is no bilingual program required in the school nearest the facility, but children who would normally attend those schools are eligible to attend bilingual programs elsewhere in the school district, the bilingual notice will also be required. If it is determined that alternate language notice is required, you are responsible for ensuring that the publication in the alternate language is complete and accurate in that language.

Is a bilingual program required by the Texas Education Code in the School District?	Yes
Are the children who attend either the elementary school or the middle school closest to your facility eligible to be enrolled in a bilingual program provided by the district?	Yes
If yes to either question above, list which language(s) are required by the bilingual program?	Spanish

III. Small Business Classification

Complete this section to determine small business classification. If a small business requests a permit, agency rules (30 TAC § 39.603(f)(1)(A)) allow for alternative public notification requirements if all of the following criteria are met. If these requirements are met, public notice does not have to include publication of the prominent (12 square inch) newspaper notice.

Does the company (including parent companies and subsidiary companies) have fewer than 100 employees or less than $6 million in annual gross receipts?	No
Small business classification:	**No**

Texas Commission on Environmental Quality
Form PI-1 General Application
Federal Applicability

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

I. County Classification	
Does the project require retrospective review?	No
County (completed for you from your response on the General sheet)	Ellis
This project will be located in an area that is in serious nonattainment for ozone as of Sept. 23, 2019. Select from the drop-down list to the right if you would like the project to be reviewed under a different classification.	
Determination:	**This project will be located in a county with a Serious Ozone nonattainment classification. Complete the nonattainment section below and provide an analysis with the application.**

II. PSD and GHG PSD Applicability Summary			
Is netting required for the PSD analysis for this project?			**No**
Pollutant	**Project Increase**	**Threshold**	**PSD Review Required?**
CO	0.127	250	No
NO_x	0.439	250	No
PM	0.025	250	No
PM_{10}	0.025	250	No
$PM_{2.5}$	0.025	250	No
SO_2	0.008	250	No
Pb	0.000	250	No
H_2S	0.000	250	No
TRS	0.000	250	No
Reduced sulfur compounds (including H_2S)	0.000	250	No
H_2SO_4	0.001	250	No
Fluoride (excluding HF)	0.000	250	No
CO2e	0.000	N/A	No

III. Nonattainment Applicability Summary			
Is netting required for the nonattainment analysis for this project?			**No**
Pollutant	**Project Increase**	**Threshold**	**NA Review Required?**
Ozone (as VOC)	0.007	50	No
Ozone (as NO_x)	0.439	50	No

Texas Commission on Environmental Quality
Form PI-1 General Application
Fees

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

I. General Information - Non-Renewal	
Is this project for new facilities controlled and operated directly by the federal government? (30 TAC § 116.141(b)(1) and 30 TAC § 116.163(a))	No
A fee of $75,000 shall be required if no estimate of capital project cost is included with the permit application. (30 TAC § 116.141(d)) Select "yes" here to use this option. Then skip sections II and III.	No
Select Application Type	Minor Application

II. Direct Costs - Non-Renewal	
Type of Cost	**Amount**
Process and control equipment not previously owned by the applicant and not currently authorized under this chapter.	$690,000.00
Auxiliary equipment, including exhaust hoods, ducting, fans, pumps, piping, conveyors, stacks, storage tanks, waste disposal facilities, and air pollution control equipment specifically needed to meet permit and regulation requirements.	$0.00
Freight charges.	$0.00
Site preparation, including demolition, construction of fences, outdoor lighting, road, and parking areas.	$0.00
Installation, including foundations, erection of supporting structures, enclosures or weather protection, insulation and painting, utilities and connections, process integration, and process control equipment.	$20,000.00
Auxiliary buildings, including materials storage, employee facilities, and changes to existing structures.	$0.00
Ambient air monitoring network.	$0.00
Sub-Total:	$710,000.00

III. Indirect Costs - Non-Renewal	
Type of Cost	**Amount**
Final engineering design and supervision, and administrative overhead.	$0.00
Construction expense, including construction liaison, securing local building permits, insurance, temporary construction facilities, and construction clean-up.	$382,000.00
Contractor's fee and overhead.	$0.00
Sub-Total:	$382,000.00

IV. Calculations - Non-Renewal
For GHG permits: A single PSD fee (calculated on the capital cost of the project per 30 TAC § 116.163) will be required for all of the associated permitting actions for a GHG PSD project. Other NSR permit fees related to the project that have already been remitted to the TCEQ can be subtracted when determining the appropriate fee to submit with the GHG PSD application. Identify these other fees in the GHG PSD permit application.

In signing the "General" sheet with this fee worksheet attached, I certify that the total estimated capital cost of the project as defined in 30 TAC §116.141 is equal to or less than the above figure. I further state that I have read and understand Texas Water Code § 7.179, which defines Criminal Offenses for certain violations, including intentionally or knowingly making, or causing to be made, false material statements or representations.

Estimated Capital Cost	Minor Application Fee	
Less than $300,000	$900 (minimum fee)	
$300,000 - $7,500,000	N/A	
$300,000 - $25,000,000	0.30% of capital cost	
Greater than $7,500,000	N/A	
Greater than $25,000,000	$75,000 (maximum fee)	

Your estimated capital cost:	**$1,092,000.00**	x 0.30% =	
Permit Application Fee:			**$3,276.00**

VI. Total Fees

Note: fees can be paid together with one payment or as two separate payments.	
Non-Renewal Fee	$3,276.00
Total	$3,276.00

VII. Payment Information

A. Payment One (required)	
Was the fee paid online?	Yes
Enter the fee amount:	$ 3,276.00
Enter the check, money order, ePay Voucher, or other transaction number:	TBD
Enter the Company name as it appears on the check:	TBD
C. Total Paid	**$3,276.00**

VIII. Professional Engineer Seal Requirement

Is the estimated capital cost of the project above $2 million?	No
Is the application required to be submitted under the seal of a Texas licensed P.E.? Note: an electronic PE seal is acceptable.	No

Texas Commission on Environmental Quality
Form PI-1 General Application
Impacts

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

Pollutant	Does this pollutant require PSD review?	How will you demonstrate that this project meets all applicable requirements?	Notes	Additional Notes (optional)
VOC	No	Not applicable	This pollutant is not a part of this project or does not require an impacts analysis.	
PM	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
PM10	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
PM2.5	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
NOx	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
CO	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
SO2	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
H2SO4	No	Modeling: screen or refined	Attach a completed "Electronic Modeling Evaluation Workbook" (EMEW).	
NH3	No	MERA analysis, steps 0-2 only or using screening tables	Attach a detailed description of which MERA step was met for each species in the project. Include speciated emission rates with the total VOC and/or PM species corresponding to the short-term and long-term differences represented on the Unit Types-Emission Rates sheet.	
HAPs	No	MERA analysis, steps 0-2 only or using screening tables	Attach a detailed description of which MERA step was met for each species in the project. Include speciated emission rates with the total VOC and/or PM species corresponding to the short-term and long-term differences represented on the Unit Types-Emission Rates sheet.	

Texas Commission on Environmental Quality
Form PI-1 General Application
BACT

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

Plant Type	Current Tier I BACT	Confirm	Additional Notes

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
New/Modified	EG-1	Engine Generator	PM	The emission reduction techniques for PM10 and PM2.5 will follow the technique for PM. See additional notes:	Yes	The engine will meet the applicable PM, PM10, and PM2.5 emissions limits (i.e., 0.03 g/kW-hr) of 40 CFR Part 60, Subpart IIII. In addition, QuikTrip proposes good operating practices as PM, PM10, and PM2.5 BACT.
			NOx	See additional notes:	Yes	The engine will meet the applicable NOX emissions limit (i.e., 0.67 g/kW-hr of NOX) of 40 CFR Part 60, Subpart IIII. In addition, the engine is equipped with selective catalytic reduction (SCR) to reduce NOX emissions and will incorporate good operating practices.
			VOC	See additional notes:	Yes	The engine will meet the applicable non-methane hydrocarbon (NMHC) emissions limit (i.e., 0.19 g/kW-hr of NMHC) of 40 CFR Part 60, Subpart IIII. In addition,QuikTrip proposes good operating practices as VOC BACT.
			CO	See additional notes:	Yes	The engine will meet the applicable CO emissions limit (i.e., 3.5 g/kW-hr of CO) of 40 CFR Part 60, Subpart IIII. In addition, QuikTrip proposes good operating practices and limited operating hours as CO BACT.
			SO2	See additional notes:	Yes	QuikTrip will fire ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight) and incorporate good operating practices.
			H2SO4	See additional notes:	Yes	QuikTrip will fire ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight) and incorporate good operating practices.
			NH3	See additional notes:	Yes	QuikTrip injects urea (instead of ammonia), which inherently reduces the risk of ammonia releases. See attached BACT analysis for details. QuikTrip will also limit the hours of operation.
			HAPs	See additional notes:	Yes	QuikTrip proposes good operating practices as HAP BACT.
			MSS	See additional notes:	Yes	QuikTrip proposes good operating practices, proper SCR cleaning, and the listed maintenance hours as MSS BACT.
New/Modified	EG-2	Engine Generator	PM	The emission reduction techniques for PM10 and PM2.5 will follow the technique for PM. See additional notes:	Yes	The engine will meet the applicable PM, PM10, and PM2.5 emissions limits (i.e., 0.03 g/kW-hr) of 40 CFR Part 60, Subpart IIII. In addition, QuikTrip proposes good operating practices as PM, PM10, and PM2.5 BACT.
			NOx	See additional notes:	Yes	The engine will meet the applicable NOX emissions limit (i.e., 0.67 g/kW-hr of NOX) of 40 CFR Part 60, Subpart IIII. In addition, the engine is equipped with selective catalytic reduction (SCR) to reduce NOX emissions and will incorporate good operating practices.
			VOC	See additional notes:	Yes	The engine will meet the applicable non-methane hydrocarbon (NMHC) emissions limit (i.e., 0.19 g/kW-hr of NMHC) of 40 CFR Part 60, Subpart IIII. In addition,QuikTrip proposes good operating practices as VOC BACT.
			CO	See additional notes:	Yes	The engine will meet the applicable CO emissions limit (i.e., 3.5 g/kW-hr of CO) of 40 CFR Part 60, Subpart IIII. In addition, QuikTrip proposes good operating practices and limited operating hours as CO BACT.
			SO2	See additional notes:	Yes	QuikTrip will fire ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight) and incorporate good operating practices.
			H2SO4	See additional notes:	Yes	QuikTrip will fire ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight) and incorporate good operating practices.
			NH3	See additional notes:	Yes	QuikTrip injects urea (instead of ammonia), which inherently reduces the risk of ammonia releases. See attached BACT analysis for details. QuikTrip will also limit the hours of operation.
			HAPs	See additional notes:	Yes	QuikTrip proposes good operating practices as HAP BACT.
			MSS	See additional notes:	Yes	QuikTrip proposes good operating practices, proper SCR cleaning, and the listed maintenance hours as MSS BACT.

Texas Commission on Environmental Quality
Form PI-1 General Application
BACT

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

Action Requested	FINs	Unit Type	Pollutant	Current Tier I BACT	Confirm	Additional Notes
New/Modified	EG-3	Engine Generator	PM	The emission reduction techniques for PM10 and PM2.5 will follow the technique for PM. See additional notes:	Yes	The engine will meet the applicable PM, PM10, and PM2.5 emissions limits (i.e., 0.03 g/kW-hr) of 40 CFR Part 60, Subpart IIII. In addition, QuikTrip proposes good operating practices as PM, PM10, and PM2.5 BACT.
			NOx	See additional notes:	Yes	The engine will meet the applicable NOX emissions limit (i.e., 0.67 g/kW-hr of NOX) of 40 CFR Part 60, Subpart IIII. In addition, the engine is equipped with selective catalytic reduction (SCR) to reduce NOX emissions and will incorporate good operating practices.
			VOC	See additional notes:	Yes	The engine will meet the applicable non-methane hydrocarbon (NMHC) emissions limit (i.e., 0.19 g/kW-hr of NMHC) of 40 CFR Part 60, Subpart IIII. In addition,QuikTrip proposes good operating practices as VOC BACT.
			CO	See additional notes:	Yes	The engine will meet the applicable CO emissions limit (i.e., 3.5 g/kW-hr of CO) of 40 CFR Part 60, Subpart IIII. In addition, QuikTrip proposes good operating practices and limited operating hours as CO BACT.
			SO2	See additional notes:	Yes	QuikTrip will fire ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight) and incorporate good operating practices.
			H2SO4	See additional notes:	Yes	QuikTrip will fire ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight) and incorporate good operating practices.
			NH3	See additional notes:	Yes	QuikTrip injects urea (instead of ammonia), which inherently reduces the risk of ammonia releases. See attached BACT analysis for details. QuikTrip will also limit the hours of operation.
			HAPs	See additional notes:	Yes	QuikTrip proposes good operating practices as HAP BACT.
			MSS	See additional notes:	Yes	QuikTrip proposes good operating practices, proper SCR cleaning, and the listed maintenance hours as MSS BACT.
New/Modified	TK-1	Storage Tank (1): Fixed roof with capacity < 25 Mgal or TVP < 0.50 psia	VOC	See additional notes:	Yes	QuikTrip proposes to implement Tier I BACT for VOC emissions from fixed roof storage tanks with less than 25,000 gallons and a true vapor pressure less than 0.5 psia. This includes having exterior surfaces that are not exposed to the sun and operating with a submerged fill.
			MSS	See additional notes:	Yes	MSS BACT same as above.

Texas Commission on Environmental Quality
Form PI-1 General Application
Monitoring

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

FIN	Unit Type	Pollutant	Minimum Monitoring Requirements	Confirm	Additional Notes for Monitoring	Proposed Measurement Technique (only complete for pollutants with a project increase above the PSD threshold)	Additional Notes for Measuring:
EG-1	Engine Generator	PM	The emission monitoring techniques for PM10 and PM2.5 will follow the technique for PM. See additional notes:	Yes	QuikTrip will maintain the engine PM emissions certification and will keep records of engine hours of operation.		
		NOx	See additional notes:	Yes	QuikTrip will maintain the engine NOX emissions certification and will keep records of engine hours of operation.		
		VOC	See additional notes:	Yes	QuikTrip will maintain the engine NMHC emissions certification and will keep records of engine hours of operation.		
		CO	See additional notes:	Yes	QuikTrip will maintain the engine CO emissions certification and will keep records of engine hours of operation.		
		SO2	See additional notes:	Yes	QuikTrip will keep fuel receipts of ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight).		
		H2SO4	See additional notes:	Yes	QuikTrip will keep fuel receipts of ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight).		
		NH3	See additional notes:	Yes	The SCR proposed for the engines uses a urea injection instead of an ammonia injection system. QuikTrip will monitor purchased urea receipts.		
EG-2	Engine Generator	HAPs	See additional notes:	Yes	QuikTrip will and will keep records of engine hours of operation and pulished emission factors to monitor HAP emissions.		
		PM	The emission monitoring techniques for PM10 and PM2.5 will follow the technique for PM. See additional notes:	Yes	QuikTrip will maintain the engine PM emissions certification and will keep records of engine hours of operation.		
		NOx	See additional notes:	Yes	QuikTrip will maintain the engine NOX emissions certification and will keep records of engine hours of operation.		
		VOC	See additional notes:	Yes	QuikTrip will maintain the engine NMHC emissions certification and will keep records of engine hours of operation.		
		CO	See additional notes:	Yes	QuikTrip will maintain the engine CO emissions certification and will keep records of engine hours of operation.		
		SO2	See additional notes:	Yes	QuikTrip will keep fuel receipts of ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight).		
		H2SO4	See additional notes:	Yes	QuikTrip will keep fuel receipts of ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight).		
		NH3	See additional notes:	Yes	The SCR proposed for the engines uses a urea injection instead of an ammonia injection system. QuikTrip will monitor purchased urea receipts.		
EG-3	Engine Generator	HAPs	See additional notes:	Yes	QuikTrip will and will keep records of engine hours of operation and pulished emission factors to monitor HAP emissions.		
		PM	The emission monitoring techniques for PM10 and PM2.5 will follow the technique for PM. See additional notes:	Yes	QuikTrip will maintain the engine PM emissions certification and will keep records of engine hours of operation.		
		NOx	See additional notes:	Yes	QuikTrip will maintain the engine NOX emissions certification and will keep records of engine hours of operation.		
		VOC	See additional notes:	Yes	QuikTrip will maintain the engine NMHC emissions certification and will keep records of engine hours of operation.		
		CO	See additional notes:	Yes	QuikTrip will maintain the engine CO emissions certification and will keep records of engine hours of operation.		
		SO2	See additional notes:	Yes	QuikTrip will keep fuel receipts of ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight).		
		H2SO4	See additional notes:	Yes	QuikTrip will keep fuel receipts of ultra-low sulfur diesel fuel (no more than 15 ppm sulfur by weight).		
		NH3	See additional notes:	Yes	The SCR proposed for the engines uses a urea injection instead of an ammonia injection system. QuikTrip will monitor purchased urea receipts.		
		HAPs	See additional notes:	Yes	QuikTrip will and will keep records of engine hours of operation and pulished emission factors to monitor HAP emissions.		

TK-1	Storage Tank (1): Fixed roof with capacity < 25 Mgal or TVP < 0.50 psia	VOC	See additional notes:	Yes	QuikTrip will keep fuel receipts which contain vapor pressure information for the tank.		

Texas Commission on Environmental Quality
Form PI-1 General Application
Materials

Date: December 2019
Permit #: TBD
Company: QuikTrip Corporation

Item	How submitted	Date submitted
A. Administrative Information		
Form PI-1 General Application	STEERS	
Hard copy of the General sheet with original (ink) signature	STEERS	
Professional Engineer Seal	Not applicable	
B. General Information		
Copy of current permit (both Special Conditions and MAERT)		
Core Data Form		
Area map	STEERS	
Plot plan	STEERS	
Process description	STEERS	
Process flow diagram	STEERS	
List of MSS activities		
State regulatory requirements discussion	STEERS	
C. Federal Applicability		
Summary and project emission increase determination - Tables 1F and 2F	Not applicable	
Netting analysis (if required) - Tables 3F and 4F as needed		
D. Technical Information		
BACT discussion, if additional details are attached	STEERS	
Monitoring information, if additional details are attached	STEERS	
Material Balance (if applicable)		
Calculations	STEERS	
E. Impacts Analysis		
Qualitative impacts analysis	STEERS	
MERA analysis	STEERS	
Electronic Modeling Evaluation Workbook: SCREEN3	Not applicable	
Electronic Modeling Evaluation Workbook: NonSCREEN3	STEERS	
PSD modeling protocol	Not applicable	
F. Additional Attachments		
Table 29	STEERS	
Table 7b	STEERS	
Table 7e	STEERS	

Executive Summary

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit the operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project. The Facility details are provided below.

QuikTrip Corporation
Midlothian, TX
RN106208655/CN600241673

Introduction

This Application is submitted via the State of Texas Environmental Electronic Reporting System (STEERS) in accordance with the provisions of 30 Texas Administrative Code (TAC) Chapter 116, Subchapter B: *NSR Permits* and consists of the following information. The bolded items are included in this section:

- Process Description
- ALL4 Quality Professional (AQP) Seal
- TCEQ 20833a: PI-1 – *General Application, Version 4.0*
- **Electronic Modeling Evaluation Workbook (EMEW)**
- Figures
  - Facility Location Map
  - Plot Plan
  - Process Flow Diagram
- Regulatory Applicability Analyses
- Best Available Control Technology (BACT) Determinations
- Summary of Emissions and Emissions Calculations
- Sample Calculations
- Equipment Tables
  - TCEQ 10166: Table 7(b) – *Horizontal Fixed Roof Storage Tank Summary*
  - TCEQ 10169: Table 7(e) – *Chemical Data Information*
  - TCEQ 10195: Table 29 – *Reciprocating Engines*
- Engine and Fuel Specifications

Should you have any questions related to this submittal or require additional information, please contact Tanner Henson at thenson@all4inc.com or 281-937-7553 x308 or me at Krudd@quiktrip.com or 918-615-7233.

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

General Information

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

EMEW Version No.: Version 2.2

Purpose Statement:
This workbook is completed by the applicant and submitted to the Texas Commission on Environmental Quality (TCEQ), specifically, the Air Dispersion Modeling Team (ADMT) for review. This workbook is a tool available for all projects using AERSCREEN, AERMOD, or ISC/ISCPrime for an impacts review and its use is required starting June 1, 2019. Provide the workbook with the permit application submittal for any Minor New Source Review project requiring a modeling impacts demonstration.

This workbook follows the guidance outlined in the Air Quality Modeling Guidelines (APDG 6232, September 2018) which can be found here:
https://www.tceq.texas.gov/assets/public/permitting/air/Modeling/guidance/airquality-mod-guidelines6232.pdf

Workbook Instructions:
1. Save a copy of the workbook to your computer or desktop prior to entering data.
2. Complete all required sections leaving no blanks. You may use the "tab" button or the arrow keys to move to the next available cell. Use "enter" to move down a line. Note: drop-downs are case-sensitive.
3. Fill in the workbook in order, do not skip around as this will cause errors. Use caution if changing a previously entered entry.
4. Not applicable sections of this workbook will be hidden as data is entered. For example, answering "No" to "Is downwash applicable? " will hide these sections of the workbook required only for downwash entry.
5. Email the workbook electronic file (EMEW) and any attachments to the Air Permits Initial Review Team. The subject line should read "Company Name - Permit Number (if known) - NSR Permit Application". Email address:

apirt@tceq.texas.gov

6. If printing the EMEW, follow the directions below to create a workbook header.
7. Printing the EMEW is not required for submitting to the Air Permits Division (APD); however, you may need to print it for sending to the regional offices, local programs, and for public access if notice is required. To print the workbook, follow the instructions below. Please be aware, several sheets contain large amounts of data and caution should be taken if printing, such as the Speciated Emissions sheet.
8. Updates may be necessary throughout the review process. Updated workbooks must be submitted in electronic format to APD. For submittal to regional offices, local programs, or public places you only have to print sheets that had updates. Be sure to change the headers accordingly.

Note: Since this will be part of the permit application, follow the instructions in the Form PI-1 General Application on where to send copies of your EMEW and permit application. The NSR Application Workbook can be found here:

https://www.tceq.texas.gov/permitting/air/guidance/newsourcereview/nsrapp-tools.html

Create Headers Before Printing:
1. Right-click one of the workbook's sheet tabs and "Select All Sheets."
2. Enter the "Page Layout View" by using the navigation ribbon's View > Workbook Views > Page Layout, or by clicking the page layout icon in the lower-right corner of Excel.
3. Add the date, company name, and permit number (if known) to the upper-right header. Note that this may take up to a minute to update your spreadsheet. Select any tab to continue working on the spreadsheet.

Printing Tips:
While APD does not need a hard copy of the full workbook, you may need to print it for sending to the regional offices, local programs, and for public access if notice is required.
1. The default printing setup for each sheet in the workbook is set for the TCEQ preferred format. The print areas are set up to not include the instructions on each sheet.
2. You have access to change all printing settings to fit your needs and printed font size. Some common options include:
   -Change what area you are printing (whole active sheet or a selection);
   -Change the orientation (portrait or landscape);
   -Change the margin size; and
   -Change the scaling (all columns on one sheet, full size, your own custom selection, etc.).

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

General Information

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Acknowledgement:	Select from the drop down:
I acknowledge that I am submitting an authorized TCEQ Electronic Modeling Evaluation Workbook and any necessary attachments. Except for inputting the requested data, I have not changed the TCEQ Electronic Modeling Evaluation Workbook in any way, including but not limited to changing formulas, formatting, content, or protections.	I agree

Administrative Information:	
Data Type:	**Facility Information:**
Project Number (6 digits):	
Permit Number:	TBD
Regulated Entity ID (9 digits):	106208655
Facility Name:	QuikTrip Distribution
Facility Address:	4200 Railport Pkwy
Facility County (select one):	Ellis
Company Name:	QuikTrip Corporation
Company Contact Name:	Damon Wright
Company Contact Number:	918-615-7633
Company Contact Email:	dawright@quiktrip.com
Modeling Company Name, as applicable:	ALL4 LLC
Modeling Contact Name:	Rebekah Bowlds
Modeling Contact Number:	678-460-0324 x214
Modeling Contact Email:	rbowlds@all4inc.com
New/Existing Site (select one):	New Site
Modeling Date (MM/DD/YYYY):	12/3/2019
Datum Used (select one):	NAD 83
UTM Zone (select one):	14

Sheet Instructions: Indicate in the Table of Contents which sections are applicable and included for this modeling demonstration. Select "X" from the drop down if the item below is included in the workbook. Note: This workbook is only for the following air dispersion models: AERSCREEN, ISC/ISCPrime, and/or AERMOD. If SCREEN3 is used, please use the separate Electronic Modeling Evaluation Workbook (EMEW) for SCREEN3 workbook.

Table of Contents:

Section:	Sheet Title *(Click to jump to specific sheet):*	Select an X from the dropdown menu if included:
1	General	X
2	Model Options	X
3	Building Downwash	X
4	Flare Source Parameters	
5	Point Source Parameters	X
6	Area Source Parameters	
7	Volume Source Calculations	
8	Volume Source Parameters	
9	Point and Flare Source Emissions	X
10	Area Source Emissions	
11	Volume Source Emissions	
12	Speciated Emissions	X
13	Intermittent Sources	
14	Modeling Scenarios	X
15	Monitor Calculations	
16	Background Justification	
17	Secondary Formation of PM2.5	
18	NAAQS/State Property Line (SPL) Modeling Results	X
19	Unit Impact Multipliers	
20	Health Effects Modeling Results	X
21	Modeling File Names	X
22	Speciated Chemicals	

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

General Information

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Included Attachments Instructions: The following are attachments that must be included with any modeling analysis. If providing the plot plan and area map with the permit application, ensure there is also a copy with the EMEW. The copy can be electronic.	**Select an X from the dropdown menu if included:**
Plot Plan: Instructions: Mark all that apply in the attached plot plan. For larger properties or dense source areas, provide multiple zoomed in plot plans that are legible.	
Property/Fence Lines all visible and marked.	X
North arrow included.	X
Clearly marked scale.	X
All sources and buildings are clearly labeled.	X
Area Map:	
Instructions: Mark all that apply in the attached area map.	
Annotate schools within 3,000ft of source's nearest property line.	X
All property lines are included.	X
Non-industrial receptors are identified.	Choose an item
Additional Attachments (as applicable): *Note: These are just a few examples of attachments that may need to be included. There may be others depending on the scope of the modeling analysis.*	**Select an X from the dropdown menu if included:**
Processed Met Data Information	
Excel spreadsheet of processed meteorology data.	Choose an item
Meteorological Files (all input and outputs).	Choose an item
Source Group Descriptions	
Description of modeling source groups (could be in a tabulated format).	Choose an item
Modeling Techniques and Scenarios *Provide all justification and discussion on modeling scenarios used for the modeling analyses. The following boxes are examples of approaches that should be provided but is not all inclusive.*	
Discussion on modeling techniques not discussed in workbook.	Choose an item
Justification for exceedance refinements, as applicable.	Choose an item
Discussion and images for worst-case determination, as applicable.	Choose an item
Single Property Line Designation, as applicable	
Include Agreement, Order, and map defining each petitioner.	Choose an item
Post Processing using Unit Impact Multipliers (UIMs)	
Include documentation on any calculations used with the UIMs (i.e., Step 3 of the MERA).	Choose an item
Tier 3 NO_2 analysis *If OLM or PVMRM are used, provide all justification and documentation on using this approach.*	
Description of model setup.	Choose an item
Description and justification of model options selected (i.e., NO_2 to NO_x in-stack ratios).	Choose an item
Other Attachments *Provide a list in the box below of additional attachments being provided that are not listed above:*	
	Choose an item

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Model Options

Date: December 2019
Permit #: TBD
Company Name: QuikTrip Distribution

I. Project Information
A. Project Overview: In the box below, give a brief Project Overview. To type or insert text in box, double click in the box below. *Please limit your response to 2000 characters.*
QuikTrip Distribution (QuikTrip) is seeking approval to permit the operation of three generator sets (gensets) driven by diesel fuel-fired Reciprocating Internal Combustion Engine (RICE) [referred to as engine generators (EG)1, EG2, and EG3] for both emergency and non-emergency use at the facility. Although the Minor New Source Review (NSR) Permit Application (Application) is to permit non-emergency operation, the intent of the engines is to serve in both emergency and non-emergency situations. EG1, EG2, and EG3 are operating onsite, and while this Application for non-emergency service is being processed, the gensets will continue to operate for emergency use under the conditions of a permit by rule (PBR).

II. Air Dispersion Modeling Preliminary Information			
Instructions: Fill in the information below based on your modeling setup. The selections chosen in this sheet will carry throughout the sheet and workbook. Based on selections below, only portions of the sheet and workbook will be available. Therefore, it is vital the sheet and workbook are filled out in order, do NOT skip around. For larger text boxes, double click to type or insert text.			
A. Type of Model Used: *Select "X" in all that apply*			
	AERSCREEN	X	AERMOD
19191	Enter in all applicable Model Version(s).		
B. Building Downwash			
Yes	Is downwash applicable? *(Select "Yes" or "No")*		
4274	Enter BPIP version (AERMOD and ISCPrime only).		
C. Type of Analyses: (Select "X" in all that apply) *PSD projects should submit a protocol and not utilize this form.			
X	Minor NSR NAAQS	X	State Property Line
X	Health Effects		

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Model Options

Date: December 2019
Permit #: TBD
Company Name: QuikTrip Distribution

D. Constituents Evaluating: (Select "X" in all that apply)			
NAAQS: List all pollutants that require an modeling review. *(Select "X" in all that apply)*			
X	SO_2	X	PM_{10}
X	CO	X	$PM_{2.5}$
	Pb	X	NO_2
Both	Identify which averaging periods are being evaluated for NO_2.		
Tier 2: ARM 2	Identify the 1-hr NO_2 tier used for the AERMOD or AERSCREEN analyses.		
Tier 2: ARM 2	Identify the annual NO_2 tier used for the AERMOD or AERSCREEN analyses.		
State Property Line: List all pollutants that require an modeling review. *(Select "X" in all that apply)*			
	H_2S	X	SO_2
X	H_2SO_4		
Health Effects: Fill in the Speciated Emissions sheet with all applicable pollutants, CAS numbers, and ESLs.			

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Model Options

Date: December 2019
Permit #: TBD
Company Name: QuikTrip Distribution

E. Dispersion Options: *If "Urban" has been selected and this project is using AERMOD or AERSCREEN, include the population used. Select "X" in the box to select an option.*			
	Urban		
X	Rural		
Provide any additional justification on the dispersion option selected above:			
The rural option was used because more than 50% of the area equivalent to a three kilometer radius surrounding the facility is considered rural based on the 2011 National Land Cover Data.			
F. Determination of Surface Roughness: *If AERSCREEN or AERMOD is used, fill out the section below.*			
Select basis for surface roughness:	AERSURFACE		
Select "X" in one of the three surface roughness categories:			
X	Low		Medium
			High
If you are using AERSURFACE, please complete the following section:			
13016	AERSURFACE Version Number		
683453	Center UTM Easting (meters)	3590539	Center UTM Northing (meters)
1	Study Radius (km)		
No	Airport? (Select Yes or No)		
No	Continuous Snow Cover (Select Yes or No)		
Average	Surface Moisture (Select Wet, Dry, or Average)		
No	Arid Region? (Select Yes or No)		
default	Month/Season Assignment		

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Model Options

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

G. Meteorological Data:			
If AERMOD and/or ISC/ISCPrime are selected, please complete the following section:			
53912		Surface Station	
13957		Upper Air Station	
136.0	Meters (m)	Profile Base Elevation (AERMOD only)	
16216		AERMET Version Number	
Yes	Was TCEQ pre-processed data used?	1 Year	Years used
Please enter the year(s) selected for this meteorological data:			
2012	1 Year		
Provide any other justification for Meteorological Data, as applicable.			
QuikTrip utilized meteorological data available through TCEQ's website, last updated April 12, 2017. These datasets were processed with AERMET version 16216 and have not been updated to the current version 19191. The updated 19191 fixed minor errors and installed beta options, but none that would affect the MET data values.			

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Model Options

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

H. Receptor Grid:		
For AERMOD or ISC/ISCPrime, fill in the following information on your modeled receptor grid. Note: Receptor grid resolution (tight, fine, medium, coarse) are based on recommended receptor grid spacing per the AQMG, if something outside of this is used, fully describe it below.		
25	Meters (m)	Tight Receptor Spacing
300	Meters (m)	Tight Receptor Distance
100	Meters (m)	Fine Receptor Spacing
1000	Meters (m)	Fine Receptor Distance
500	Meters (m)	Medium Receptor Spacing
5000	Meters (m)	Medium Receptor Distance
1000	Meters (m)	Coarse Receptor Spacing
10000	Meters (m)	Coarse Receptor Distance
Describe any other receptor grid designs (over water, GLC_{ni}, SPLD etc.):		
Not Applicable (N/A)		

I. Terrain:	
X	Elevated
18081	AERMAP Version.
For additional justification on terrain selection, fill in the box below:	

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Building Downwash

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Facility:

Downwash Type	Modeled Building ID	Tank Diameter (m)	Number of Tiers	Maximum Height (m)	Tier 1 Height (m)	Tier 2 Height (m)	Tier 3 Height (m)	Tier 4 Height (m)	Tier 5 Height (m)	Tier 6 Height (m)	Tier 7 Height (m)	Tier 8 Height (m)	Tier 9 Height (m)	Tier 10 Height (m)
Building	BLD1		1	26.21	26.21									
Building	BLD2		1	4.27	4.27									

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Point Source Parameters

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Facility:

EPN	Model ID	Modeling Scenario	Source Description	Point Source Type	Point Source Justification	Easting: X [m]	Northing: Y [m]	Base Elevation [m]	Height [m]	Exit Temperature [K]	Exit Velocity [m/s]	Diameter [m]
EG-1	EG1	Normal	Engine-Generator 1	POINT	Vertical Stack	683478.25	3590555.15	200.65	4.57	757.040	73.100	0.200
EG-2	EG2	Normal	Engine-Generator 2	POINT	Vertical Stack	683480.51	3590556.37	200.65	4.57	757.040	73.100	0.200
EG-3	EG3	Normal	Engine-Generator 3	POINT	Vertical Stack	683482.81	3590557.33	200.65	4.57	757.040	73.100	0.200

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Point and Flare Source Emissions

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Facility:

EPN	Model ID	Modeling Scenario	Pollutant	Modeled Averaging Time	Standard Type	Review Context	Intermittent Source?	Modeled Emission Rate [lb/hr]	Basis of Emission Rate	Scalars or Factors Used?	Scalar/Factor in Use
EG-1	EG1	Normal	NOx	1-hr	NAAQS	SIL Analysis	No	0.590	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate intermittant operation.	No	
EG-1	EG1	Normal	NOx	Annual	NAAQS	SIL analysis	No	0.0334	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate intermittant operation.	No	
EG-1	EG1	Normal	PM10	24-hr	NAAQS	SIL Analysis	No	0.0340	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-1	EG1	Normal	PM2.5	24-hr	NAAQS	SIL Analysis	No	0.0340	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-1	EG1	Normal	PM2.5	Annual	NAAQS	SIL Analysis	No	0.00194	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate long-term standards.	No	
EG-1	EG1	Normal	CO	1-hr	NAAQS	SIL Analysis	No	0.170	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-1	EG1	Normal	CO	8-hr	NAAQS	SIL Analysis	No	0.170	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-1	EG1	Normal	SO2	1-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-1	EG1	Normal	SO2	3-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-1	EG1	Normal	SO2	24-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-1	EG1	Normal	SO2	Annual	NAAQS	SIL Analysis	No	6.45E-04	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate long-term standards.	No	
EG-1	EG1	Normal	H2SO4	1-hr	State Property Line	Project-Wide	No	0.00173	10% molar conversion of SO2 to SO3 and 100% conversion of SO3 to H2SO4 based on engineering judgment.	No	
EG-1	EG1	Normal	H2SO4	24-hr	State Property Line	Project-Wide	No	0.00173	10% molar conversion of SO2 to SO3 and 100% conversion of SO3 to H2SO4 based on engineering judgment.	No	
EG-1	EG1	Normal	SO2	1-hr	State Property Line	Project-Wide	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Point and Flare Source Emissions

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

EPN	Model ID	Modeling Scenario	Pollutant	Modeled Averaging Time	Standard Type	Review Context	Intermittent Source?	Modeled Emission Rate [lb/hr]	Basis of Emission Rate	Scalars or Factors Used?	Scalar/Factor in Use
EG-2	EG2	Normal	NOx	1-hr	NAAQS	SIL Analysis	No	0.590	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate intermittant operation.	No	
EG-2	EG2	Normal	NOx	Annual	NAAQS	SIL Analysis	No	0.0334	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate intermittant operation.	No	
EG-2	EG2	Normal	PM10	24-hr	NAAQS	SIL Analysis	No	0.0340	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-2	EG2	Normal	PM2.5	24-hr	NAAQS	SIL Analysis	No	0.0340	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-2	EG2	Normal	PM2.5	Annual	NAAQS	SIL Analysis	No	0.00194	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate long-term standards.	No	
EG-2	EG2	Normal	CO	1-hr	NAAQS	SIL Analysis	No	0.170	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-2	EG2	Normal	CO	8-hr	NAAQS	SIL Analysis	No	0.170	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-2	EG2	Normal	SO2	1-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-2	EG2	Normal	SO2	3-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-2	EG2	Normal	SO2	24-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-2	EG2	Normal	SO2	Annual	NAAQS	SIL Analysis	No	6.45E-04	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate long-term standards.	No	
EG-2	EG2	Normal	H2SO4	1-hr	State Property Line	Project-Wide	No	0.00173	10% molar conversion of SO2 to SO3 and 100% conversion of SO3 to H2SO4 based on engineering judgment.	No	
EG-2	EG2	Normal	H2SO4	24-hr	State Property Line	Project-Wide	No	0.00173	10% molar conversion of SO2 to SO3 and 100% conversion of SO3 to H2SO4 based on engineering judgment.	No	
EG-2	EG2	Normal	SO2	1-hr	State Property Line	Project-Wide	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-3	EG3	Normal	NOx	1-hr	NAAQS	SIL Analysis	No	0.590	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate intermittant operation.	No	

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Point and Flare Source Emissions

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

EPN	Model ID	Modeling Scenario	Pollutant	Modeled Averaging Time	Standard Type	Review Context	Intermittent Source?	Modeled Emission Rate [lb/hr]	Basis of Emission Rate	Scalars or Factors Used?	Scalar/Factor in Use
EG-3	EG3	Normal	NOx	Annual	NAAQS	SIL Analysis	No	0.0334	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate intermittant operation.	No	
EG-3	EG3	Normal	PM10	24-hr	NAAQS	SIL Analysis	No	0.0340	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-3	EG3	Normal	PM2.5	24-hr	NAAQS	SIL Analysis	No	0.0340	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-3	EG3	Normal	PM2.5	Annual	NAAQS	SIL Analysis	No	0.00194	Vendor information with 25% added safety factor. 931 bhp engine. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate long-term standards.	No	
EG-3	EG3	Normal	CO	1-hr	NAAQS	SIL Analysis	No	0.170	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-3	EG3	Normal	CO	8-hr	NAAQS	SIL Analysis	No	0.170	Vendor information with 25% added safety factor. 931 bhp engine.	No	
EG-3	EG3	Normal	SO2	1-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-3	EG3	Normal	SO2	3-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-3	EG3	Normal	SO2	24-hr	NAAQS	SIL Analysis	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	
EG-3	EG3	Normal	SO2	Annual	NAAQS	SIL Analysis	No	6.45E-04	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content. Long-term emissions rates are calculated utilizing 500 hours of operation divided by 8,760 hours of modeled hours in order to evaluate long-term standards.	No	
EG-3	EG3	Normal	H2SO4	1-hr	State Property Line	Project-Wide	No	0.00173	10% molar conversion of SO2 to SO3 and 100% conversion of SO3 to H2SO4 based on engineering judgment.	No	
EG-3	EG3	Normal	H2SO4	24-hr	State Property Line	Project-Wide	No	0.00173	10% molar conversion of SO2 to SO3 and 100% conversion of SO3 to H2SO4 based on engineering judgment.	No	
EG-3	EG3	Normal	SO2	1-hr	State Property Line	Project-Wide	No	0.0113	AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content	No	

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Speciated Emissions

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Speciated Emissions by Model ID

CAS #	Chemical Species	Other Species	Short-Term ESL (µg/m³)	Long-Term ESL (µg/m³)				
7664-41-7	ammonia		180	92				
68476-34-6	diesel fuel #2		1000	100				

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Modeling Scenarios

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Modeling Scenario	Scenario Description:
Normal	EG-1, EG-2 and EG-3 operating at full load for 500 hours/year.

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Modeling Results Summary

Date: December 2019
Permit #: TBD
Company Name: QuikTrip Distribution

Table 1. Project-Related Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	1.85402	20.42
H_2SO_4	1-hr	0.285	1
H_2SO_4	24-hr	0.0465	0.3
H_2S	1-hr		2.16 *(If property is residential, recreational, business, or commercial)*
H_2S	1-hr		3.24 *(If property is not residential, recreational, business, or commercial)*

Table 2. Site-wide Modeling Results for State Property Line

Pollutant	Averaging Time	GLCmax (µg/m^3)	Standard (µg/m^3)
SO_2	1-hr	1.85402	1021
H_2SO_4	1-hr	0.285	50
H_2SO_4	24-hr	0.0465	15
H_2S	1-hr		108 *(If property is residential, recreational, business, or commercial)*
H_2S	1-hr		162 *(If property is not residential, recreational, business, or commercial)*

Table 3. Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m^3)	De Minimis (µg/m^3)
SO_2	1-hr	1.85402	7.8*
SO_2	3-hr	0.854	25
SO_2	24-hr	0.303	5
SO_2	Annual	0.00539	1
PM_{10}	24-hr	0.914	5
NO_2	1-hr	87.34525	7.5**
NO_2	Annual	0.251	1
CO	1-hr	27.94088	2000
CO	8-hr	9.04550	500

Additional information for the De Minimis values listed above can be found at:
* www.tceq.texas.gov/assets/public/permitting/air/memos/appwso2.pdf
** www.tceq.texas.gov/assets/public/permitting/air/memos/guidance_1hr_no2naaqs.pdf

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Modeling Results Summary

Date: December 2019
Permit #: TBD
Company Name: QuikTrip Distribution

Table 4. $PM_{2.5}$ Modeling Results for Minor NSR De Minimis

Pollutant	Averaging Time	GLCmax (µg/m^3)	Secondary $PM_{2.5}$ Contribution (µg/m^3)	Total Conc. = Secondary $PM_{2.5}$ + GLCmax (µg/m^3)	De Minimis (µg/m^3)
$PM_{2.5}$	24-hr	0.914	0.000240868	0.91385	1.2*
$PM_{2.5}$	Annual	0.0162	9.7417E-06	0.01620	0.2*

Additional information for the De Minimis values listed above can be found at:
* www.tceq.texas.gov/permitting/air/modeling/epa-mod-guidance.html

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Modeling Results Summary

Date: December 2019
Permit #: TBD
Company Name: QuikTrip Distribution

Table 5. Total Concentrations for Minor NSR NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m^3)	Background (µg/m^3)	Total Conc. = [Background + GLCmax] (µg/m^3)	Standard (µg/m^3)
SO_2	1-hr		0	0	196
SO_2	3-hr		0	0	1300
SO_2	24-hr		0	0	365
SO_2	Annual		0	0	80
PM_{10}	24-hr		0	0	150
Pb	3-mo		0	0	0.15
NO_2	1-hr	87.34525	69.00	156.35	188
NO_2	Annual		0	0	100
CO	1-hr		0	0	40000
CO	8-hr		0	0	10000

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Modeling Results Summary

Date: December 2019
Permit #: TBD
Company Name: QuikTrip Distribution

Table 6. Total Concentrations for Minor NSR NAAQS (Concentrations > De Minimis)

Pollutant	Averaging Time	GLCmax (µg/m^3)	Secondary $PM_{2.5}$ Contribution (µg/m^3)	Background (µg/m^3)	Total Conc. = [Background + Secondary + GLCmax] (µg/m^3)	Standard (µg/m^3)
$PM_{2.5}$	24-hr	0.914	0.000240868	0	0.914	35
$PM_{2.5}$	Annual	0.0162	9.7417E-06	0	0.0162	12

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Health Effects Modeling Results

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Facility:

Modeled Health Effect Results (MERA Guidance):				Step 3	Step 4: Production		Step 4: MSS		Step 5: MSS Only	Step 5: Hours of Exceedance				Step 6	Step 7: Site Wide		Step 7: Hours of Exceedance			
Chemical Species	CAS Number	Averaging Time	ESL [µg/m^3]	10% ESL Step 3 Modeled GLCmax [µg/m^3]	25 % ESL Step 4 Production GLCmax since most recent site wide modeling [µg/m^3]	10% ESL Step 4 Production Project Only GLCmax [µg/m^3]	50% ESL Step 4 MSS GLCmax since most recent site wide modeling [µg/m^3]	25% ESL Step 4 MSS Project Only GLCmax [µg/m^3]	Full ESL Step 5 GLCmax [µg/m^3]	*1X ESL GLCmax* Step 5 MSS Hours of Exceedance	*2X ESL GLCmax* Step 5 MSS Hours of Exceedance	*4X ESL GLCmax* Step 5 MSS Hours of Exceedance	*10X ESL GLCmax* Step 5 MSS Hours of Exceedance	Was Step 6 relied on to fall out of the MERA?	Site Wide GLCmax [µg/m^3]	Site Wide GLCni [µg/m^3]	*1X ESL GLCni* Hours of Exceedance	*2X ESL GLCmax* Hours of Exceedance	*4X ESL GLCmax* Hours of Exceedance	*10X ESL GLCmax* Hours of Exceedance
ammonia	7664-41-7	1-hr	180	Refer to Table A-1																
diesel fuel #2	68476-34-6	1-hr	1000																	
ammonia	7664-41-7	Annual	92																	
diesel fuel #2	68476-34-6	Annual	100																	

Texas Commission on Environmental Quality

Electronic Modeling Evaluation Workbook (EMEW)

Modeling File Names

Date: December 2019
Permit #: _TBD_
Company Name: _QuikTrip Distribution_

Facility:

Model File Base Name	Pollutant	Averaging Time	File Extensions	Additional File Description
N_SH12_01	NO2	1-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
N_SA12_01	NO2	Annual	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
C_SHE12_01	CO	1-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
C_SHE12_01	CO	8-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
PM10_SD12_01	PM10	24-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
PM25_SD12_01	PM2.5	24-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
PM25_SA12_01	PM2.5	Annual	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
S_SHTD12_01	SO2	1-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
S_SHTD12_01	SO2	3-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
S_SHTD12_01	SO2	24-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
S_SH12_01	SO2	1-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SPL
S_SA12_01	SO2	Annual	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SIL
H2SO4_SHD12_01	H2SO4	1-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SPL
H2SO4_SHD12_01	H2SO4	24-hr	*.ADI, .ADO, .bpi, *-ALL-H1.PLT	SPL

Executive Summary

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit the operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project. The Facility details are provided below.

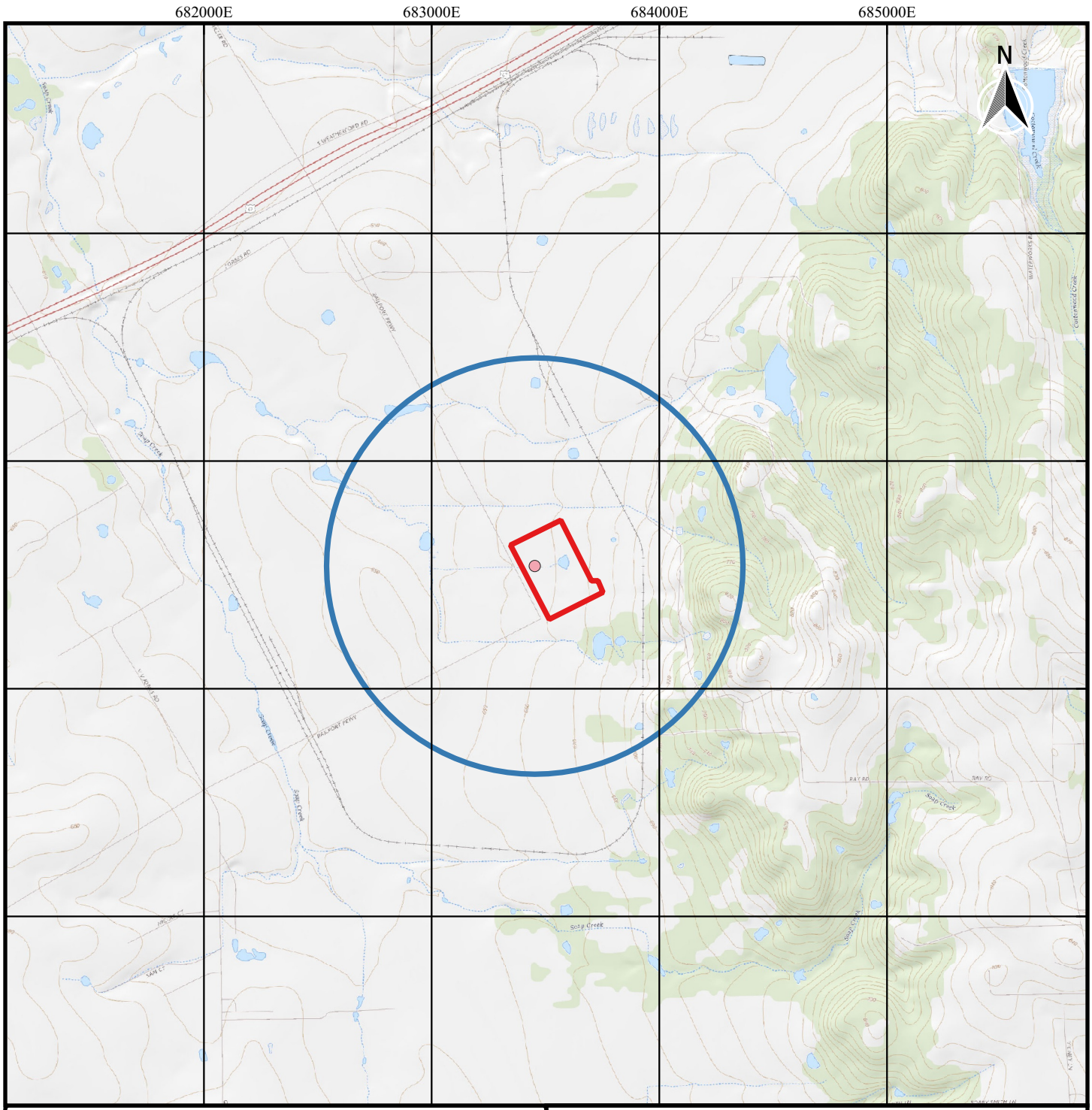
QuikTrip Corporation
Midlothian, TX
RN106208655/CN600241673

Introduction

This Application is submitted via the State of Texas Environmental Electronic Reporting System (STEERS) in accordance with the provisions of 30 Texas Administrative Code (TAC) Chapter 116, Subchapter B: *NSR Permits* and consists of the following information. The bolded items are included in this section:

- Process Description
- ALL4 Quality Professional (AQP) Seal
- TCEQ 20833a: PI-1 – *General Application, Version 4.0*
- Electronic Modeling Evaluation Workbook (EMEW)
- Figures
  - **Facility Location Map**
  - **Plot Plan**
  - **Process Flow Diagram**
- Regulatory Applicability Analyses
- Best Available Control Technology (BACT) Determinations
- Summary of Emissions and Emissions Calculations
- Sample Calculations
- Equipment Tables
  - TCEQ 10166: Table 7(b) – *Horizontal Fixed Roof Storage Tank Summary*
  - TCEQ 10169: Table 7(e) – *Chemical Data Information*
  - TCEQ 10195: Table 29 – *Reciprocating Engines*
- Engine and Fuel Specifications

Should you have any questions related to this submittal or require additional information, please contact Tanner Henson at thenson@all4inc.com or 281-937-7553 x308 or me at Krudd@quiktrip.com or 918-615-7233.



3,000 Foot Radius from Facility

Facility Location

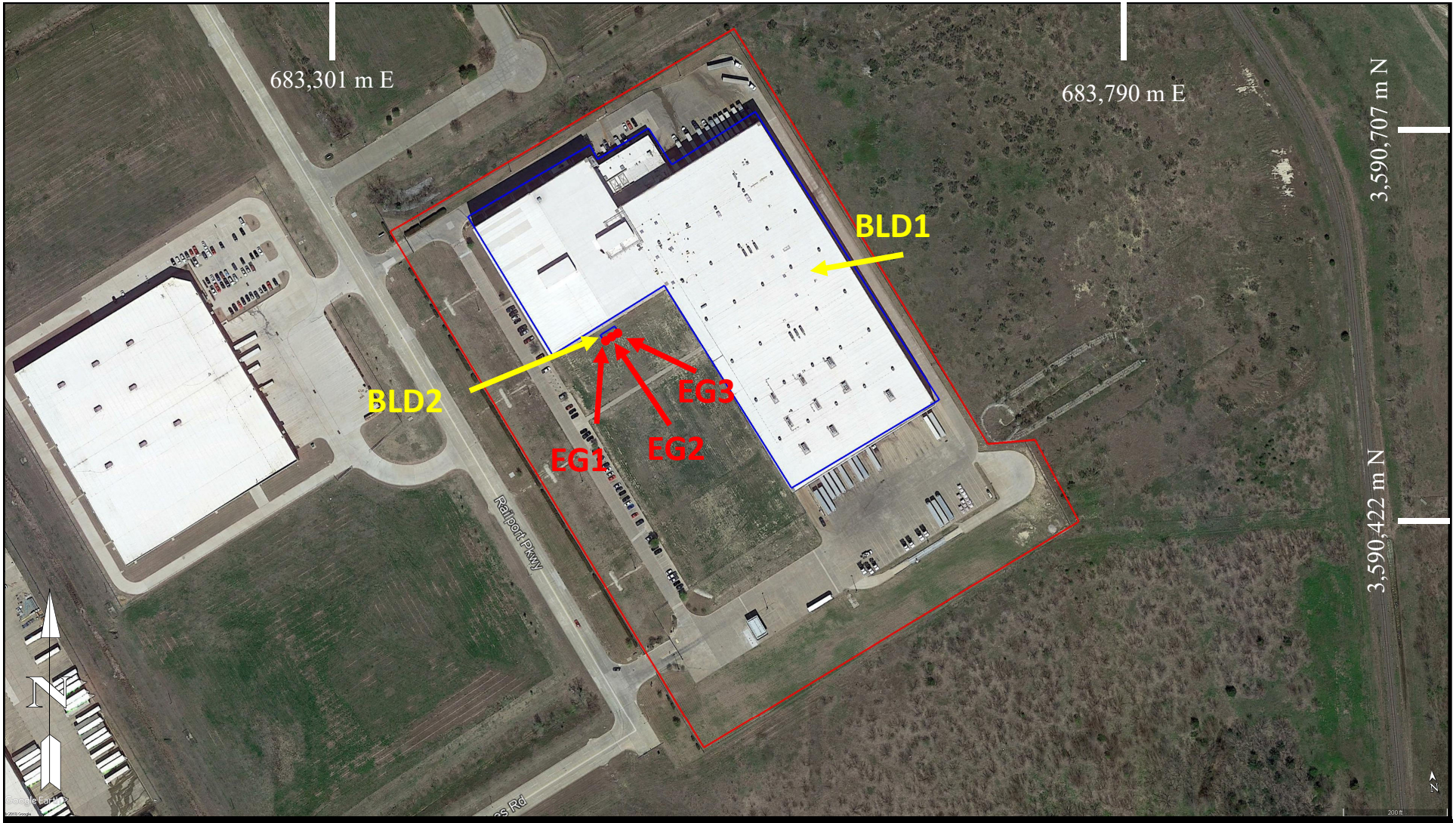
Facility Boundary

0 250 500 750 1000 m

Coordinate Datum: UTM NAD 83 Zone 14

QuikTrip Distribution
Midlothian, TX

Figure 1
Area Map



Structure Location (Refer to EMEW for Building Dimensions)

Generator Location
EG1 (683,478 m E, 3,590,555 m N)
EG2 (683,481 m E, 3,590,556 m N)
EG3 (683,483 m E, 3,590,557 m N)

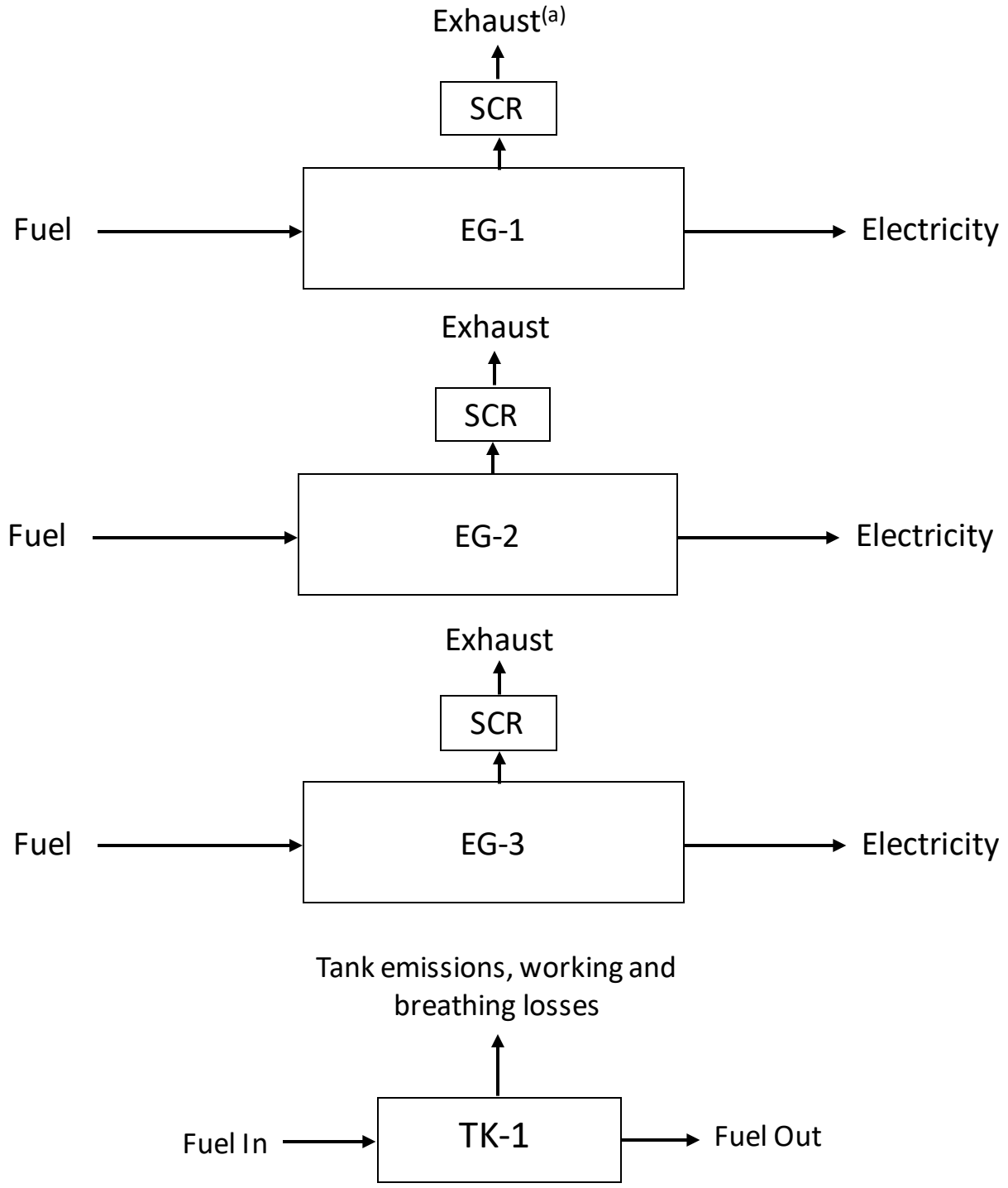
0 200 400
Feet

Coordinate Datum: UTM NAD 83 Zone 14

QuikTrip Distribution
Midlothian, TX

Figure 2
Plot Plan

Figure 3
Process Flow Diagram
Air Emission Sources
PowerSecure, Inc./QuikTrip



(a) Because the normal operation of the engine generator sets is related related to maintaining readiness, the typical operational sequence is startup, brief operation, and shutdown. Consequently, maintenance, startup, and shutdown (MSS) emissions are not expected to be greater than normal operating conditions.

Executive Summary

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit and operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project. The Facility details are provided below.

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Regulatory Applicability Analysis

QuikTrip reviewed Federal and state of Texas air quality regulations to determine potentially applicable air quality requirements for the Project. The regulations that potentially apply to the proposed non-emergency generators, driven by diesel fuel-fired RICE, are described in the following subsections.

Standards of Performance for New Stationary Sources

The United States Environmental Protection Agency (U.S. EPA) has promulgated standards of performance for specific new, reconstructed, and modified sources, otherwise known as Standards of Performance for New Stationary Sources (NSPS), which are codified at 40 CFR Part 60.

40 CFR Part 60, Subpart A – General Provisions

The provisions of 40 CFR Part 60, Subpart A apply to the owner or operator of any stationary source subject to an NSPS. These general provisions include recordkeeping, reporting, monitoring, and testing requirements. Because the Project will be subject to NSPS, it will be required to comply with the applicable requirements of 40 CFR Part 60, Subpart A.

40 CFR Part 60, Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984

40 CFR Part 60, Subpart Kb (Standards of Performance for Volatile Organic Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984) applies to fuel storage tanks greater than 75 cubic meters (m^3) pursuant to 40 CFR §60.110b. The Project includes one diesel fuel storage tank with a capacity of 3,000 gallons (11.36 m^3). The tank is less than 75 m^3; therefore, Subpart Kb does not apply to the Project.

40 CFR Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines

The requirements of 40 CFR Part 60, Subpart IIII (Standards of Performance for Stationary Compression Ignition Internal Combustion Engines) apply to the owners and operators of stationary compression ignition (CI) internal combustion engines (ICE) that commence operation after July 11, 2005 and are manufactured after the dates specified in 40 CFR §60.4200. Subpart IIII applies to the proposed 931 brake horsepower (bhp) diesel fuel-fired engines that drive the non-emergency generators at the Facility.

The emissions standards applicable to the proposed engines are presented in 40 CFR §60.4204(b), where owners and operators of 2007 or later model year non-emergency stationary CI ICE with a displacement of less than 30 liters per cylinder must comply with the emissions standards in 40 CFR §60.4201. Non-emergency diesel fuel-fired RICE must be certified by manufacturers to meet the applicable emissions standards for new, non-road compression ignition engines for the same model year and maximum engine power in Table 1 of 40 CFR §1039.101. Pursuant to 40 CFR §1039.101(b), for model year 2014 or later non-emergency engines with power ratings greater than 560 kilowatt (kW) (i.e., 750 bhp), steady-state exhaust emissions may not exceed the following applicable Tier 4f emissions standards:

- 0.67 grams per kilowatt-hour (g/kW-hr) of nitrogen oxides (NO_X)
- 3.5 g/kW-hr of carbon monoxide (CO)
- 0.19 g/kW-hr of nonmethane hydrocarbons (NMHC)
- 0.03 g/kW-hr of particulate matter (PM)

Since October 1, 2010, 40 CFR §60.4207(b) requires engines to use compliant fuel in accordance with 40 CFR §80.510(b). Such fuel must not exceed a maximum sulfur content of 15 parts per million (ppm) and have a minimum cetane index of 40 or not exceed a maximum aromatic content of 35% by volume. Therefore, the proposed RICE will use ultra-low sulfur diesel (ULSD). Manufacturer information for a typical fuel gas analysis for ULSD is provided in the additional space attachment in STEERS. Additionally, per 40 CFR §60.4211(a), QuikTrip must operate and maintain the RICE and associated control device according to the manufacturers' written instructions. QuikTrip may also change only those emission-related settings that are

permitted by the manufacturer. QuikTrip will comply with the applicable monitoring, recordkeeping, and reporting requirements under Subpart IIII.

National Emission Standards for Hazardous Air Pollutants

The National Emission Standards for Hazardous Air Pollutants (NESHAP) originally required by the 1970 Clean Air Act (CAA), found at 40 CFR Part 61, apply to specific compounds emitted from specific source categories. The Project does not fall under any of the source categories regulated by 40 CFR Part 61. Therefore, 40 CFR Part 61 requirements are not applicable to the Project.

The provisions of 40 CFR Part 63 implement Maximum Achievable Control Technology (MACT) standards which apply to specific source categories that are considered either major or area sources of hazardous air pollutants (HAP). A major source of HAP is defined as a stationary source that has the potential to emit (PTE) 10 tons per year (tpy) or more of any single HAP, or 25 tpy or more of any combination of HAP. Emissions from the Facility do not exceed the 10 tpy threshold for any single HAP, or the 25 tpy threshold for any combination of HAP; therefore, the Facility is an area source of HAP.

40 CFR Part 63, Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

40 CFR Part 63, Subpart ZZZZ (National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines) (also referred to as RICE MACT) applies to stationary RICE located at a major or area source of HAP emissions. Therefore, the provisions of 40 CFR Part 63, Subpart ZZZZ apply to the non-emergency engines. In accordance with 40 CFR §63.6590(c)(1), a stationary RICE located at an area source of HAP meets the requirements of 40 CFR Part 63, Subpart ZZZZ by meeting the requirements of 40 CFR Part 60, Subpart IIII or 40 CFR Part 60, Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines). The diesel fuel-fired RICE will comply with the applicable requirements of Subpart IIII; therefore, the requirements of Subpart ZZZZ will be met.

State of Texas Air Quality Regulations

Potentially applicable state of Texas regulations as codified in 30 TAC – Environmental Quality are summarized below and discussed in the following subsections.

- 30 TAC Chapter 101 – General Air Quality Rules
- 30 TAC Chapter 106 – Permits By Rule
- 30 TAC Chapter 111 – Control of Air Pollution from Visible Emissions and Particulate Matter
- 30 TAC Chapter 112 – Control of Air Pollution from Sulfur Compounds
- 30 TAC Chapter 113 – Standards of Performance for Hazardous Air Pollutants and for Designated Facilities and Pollutants
- 30 TAC Chapter 115 – Control of Air Pollution from Volatile Organic Compounds
- 30 TAC Chapter 116 – Control of Air Pollution by Permits for New Construction or Modification
- 30 TAC Chapter 117 – Control of Air Pollution from Nitrogen Compounds
- 30 TAC Chapter 118 – Control of Air Pollution Episodes
- 30 TAC Chapter 122 – Federal Operating Permits Program

30 TAC Chapter 101 – General Air Quality Rules

30 TAC Chapter 101 specifies the general air quality rules for the State of Texas. QuikTrip will demonstrate compliance with the requirements of 30 TAC §101 upon commencement of operation as applicable.

30 TAC Chapter 106 – Permits By Rule

30 TAC Chapter 106 identifies types of changes or facilities that the Texas Commission on Environmental Quality (TCEQ) has determined will not

make a significant contribution of air contaminants to the atmosphere pursuant to the Texas Health and Safety Code, Chapter 382 the Texas Clean Air Act (TCAA) §382.057 and §382.05196, respectively. QuikTrip is requesting authorization of its engines in non-emergency situations through this Application and is seeking authorization of its engines in emergency situations under the conditions of a PBR, specifically through 30 TAC §106.511 (Portable and Emergency Engines and Turbines). No registration or fees are associated with this PBR. As applicable, QuikTrip will maintain records required pursuant to 30 TAC §106.8.

30 TAC Chapter 111 – Control of Air Pollution from Visible Emissions and Particulate Matter

Standards for visible emissions and PM are addressed in 30 TAC Chapter 111. Specifically, 30 TAC §111.111(a)(1)(B) prohibits visible emissions in excess of 20% averaged over a six-minute period for any source. The proposed engines will be maintained and operated in accordance with manufacturer recommendations to demonstrate compliance with this visible emissions requirement. Pursuant to 30 TAC 111.111(a)(1)(F)(ii), QuikTrip will perform a Method 9 Test to confirm compliance.

Allowable emissions limits for nonagricultural processes are addressed in 30 TAC §111.151. Specifically, 30 TAC §111.151(a) prohibits PM from any source to exceed the allowable rates specified in Table 1 of the rule. The proposed engines will combust ULSD and will be maintained and operated in accordance with the manufacturer recommendations. Thus, the engines will demonstrate compliance with the total suspended particulate (TSP) emissions requirements, as applicable.

30 TAC Chapter 112 – Control of Air Pollution from Sulfur Compounds

Allowable emissions limits from sulfur compounds are addressed in 30 TAC Chapter 112. QuikTrip will meet the provisions of 30 TAC Chapter 112 as applicable. There are no emissions of hydrogen sulfide (H_2S) associated with this Project. In accordance with 30 TAC §112.3(a), sulfur dioxide (SO_2) emissions will not exceed a net ground level concentration of 0.4 parts per million volume (ppmv) averaged over any 30-minute period. In accordance with 30 TAC §112.3(a), sulfuric acid (H_2SO_4) emissions will not exceed the net ground level concentrations

specified in 30 TAC §§112.41(a)(1)-(3). Because the engines combust ULSD with a sulfur content of less than 15 ppmv and through air quality modeling, the Project demonstrates compliance with the aforementioned emissions limits for SO_2 and H_2SO_4.

30 TAC Chapter 113 – Standards of Performance for Hazardous Air Pollutants and for Designated Facilities and Pollutants

The provisions of 30 TAC Chapter 113, Subchapter C incorporates multiple Federal NESHAP by reference. The RICE MACT standards as specified in 40 CFR Part 63, Subpart ZZZZ are incorporated by reference in 30 TAC §113.1090. As stated above, QuikTrip will comply with the provisions of 40 CFR Part 63, Subpart ZZZZ that apply to the non-emergency engines that drive the generators.

30 TAC Chapter 115 – Control of Air Pollution from Volatile Organic Compounds

The provisions of 30 TAC Chapter 115 apply to specific volatile organic compound (VOC)-emitting processes. QuikTrip will operate ULSD fuel storage tank which meets the exemption criteria pursuant to 30 TAC §115.111(a)(1) because the ULSD will have a true vapor pressure less than 1.5 pounds per square inch absolute (psia). Therefore, the Project does not meet the applicability of the provisions in 30 TAC §115. Pursuant to 30 TAC §115.118(a)(1), PowerSecure must maintain records sufficient to demonstrate continuous compliance with the applicable exemption criteria for the ULSD tank.

30 TAC Chapter 116 – Control of Air Pollution by Permits for New Construction or Modification

Pursuant to the provisions of 30 TAC Chapter 116, QuikTrip is submitting this Minor NSR Permit Application to TCEQ. The provisions of 30 TAC §116.111(a)(2)(C) require applicants to provide a BACT analysis for applicable new and modified facilities. The procedures for conducting a BACT analysis are not explicitly defined in the Texas regulations. In general, a Texas BACT analysis follows a three-tiered approach, which is comparable to the Federal "top-down" BACT requirements. Specifically, BACT is defined in 30 TAC §116.10 as:

> *"An air pollution control method for a new or modified facility that through experience and research, has proven to be operational, obtainable, and capable of reducing or eliminating emissions from the facility, and is considered technically practical and economically reasonable for the facility. The emissions reduction can be achieved through technology such as the use of add-on control equipment or by enforceable changes in production processes, systems, methods, or work practice."*

Details regarding the required BACT analyses are provided in the BACT attachment in STEERS. QuikTrip initiated the BACT analysis for the non-emergency engines using the TCEQ three-tier evaluation. The three-tier evaluation begins at the first tier (i.e., Tier I) and progresses in sequence to the second (i.e., Tier II) and third tiers (i.e., Tier III), only if necessary. QuikTrip first compared the proposed emissions rates to the emissions reduction performance levels accepted as BACT in recent NSR permit reviews for ICE. TCEQ has established Tier I NO_X and SO_2 BACT requirements for non-emergency electric generating engines. TCEQ has not established Tier I PM, PM less than 10 microns (PM_{10}), PM less than 2.5 microns ($PM_{2.5}$), CO, VOC and H_2SO_4 BACT requirements for non-emergency electric generating engines.

The proposed engines NO_X emissions guarantee does not meet the minimum acceptable NO_X control limit of 0.47 pounds per megawatt hour (lb/MW-hr) for an electric generating unit less than 10 MW in East Texas. Therefore, QuikTrip evaluated the Tier II and Tier III BACT approaches for NO_X emissions. With regard to SO_2 emissions, the engines meet TCEQ SO_2 Tier I BACT requirements, which requires liquid fuel to be limited to 0.05 percent weight of sulfur. With regard to PM/PM_{10}/$PM_{2.5}$, CO, VOC and H_2SO_4 emissions, QuikTrip is proposing that the non-emergency electric generating engines meet the applicable Federal and State emissions limits, which would constitute BACT. Therefore, a modified a Tier III BACT approach was used to evaluate PM/PM_{10}/$PM_{2.5}$, CO, VOC and H_2SO_4 emissions.

A Tier II evaluation applies if BACT requirements have not already been established for a particular process/industry. Because BACT for non-emergency engines is already established, a Tier II evaluation is not appropriate for this Application. After Tier I and Tier II BACT evaluations are exhausted, a Tier III BACT evaluation is considered. A Tier III BACT is similar to the Federal "top-down" BACT evaluation as it involves a detailed technical and quantitative economic analysis of all emissions reduction options available for the process/industry under

review. Because of the similarities between the Tier III approach and the "top-down" BACT approach as described in U.S. EPA guidance, QuikTrip has evaluated NO_X BACT for the engines using the "top-down" approach in this section.

Pursuant to 30 TAC §116.111(a)(2)(C), QuikTrip has performed a NO_X BACT analysis for the engines that considers energy, environmental, and economic impacts. The BACT analyses provided in the BACT attachment in STEERS were performed by generally conducting a "top-down" analysis as outlined in Chapters B and G of the U.S. EPA Draft "New Source Review Workshop Manual[1]."

30 TAC Chapter 117 – Control of Air Pollution from Nitrogen Compounds

The provisions 30 TAC Chapter 117, Subchapter D apply to nitrogen compound emitting processes located at minor sources in ozone nonattainment areas in the state of Texas. Because the non-emergency engines will be located in the Dallas-Fort Worth (DFW) ozone nonattainment area and the Facility will be a minor source of regulated NSR pollutants, 30 TAC Chapter 117, Subchapter D, Division 2 potentially applies. Pursuant to 30 TAC §117.2100, stationary RICE are subject 30 TAC Chapter 117, Subchapter D, Division 2.

Pursuant to 30 TAC §117.2110(a)(3)(B)(iii), the engines must comply with the NO_X emissions standard of 4.5 grams per brake horsepower hour (g/bhp-hr). The engines meet this requirement by complying with the applicable emissions limits identified in 40 CFR Part 60, Subpart IIII (i.e., 2.6 g/bhp-hr). Because the engines are not operated with a NO_X continuous emissions monitoring system (CEMS) or predictive emissions monitoring system (PEMS) under 30 TAC §117.2135(b), the averaging time for the emissions limit will be a 1-hour block average pursuant to 30 TAC §117.2110(b)(2). The units will be tested in accordance with the provisions of 30 TAC §117.2135(d) and §117.8000.

Pursuant to 30 TAC §117.2110(h)(1), the engines must comply with the CO emissions standard of 400 ppmv at 3.0% O_2 dry basis (or alternatively, 3.0 g/bhp-hr). Because the engines are not operated with a CO CEMS or PEMS, the emissions limit will be based on a 1-hour average

[1] U.S. EPA, Draft New Source Review Workshop Manual, Prevention of Significant Deterioration and Nonattainment Area Permitting, October 1990 (1990 Workshop Manual).

pursuant to 30 TAC §117.2110(h)(1)(B). Therefore, the engines will comply with the 3.0 g/bhp-hr emissions limit on a 1-hour block average. The engines meet this requirement by complying with the applicable emissions limits identified in 40 CFR Part 60, Subpart IIII (i.e., 2.6 g/bhp-hr). The units will be tested in accordance with the provisions of 30 TAC §117.2135(d), §117.8000, and §117.8000(a).

Because the engines are equipped with SCR that injects urea into the exhaust stream for NO_X control, pursuant to 30 TAC §117.2110(h)(2), the engines must comply with the NH_3 emissions standard of 10 ppmv at 3.0% O_2 dry basis. Because the engines are not operated with a CEMS or PEMS, the emissions limit will be based on a 1-hour block average pursuant to 30 TAC §117.2110(h)(2)(A). Therefore, the Project will comply with the NH_3 emissions standard of 10 ppmv at 3.0% O_2 emissions limit on a 1-hour block average. The units will be tested in accordance with the provisions of 30 TAC §117.2135(d), §117.8000, and §117.8120(2).

The operating requirements of 30 TAC §§117.2130(a)-(c) are applicable. Specifically, pursuant to 30 TAC §117.2130(b)(1), the SCR of the engines will be operated such that the urea injection rate is maintained to limit NO_X concentrations to less than or equal to the NO_X concentrations achieved at maximum rated capacity. QuikTrip must check the engines for proper operation pursuant to 30 TAC §117.8140(b) as required by 30 TAC §117.2130(b)(3). Pursuant to 30 TAC §117.8140(b), QuikTrip shall check the engines for proper operation by recording measured concentrations of engine exhaust NO_X and CO emissions using portable instruments at least quarterly and as soon as practicable within two weeks after each occurrence of engine maintenance that may reasonably be expected to increase emissions, oxygen (O_2) sensor replacement, or catalyst cleaning or catalyst replacement. Furthermore, QuikTrip shall not operate the RICE for testing or maintenance between the hours of 6:00 AM and noon, except as specified in 30 TAC §§117.2130(c)(1)-(3).

The RICE are subject to the monitoring, notification and testing requirements of 30 TAC §117.2135. Pursuant to 30 TAC §117.2135(d)(1), the units must be tested for NO_X, CO and O_2 emissions. Pursuant to 30 TAC §117.2135(d)(2), QuikTrip will use one of the NH_3 emissions monitoring procedures in 30 TAC §117.8130 to demonstrate compliance with NH_3 emissions.

The NH_3 emissions will be calculated using the equation in 30 TAC §117.8130(1). QuikTrip will comply with the above monitoring, notification, and testing requirements as applicable.

The Project is subject to the recordkeeping and reporting requirements specified in 30 TAC §117.2145. QuikTrip will comply with these recordkeeping and reporting requirements as applicable. QuikTrip will maintain the required records (e.g., emissions measurements, initial certification testing, performance testing, etc.) pursuant to 30 TAC §§117.2145(a)(2)-(5). Furthermore, pursuant to 30 TAC §117.2145(c), QuikTrip will maintain the records of operation for testing and maintenance. All records will be kept for a period of at least five years.

30 TAC Chapter 118 – Control of Air Pollution Episodes

The provisions of 30 TAC Chapter 118 require control measures when immediate action is needed to control air pollution episodes. 30 TAC Chapter 118 is generally applicable to the Project, and QuikTrip will comply with the requirements, whenever a pollution episode exists.

30 TAC Chapter 122 – Federal Operating Permits Program

The provisions of 30 TAC Chapter 122 specify the regulations applicable to the Federal Operating Permit Program. QuikTrip is seeking authorization for the Project under 30 TAC Chapter 116 and does not meet the applicability requirement specified at 30 TAC §122.120. The Project is not subject to 30 TAC Chapter 122 because federally enforceable conditions that restrict its potential emissions below the major source threshold for applicability of Title V Operating Permit (TVOP) requirements are proposed. Although the Project is subject to regulation under 40 CFR Part 60 and Part 63, the Project is not required to obtain a TVOP as specifically noted in each regulation.

Executive Summary

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit the operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project. The Facility details are provided below.

QuikTrip Corporation
Midlothian, TX
RN106208655/CN600241673

Introduction

This Application is submitted via the State of Texas Environmental Electronic Reporting System (STEERS) in accordance with the provisions of 30 Texas Administrative Code (TAC) Chapter 116, Subchapter B: *NSR Permits* and consists of the following information. The bolded items are included in this section:

- Process Description
- ALL4 Quality Professional (AQP) Seal
- TCEQ 20833a: PI-1 – *General Application, Version 4.0*
- Electronic Modeling Evaluation Workbook (EMEW)
- Figures
  - Facility Location Map
  - Plot Plan
  - Process Flow Diagram
- Regulatory Applicability Analyses
- **Best Available Control Technology (BACT) Determinations**
- Summary of Emissions and Emissions Calculations
- Sample Calculations
- Equipment Tables
  - TCEQ 10166: Table 7(b) – *Horizontal Fixed Roof Storage Tank Summary*
  - TCEQ 10169: Table 7(e) – *Chemical Data Information*
  - TCEQ 10195: Table 29 – *Reciprocating Engines*
- Engine and Fuel Specifications

Should you have any questions related to this submittal or require additional information, please contact Tanner Henson at thenson@all4inc.com or 281-937-7553 x308 or me at Krudd@quiktrip.com or 918-615-7233.

Best Available Control Technology Determinations

BACT determinations are case-by-case analyses that involve an assessment of the applicable control technologies capable of reducing emissions of a pollutant and are conducted using a "top-down" approach considering technical feasibility, as well as economic, environmental, and energy impacts. The "top-down" BACT analysis conducted for the Project included the following five basic steps:

- Step 1: Identify Available Control Technologies
- Step 2: Eliminate Technically Infeasible Options
- Step 3: Rank Remaining Control Technologies by Control Effectiveness
- Step 4: Evaluate Economic, Environmental, and Energy Impacts of Technically Feasible Control Technologies
- Step 5: Identify BACT

The five-step approach taken to perform "top-down" BACT analyses for the RICE is described below.

Step 1 – Identify Available Control Technologies

In Step 1, "available" control options are identified. Available control options are those air pollution control technologies or techniques (including lower-emitting processes and practices) that have the potential for practical application to the emissions unit and pollutant under evaluation, with a focus on technologies that are demonstrated to achieve the highest levels of control for the pollutant in question, regardless of the source type in which the demonstration has occurred.

Step 2 – Eliminate Technically Infeasible Options

In Step 2, available control techniques listed in Step 1 may be eliminated from further consideration if not technically feasible for the specific source under review. A demonstration of technical infeasibility must be documented and show, based on physical, chemical, or engineering principles, that technical reasons would preclude the successful use of the control option on the emissions unit under review. U.S. EPA generally considers a technology technically feasible if it has been demonstrated and operated successfully on the same type of emissions unit under review. An available technology from Step 1, however, cannot be eliminated as technically infeasible simply because it has not been used on the same type of source that is under review. If the technology has not been operated successfully on the type of source under review, then questions regarding "availability" and "applicability" to the specific source type under review should be considered prior to the elimination of the technology as technically infeasible.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

In Step 3, the remaining control technologies are listed in order of overall control effectiveness for the pollutant under review. The most effective control alternative (i.e., the option that achieves the greatest emissions reduction) should be listed as the top choice and the remaining technologies ranked in descending order of control effectiveness. The ranking of control options in Step 3 determines where to start the "top-down" selection process in Step 4. In determining and ranking technologies based on control effectiveness, facilities may include information on control efficiency (e.g., percent pollutant removed), expected emissions rate (e.g., tons per year [tpy], pounds per hour [lb/hr], pounds per unit of product, pounds per unit of input, parts per million volume [ppmv], dry [ppmvd]), and expected emissions reduction (e.g., tpy). The metrics chosen for ranking should best represent the array of control technology alternatives under consideration for the pollutant included in the evaluation. If the top ranked control is selected prior to Step 4, then Step 4 may not be necessary.

Step 4 – Evaluate Economic, Environmental, and Energy Impacts of Technically Feasible Control Technologies

In Step 4, economic, environmental, and energy impacts are evaluated for each remaining option under consideration. Accordingly, after available and technically feasible control options have been ranked in terms of control effectiveness (i.e., Step 3), facilities should consider specific economic, environmental, and energy impacts identified with those technologies to either confirm that the "top" control alternative is appropriate or inappropriate. The "top" control option should be established as BACT unless the applicant demonstrates that the economic, environmental, and energy impacts are constraining such that the most stringent technology is not "reasonable" in that case. If the most stringent technology is eliminated in this fashion, then the next most stringent alternative is considered, and so on. Both direct and indirect impacts of the emissions control option or strategy being evaluated should be considered.

Step 5 – Identify BACT

In Step 5, the most effective control option not eliminated in Step 4 should be selected as BACT for the pollutant and emissions unit under review.

Best Available Control Technology Analysis for the Non-Emergency Engines

The text below presents the BACT analysis for the proposed non-emergency engines.

Nitrogen Oxides BACT

This section presents the nitrogen oxides (NO_X) BACT discussion for the non-emergency engines. NO_X is primarily formed by two mechanisms: (1) the combination of elemental nitrogen (N_2) and oxygen (O_2) in the combustion air within the high-temperature environment of the combustor (thermal NO_X); and (2) the oxidation of N_2 contained in the fuel (fuel NO_X). NO_X emissions from the non-emergency engines, which drive the generators, originate primarily

as thermal NO_X. The rate of formation of thermal NO_X is a function of residence time and free O_2 and is exponential with peak combustion cylinder temperature.

Step 1 – Identify Available Control Technologies

To identify available control options for NO_X emissions from stationary, non-emergency, diesel-fuel fired RICE of comparable size to the non-emergency engines proposed for this Project, QuikTrip reviewed the following resources:

- The U.S. EPA Reasonably Available Control Technology (RACT)/BACT/Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC) database
- The California Air Resources Board (CARB) BACT Clearinghouse

The following NO_X control technologies were identified for the specified RICE:

- Hydrocarbon Lean NO_X Catalyst
- Exhaust Gas Recirculation (EGR)
- NO_X Adsorber (Lean NO_X Trap [LNT])
- Engine Coatings with Engine Timing Retard
- Selective Catalytic Reduction (SCR)
- Good Operating Practices

The results of the search indicate that implementation of the following control technologies have not been applied in practice for stationary, diesel-fuel fired RICE of comparable size as that proposed:

- Hydrocarbon Lean NO_X Catalyst
- Exhaust Gas Recirculation
- NO_X Adsorber
- Engine Coatings with Engine Timing Retard

The lack of documented use of these four NO_X control technologies suggests that while these control technologies may be available and, in theory, technically feasible, the technologies are either inherent to the design of a specific engine or are not readily available for the proposed

Project engines. Nonetheless, the technical feasibility of these four options are discussed in Step 2 of the BACT analysis. The following are descriptions of the technically feasible control technologies.

Hydrocarbon Lean NO_X Catalyst

A hydrocarbon lean NO_X catalyst system uses hydrocarbons as an after-treatment reductant to achieve NO_X conversion efficiency in an engine exhaust stream along with a catalyst. The hydrocarbon or diesel fuel in this case is injected into the exhaust stream in the presence of a proprietary catalyst, to create a catalytic reaction which reduces NO_X emissions at an efficiency of 5%-40%.

Exhaust Gas Recirculation

EGR redirects a portion of the exhaust flow from a RICE back to the cylinders. This process cools the cylinder combustion chamber, lowering the peak combustion temperature, thereby reducing the amount of thermal NO_X generated in the fuel combustion process. EGR can potentially reduce NO_X emissions at an efficiency of 25%-40%.

NO_X Adsorber (Lean NO_X Trap)

NO_X adsorption uses an adsorbent to adhere and trap NO_X molecules present in RICE exhaust at an efficiency of 5%-40%.

Engine Coatings with Engine Timing Retard

Ceramic engine coatings applied to the combustion zone surfaces of the piston crown, valve faces, and head, coupled with engine timing retard, are demonstrated to reduce NO_X emissions from diesel fuel-fired RICE up to 40% in certain applications.

Selective Catalytic Reduction

SCR is a post-combustion add-on NO_X control technology placed in the exhaust stream. SCR uses ammonia (NH_3) or urea to react with NO_X in the presence of a catalyst. NH_3 reacts with

NO_X to form N_2 and water (H_2O). The NO_X reduction reaction is effective only within a given exhaust temperature range. The optimum exhaust temperature range depends on the type of catalyst used and the exhaust gas composition. Optimum temperatures vary from 480 to 800 degrees Fahrenheit[1]. Titanium dioxide, tungsten trioxide, or vanadium pentoxide are typical materials used for the catalyst material.

Good Operating Practices

Good operating practices include both effective combustion system design and proper operation and maintenance practices. Combustion system design is implemented during the design and manufacture of an engine. Typical combustion design features include electronic fuel/air ratio and timing controllers, pre-chamber ignition, and intercoolers[2]. Good combustion system design is standard on new engines and therefore is included for the proposed non-emergency RICE.

Step 2 – Eliminate Technically Infeasible Options

Hydrocarbon Lean NO_X Catalyst

A hydrocarbon lean NO_X catalyst system is not a NO_X control technology that has been effectively used on stationary RICE driving non-emergency generators and is instead more often used in on-road and non-road mobile applications. Additionally, a lean NO_X catalyst is not one of the control technologies included on U.S. EPA's Verified Technologies List[3] for stationary, non-emergency, diesel-fuel fired RICE of comparable size as that proposed by the Facility. Therefore, QuikTrip considers hydrocarbon lean NO_X catalyst a technically infeasible control option for reducing NOx emissions from the proposed stationary, non-emergency, diesel-fuel fired RICE at the Facility. As a result, hydrocarbon lean NO_X catalyst control technology is not evaluated further herein.

[1] U.S. EPA Air Pollution Control Technology Fact Sheet for SCR, EPA-452/F-03-032.
[2] U.S. EPA AP-42. Chapter 3.3. Gasoline and Diesel Industrial Engines (10/96).
[3] U.S. EPA, *Verified Technologies List for Clean Diesel*, https://www.epa.gov/verified-diesel-tech/verified-technologies-list-clean-diesel.

Exhaust Gas Recirculation

According to U.S. EPA's Verified Technologies List, EGR is most often evaluated as a NO_X emissions reduction technology during the design phase of a RICE and is sometimes used by RICE manufacturers as a method to comply with new RICE emissions standards. The installation of EGR after engine manufacture would require significant modifications to a RICE. As a result, EGR is not often used as a retrofit control technology. Also, according to the RBLC database, EGR has not been demonstrated in practice for use in reducing NO_X emissions from stationary, non-emergency, diesel-fuel fired RICE of comparable size as those proposed at the Facility. Therefore, QuikTrip considers EGR to be a technically infeasible control option. EGR control technology is not evaluated further herein.

NO_X Adsorber

According to the RBLC database, NO_X adsorption has not been demonstrated for use in reducing NO_X emissions from stationary, non-emergency, diesel-fuel fired RICE of comparable size as those located at the Facility. NO_X adsorption is not one of the control technologies included on U.S. EPA's Verified Technologies List or on the CARB list of verified technologies[4] for stationary, non-emergency, diesel-fuel fired RICE of comparable size and manufacture date as those located at the Facility. NO_X adsorption is also not addressed in any of the publications included on U.S. EPA's National Clean Diesel Campaign's (NCDC) website[5]. Therefore, QuikTrip considers NO_X adsorption a technically infeasible control option and is not evaluated further herein.

Engine Coatings with Engine Timing Retard

Variable fuel timing (a key factor in reducing NO_X emissions via engine timing retard) cannot be achieved based on the design of the RICE proposed at the Facility. For RICE of a certain manufacture date, including that proposed at the Facility, all fuel timing is done via mechanical devices (an offset key on the camshaft). This offset correlates to the start of fuel injection and

[4] CARB. *Verification Procedure – Currently Verified*, https://www.arb.ca.gov/diesel/verdev/vt/cvt.htm.

can only be incrementally adjusted within stringent nominal settings before deviating from the performance Critical Parts List (CPL) for a RICE. If the fuel timing for the proposed RICE exceeds CPL tolerances, the RICE will not function properly, and the key mechanical components of the RICE will be in jeopardy of degradation and/or failure. Also, according to the RBLC database, ceramic engine coatings, coupled with engine timing retard, have not been recorded for use in reducing NOx emissions from stationary, non-emergency, diesel-fuel fired RICE of comparable size as that proposed at the Facility. Additionally, ceramic engine coatings, coupled with engine timing retard, is not one of the control technologies included on U.S. EPA's Verified Technologies List or the CARB list of verified technologies for stationary, non-emergency, diesel-fuel fired RICE of comparable size and manufacture date as those at the Facility. Therefore, QuikTrip considers ceramic engine coatings, coupled with engine timing retard, a technically infeasible control option and are not evaluated further herein.

Selective Catalytic Reduction

SCR is applied in base-load diesel engine applications where engines are operated primarily at high capacity for extended periods of time for industrial and power generation purposes. SCR has been applied successfully to non-emergency engines and is considered technically feasible for the proposed non-emergency engines. Thus, SCR control technology is considered technically feasible for the purposes of this BACT analysis and is further considered in Step 3 and Step 4 of the analysis.

Good Operating Practices

Good operating practices, which can include combustion system design, proper preventative maintenance practices, and minimizing time spent in idle are successfully applied to non-emergency engines and have been demonstrated. Thus, good operating practices are considered technically feasible for the purposes of this BACT analysis and are further considered in Step 3 and Step 4 of the analysis.

[5]U.S. EPA *Verified Technologies for SmartWay and Clean Diesel.* https://www.epa.gov/verified-diesel-tech/learn-about-verified-technologies-clean-diesel.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

The technically feasible control options identified in Step 2 are ranked in terms of control efficiency in BACT Table 1:

BACT Table 1
NO_X Control Technology Ranking for the Non-emergency Engines that Drive the Power Generators

Control Technology Option	Control Efficiency	Ranking
SCR	~90%[6]	1
Good operating practices	Vendor and process dependent	2

Step 4 – Evaluate Economic, Environmental, and Energy Impacts of Technically Feasible Control Technologies

QuikTrip proposes the use of the top two technically feasible options, SCR and good operating practices to control NO_X emissions from the non-emergency engines that drive the generators. Thus, a control cost analysis is not included in this BACT analysis. QuikTrip does not anticipate additional environmental or energy impacts associated with the use of the proposed control technologies for the RICE, specifically the proposed use of SCR and good operating practices.

Step 5 – Proposed BACT

The proposed Volvo TWD1673GE engines are certified as a Tier 4f engines. The engines are equipped with SCR to control NO_X emissions. The proposed engines will meet the 0.67 grams per kilowatt hour (g/kW-hr) NO_X limit requirement of 40 CFR Part 60, Subpart IIII, and the engine has vendor guaranteed NO_X emissions with the application of SCR lower than the applicable Subpart IIII emissions limit. QuikTrip proposes the use of SCR and good operating practices as NO_X BACT.

[6] U.S. EPA's Office of Air Quality Planning and Standards *Air Pollution Control Cost Manual Control.* Chapter 2 SCR (pg. 2-1). https://www3.epa.gov/ttn/ecas/docs/SCRCostManualchapter7thEdition_2016.pdf (May 2016).

Particulate Matter BACT

For non-emergency engines of similar size to those for the Project, good operating practices are used to limit emissions of particulate matter (PM), PM less than 10 microns (PM_{10}), and PM less than 2.5 microns ($PM_{2.5}$). TCEQ does not have a Tier I or Tier II BACT evaluation established for PM, PM_{10} and $PM_{2.5}$ for non-emergency engines. Therefore, a modified Tier III approach was used for the PM, PM_{10} and $PM_{2.5}$ BACT evaluation. Using the modified Tier III BACT approach for PM, PM_{10} and $PM_{2.5}$, the results of the RBLC, CARB BACT Clearinghouse, and other permitted facilities were searched to understand the control technologies used for non-emergency engines and no other technologies were identified for the control of PM, PM_{10}, and $PM_{2.5}$. Unlike NO_X controls, the PM, PM_{10} and $PM_{2.5}$ BACT search indicated that good operating practices are considered BACT for the engines. Therefore, a complete top-down approach was not completed for PM, PM_{10} and $PM_{2.5}$. Additionally, given the limited hours of use and minimal annual emissions, there is no appreciable environmental benefit nor anticipated feasible cost-effective control options for PM, PM_{10}, and $PM_{2.5}$ emissions. Furthermore, each engine has vendor guaranteed PM emissions lower than the applicable 40 CFR Part 60, Subpart IIII emissions limits. Based on these findings, QuikTrip proposes good operating practices as PM, PM_{10} and $PM_{2.5}$ BACT and will meet Texas PM requirements.

Carbon Monoxide BACT

This section presents the carbon monoxide (CO) BACT discussion for the non-emergency engine generators. CO emissions are a result of incomplete combustion of carbon contained within the fuel. Properly designed and operated engines typically emit low levels of CO. High levels of CO emissions could result from poor design or sub-optimal firing conditions.

Step 1 – Identify Available Control Technologies

To identify available control options for CO emissions from stationary, non-emergency, diesel-fuel fired RICE of comparable size to the non-emergency engines proposed for this Project, QuikTrip reviewed the following resources:

- U.S. EPA's RACT/BACT/LAER RBLC database
- CARB BACT Clearinghouse

The following control technologies were identified for CO reduction from the specified RICE:

- Diesel Oxidation Catalyst (DOC)
- Good Operating Practices

Diesel Oxidation Catalyst

DOC technology is an add-on control designed to reduce CO emissions. The catalysts are usually made of a precious metal and operate at temperatures in the range of 650 to 1,000°F[7]. The catalysts cause excess O_2 to react with CO to form carbon dioxide (CO_2). The catalytic oxidizer can be susceptible to poisoning by fine particles in the exhaust gas, which reduces the catalyst effectiveness.

Good Combustion Practices

Good combustion practices are implemented in the design of the engine. Typical design features include electronic fuel/air ratio and timing controllers, pre-chamber ignition, intercoolers, and lean-burn fuel mix[8]. Good combustion practices are standard on new engines, and therefore have been proposed for the ultra-low sulfur diesel (ULSD)-fired generator engines.

[7] Catalytic Oxidizer. *Technology Transfer Network Clearinghouse for Inventories & Emissions Factors.* http://cfpub.epa.gov/oarweb/mkb/contechnique.cfm?ControlID=10
[8] U.S. EPA AP-42. Chapter 3.3. Gasoline and Diesel Industrial Engines (10/96).

Step 2 – Eliminate Technically Infeasible Options

Diesel Oxidation Catalyst

DOC is not considered to be technically feasible due to the smaller size of the non-emergency generator engines and intermittent operations. DOC is mainly effective for steady-state engine operation and not intermittent operation. The engines will typically only operate a few hours each month for readiness testing and maintenance checks, in response to dispatches, and will be permitted to operate for no more than 500 hours/12-month rolling period.

Step 3 – Rank Remaining Control Technologies by Control Effectiveness

The only feasible control technology for the ULSD-fired generator engines is good combustion practices. Therefore, a ranking has not been considered to establish a top technology.

Step 4 – Evaluate Economic, Environmental, and Energy Impacts of Technically Feasible Control Technologies

Good combustion practices will be implemented as part of the design and operation of the engine generators. Therefore, economic, environmental, and/or energy impacts were not assessed.

Step 5 – Proposed BACT

A review was conducted of CO control determinations for engine generators, including a search of the RBLC database and a review of information concerning recently permitted facilities with non-emergency generator engines. No other facility employs more stringent control technologies than what is currently employed for the engines. QuikTrip proposes good combustion practices, including the use of ULSD, and limited annual operating hours as BACT for the non-emergency generator engine. Furthermore, each engine has vendor guaranteed CO emissions lower than the applicable Subpart IIII emissions limits and will meet Texas CO requirements.

Volatile Organic Compound BACT

For non-emergency engines of similar size to those for the Project, good operating practices are used to limit Volatile Organic Compound (VOC) emissions. TCEQ does not have a Tier I or Tier II BACT evaluation established for VOC for non-emergency engines. Therefore, a modified Tier III approach was used for VOC BACT evaluation. Using the modified Tier III BACT approach for VOC, the results of the RBLC, CARB BACT Clearinghouse, and other permitted facilities were searched to understand the control technologies used for non-emergency engines. Unlike NO_X controls, the VOC BACT search indicated that good operating practices are considered BACT for each engine and no other technologies were identified for the control of VOC. Therefore, a complete top-down approach was not completed for VOC. Additionally, given the limited hours of use and minimal annual emissions, there is no appreciable environmental benefit nor anticipated feasible cost-effective control option for VOC emissions. Furthermore, each engine has vendor guaranteed VOC emissions that are lower than the nonmethane hydrocarbon (NMHC) portion of the Subpart IIII emissions limits. Based on these findings, QuikTrip proposes good operating practices as VOC BACT.

For storage tanks similar to those for the Project, good operating practices and specific design features are used to limit VOC emissions. TCEQ maintains Tier I BACT for VOC emissions from fixed roof storage tanks with a capacity of less than 25,000 gallons or storing liquids with a true vapor pressure of less than 0.50 pounds per square inch absolute (psia). Specifically, Tier I BACT for these tanks includes having the exterior surfaces that are exposed to the sun be white or aluminum and having a submerged fill. The proposed storage tank does not have surfaces exposed to the sun and operates with a submerged fill. Therefore, by storing ULSD with a true vapor pressure of less than 0.50 psia and having a submerged fill, QuikTrip meets TCEQ's Tier I BACT requirements.

Sulfuric Acid BACT

For non-emergency engines of similar size to those for the Project, good operating practices and the use of ULSD are used to limit sulfuric acid (H_2SO_4) emissions. TCEQ does not have a Tier I or Tier II BACT evaluation established for H_2SO_4 for non-emergency engines. Therefore, a modified Tier III approach was used for the H_2SO_4 BACT evaluation. Using the modified Tier III BACT approach for H_2SO_4, the results of the RBLC, CARB BACT Clearinghouse, and other permitted facilities were searched to understand the control technologies used for non-emergency engines. Unlike NO_X controls, the H_2SO_4 BACT search indicated that good operating practices and the use of ULSD are considered BACT for each engine and no other technologies were identified for the control of H_2SO_4. Therefore, a complete top-down approach was not completed for H_2SO_4. Additionally, given the limited hours of use and minimal annual emissions, there is no appreciable environmental benefit nor anticipated feasible cost-effective control option for H_2SO_4 emissions. Based on these findings, QuikTrip proposes good operating practices and the use of ULSD as H_2SO_4 BACT and will meet Texas H_2SO_4 requirements.

Sulfur Dioxide BACT

For non-emergency engines of similar size to those for the Project, good operating practices and the use of ULSD are used to limit sulfur dioxide (SO_2) emissions. TCEQ does not have a Tier I or Tier II BACT evaluation established for SO_2 for non-emergency engines. Therefore, a modified Tier III approach was used for the SO_2 BACT evaluation. Using the modified Tier III BACT approach for SO_2, the results of the RBLC, CARB BACT Clearinghouse, and other permitted facilities were searched to understand the control technologies used for non-emergency engines. Unlike NO_X controls, the SO_2 BACT search indicated that good operating practices and the use of ULSD are considered BACT for each engine and no other technologies were identified for the control of SO_2. Therefore, a complete top-down approach was not completed for SO_2. Additionally, given the limited hours of use and minimal annual emissions, there is no appreciable environmental benefit nor any anticipated feasible cost-effective control option for

SO_2 emissions. Based on these findings, QuikTrip proposes good operating practices and the use of ULSD as SO_2 BACT and will meet Texas SO_2 requirements.

Ammonia BACT

For non-emergency engines of similar size to those for the Project, equipped with SCR, good operating practices are used to limit NH_3 emissions. TCEQ does not have a Tier I or Tier II BACT evaluation established for NH_3 slip for non-emergency engines with SCR. Therefore, a modified Tier III approach was used for the NH_3 BACT evaluation. Using the modified Tier III BACT approach for NH_3, the results of the RBLC, CARB BACT Clearinghouse, and other permitted facilities were searched to understand the control technologies used for non-emergency engines. The NH_3 BACT search indicated that good operating practices are considered BACT for each engine. Therefore, a complete top-down approach was not completed for NH_3. Additionally, given the limited hours of use and minimal annual emissions, there is no appreciable environmental benefit nor any anticipated feasible cost-effective control option for NH_3 emissions. In addition, QuikTrip injects urea (instead of ammonia), which inherently reduces the risk of ammonia releases and will also meet Texas NH_3 requirements.

Maintenance, Startup, and Shutdown BACT

Non-emergency engines are designed to operate intermittently. The proposed emissions encompass all activities, including maintenance, startup, and shutdown (MSS). The engines operate with SCR that will be cleaned periodically to ensure optimal operation. Additionally, QuikTrip will not operate the engine for testing or maintenance during the hours of 6:00 am and noon. QuikTrip has evaluated MSS emissions and proposes good operating practices, proper SCR cleaning, and the listed maintenance hours as MSS BACT.

Executive Summary

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit the operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project. The Facility details are provided below.

QuikTrip Corporation
Midlothian, TX
RN106208655/CN600241673

Introduction

This Application is submitted via the State of Texas Environmental Electronic Reporting System (STEERS) in accordance with the provisions of 30 Texas Administrative Code (TAC) Chapter 116, Subchapter B: *NSR Permits* and consists of the following information. The bolded items are included in this section:

- Process Description
- ALL4 Quality Professional (AQP) Seal
- TCEQ 20833a: PI-1 – *General Application, Version 4.0*
- Electronic Modeling Evaluation Workbook (EMEW)
- Figures
  - Facility Location Map
  - Plot Plan
  - Process Flow Diagram
- Regulatory Applicability Analyses
- Best Available Control Technology (BACT) Determinations
- **Summary of Emissions and Emissions Calculations**
- **Sample Calculations**
- Equipment Tables
  - TCEQ 10166: Table 7(b) – *Horizontal Fixed Roof Storage Tank Summary*
  - TCEQ 10169: Table 7(e) – *Chemical Data Information*
  - TCEQ 10195: Table 29 – *Reciprocating Engines*
- Engine and Fuel Specifications

Should you have any questions related to this submittal or require additional information, please contact Tanner Henson at thenson@all4inc.com or 281-937-7553 x308 or me at Krudd@quiktrip.com or 918-615-7233.

Emission Calculation Table 1
Summary of Emissions from Project
PowerSecure, Inc./QuikTrip Distribution

Pollutant	Combined Potential to Emit (PTE)[c]	
	(lb/hr)	(tpy)
$PM/PM_{10}/PM_{2.5}$[a]	0.10	2.55E-02
NO_X	1.76	0.44
VOC[b]	0.18	8.83E-03
CO	0.51	0.13
SO_2	3.39E-02	8.48E-03
H_2SO_4	5.20E-03	1.30E-03
NH_3	0.23	5.64E-02
HAPs	2.64E-02	6.59E-03

[a] PM emissions are equivalent to PM_{10} and $PM_{2.5}$ emissions and include both filterable and condensable fractions.

[b] Volatile organic compounds (VOC) emissions include emissions from the engine and fuel storage tank.

[c] PTE includes emissions from each engine during planned maintenance, startup, and shutdown (MSS) operation.

Emission Calculation Table 2
RICE Potential Non-HAP and Non-Air Toxics Emissions Summary
PowerSecure, Inc./QuikTrip Distribution

Pollutant	Emissions Factor	Units	Reference	PTE for Each Engine[g]		PTE for All Engines[g]	
				(lb/hr)	(tpy)	(lb/hr)	(tpy)
$PM/PM_{10}/PM_{2.5}$	1.80E-02	g/kW-hr	(a), (b)	3.40E-02	8.49E-03	0.10	2.55E-02
PM (filterable)	1.60E-02	g/kW-hr	(b), (c)	3.02E-02	7.56E-03	9.07E-02	2.27E-02
PM (condensable)	1.99E-03	g/kW-hr	(b), (c)	3.75E-03	9.38E-04	1.13E-02	2.82E-03
NO_X	0.31	g/kW-hr	(a)	0.59	0.15	1.76	0.44
VOC	3.31E-03	g/kW-hr	(a)	5.66E-03	1.42E-03	1.70E-02	4.25E-03
CO	9.00E-02	g/kW-hr	(a)	0.17	4.25E-02	0.51	0.13
SO_2	1.21E-05	lb/hp-hr	(d)	1.13E-02	2.83E-03	3.39E-02	8.48E-03
H_2SO_4	1.86E-06	lb/hp-hr	(e)	1.73E-03	4.33E-04	5.20E-03	1.30E-03
NH_3	6.02E-02	lb/hr	(f)	7.53E-02	1.88E-02	0.23	5.64E-02

[a] Emissions factors were provided by the vendor. The emissions rates were adjusted up by 25% to present a not to exceed value.

[b] PM emissions are equivalent to PM_{10} and $PM_{2.5}$ emissions and include both filterable and condensable fractions.

[c] The filterable and condensable portions of PM were back-calculated using a ratio of referenced PM emissions factors obtained from AP-42, Chapter 3, Table 3.4-2 (October 1996).

[d] The SO_2 emissions factor was obtained from AP-42 Chapter 3.4 Table 3.4-1, using ULSD sulfur content of 0.0015% by weight.

[e] The H_2SO_4 emissions factor is conservatively estimated based on 10% molar conversion of SO_2 to SO_3 and 100% conversion of SO_3 to H_2SO_4 based on engineering judgement.

[f] The NH_3 emissions factor for SCR was obtained from Table 5-5: *SCR and SNCR Ammonia Emission Factors*, for use with oil as fuel, provided in the Development and Selection of Ammonia Emission Factors, Final Report, dated August 1994, prepared for the United States Environmental Protection Agency (U.S. EPA). The emissions rates were adjusted up by 25% to present a not to exceed value.

[g] PTE rates account for emissions from the engines during planned maintenance, startup, and shutdown (MSS) as the worst case emissions profile occurs at maximum engine load. Fuel supply flow was used in lieu of consumption rate as vendor information did not provide fuel consumption. PTE rates are calculated assuming the following information and assumptions:

Operational Parameters

Parameter	Value
Fuel	ULSD
Number of units	3
Fuel Supply Flow per engine, gal/hr	43
Rating per engine, kW	685
Rating per engine, bhp	931
Diesel Sulfur content, wt. %	0.0015
Max. hrs/yr	500

Emission Calculation Table 3
RICE Potential Air Toxics and HAPs Emissions Summary
PowerSecure, Inc./QuikTrip Distribution

Pollutant	Emissions Factor	Units	Reference	PTE for Each Engine[(a)]		PTE for All Engines[(a)]	
				(lb/hr)	(tpy)	(lb/hr)	(tpy)
Acenaphthene	4.68E-06	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	2.76E-05	6.89E-06	8.27E-05	2.07E-05
Acenaphthylene	9.23E-06	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	5.44E-05	1.36E-05	1.63E-04	4.08E-05
Anthracene	1.23E-06	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	7.25E-06	1.81E-06	2.17E-05	5.44E-06
Benz(a)anthracene	6.22E-07	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	3.67E-06	9.16E-07	1.10E-05	2.75E-06
Benzo(a)pyrene	2.57E-07	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	1.51E-06	3.79E-07	4.54E-06	1.14E-06
Benzo(b)fluoranthene	1.11E-06	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	6.54E-06	1.64E-06	1.96E-05	4.91E-06
Benzo(g,h,l)perylene	5.56E-07	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	3.28E-06	8.19E-07	9.83E-06	2.46E-06
Benzo(k)fluoranthene	2.18E-07	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	1.28E-06	3.21E-07	3.85E-06	9.63E-07
Chrysene	1.53E-06	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	9.02E-06	2.25E-06	2.70E-05	6.76E-06
Dibenz(a,h)anthracene	3.46E-07	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	2.04E-06	5.10E-07	6.12E-06	1.53E-06
Fluoranthene	4.03E-06	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	2.37E-05	5.94E-06	7.12E-05	1.78E-05
Fluorene	1.28E-05	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	7.54E-05	1.89E-05	2.26E-04	5.66E-05
Indeno(1,2,3-cd)pyrene	4.14E-07	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	2.44E-06	6.10E-07	7.32E-06	1.83E-06
Phenanthrene	4.08E-05	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	2.40E-04	6.01E-05	7.21E-04	1.80E-04
Pyrene	3.71E-06	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	2.19E-05	5.47E-06	6.56E-05	1.64E-05
Acetaldehyde	2.52E-05	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-3	1.48E-04	3.71E-05	4.45E-04	1.11E-04
Acrolein	7.88E-06	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-3	4.64E-05	1.16E-05	1.39E-04	3.48E-05
Benzene	7.76E-04	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-3	4.57E-03	1.14E-03	1.37E-02	3.43E-03
Formaldehyde	7.89E-05	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-3	4.65E-04	1.16E-04	1.39E-03	3.49E-04
Naphthalene	1.30E-04	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-4	7.66E-04	1.91E-04	2.30E-03	5.74E-04
Toluene	2.81E-04	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-3	1.66E-03	4.14E-04	4.97E-03	1.24E-03
Xylenes	1.93E-04	lb/MMBtu	AP-42 Chapter 3.4 Table 3.4-3	1.14E-03	2.84E-04	3.41E-03	8.53E-04
			Highest Individual HAP (tpy)	1.14E-03		-	3.43E-03
			Total HAP (tpy)	2.20E-03		-	6.59E-03

[(a)] Fuel supply flow was used in lieu of consumption rate as vendor information did not provide fuel consumption. PTE rates are calculated assuming the following information and assumptions:

Operational Parameters

Parameter	Value
Fuel	ULSD
Fuel, MMBtu/gal	0.137
Number of units	3
Fuel Supply Flow, gal/hr per engine	43
MMBtu/hr per engine	5.9
Max. hrs/yr per engine	500

Emission Calculation Table 4
3,000-Gallon Diesel Fuel Storage Tank Potential VOC Emissions
PowerSecure, Inc./QuikTrip Distribution

Description	Reference Factor	Abbreviation	Unit	Diesel Storage Tank
General Tank Information				
Tank ID	-	-	-	TK-1
Product Code	-	-	-	UL# 142 Double Wall
Material	-	-	-	Diesel
Orientation	-	-	-	Horizontal
Vessel Shape	-	-	-	Rectangular
Roof Type	-	-	-	Horizonal Fixed Roof
Emission Control	-	-	-	N/A
Tank Color	-	-	-	Gray
Roof Construction	-	-	-	Welded
Shell Construction	-	-	-	Welded
Product Days	-	-	days	365
Capacity	-	-	bbl	71.43
Capacity	-	-	gal	3,000.00
Height	-	-	ft	2.83
Length	-	-	ft	33.75
Width	-	-	ft	8.25
Emissions Factors for Fixed Roof Tanks (AP-42 Chapter 7.1, Organic Liquid Storage Tanks)				
Tank Roof Height	-	H_R	ft	2.83
Liquid Height	-	H_L	ft	1.42
Vapor Space Outage	-	H_{VO}	ft	1.42
Vapor Space Volume	-	V_V	ft^3	394.45
Paint Solar Absorptance For Fixed Roof Tank	(a)	α	-	0.68
Daily Maximum Ambient Temperature	(b)	T_{AX}	°R	537.67
Daily Minimum Ambient Temperature	(b)	T_{AN}	°R	514.83
Daily Average Ambient Temperature	(b)	T_{AA}	°F	66.25
Daily Average Ambient Temperature	(b)	T_{AA}	°R	526.25
Liquid Bulk Temperature	(c)	T_B	°R	529.27
Daily Total Solar Insolation Factor	(d)	I	$Btu/ft^2 \cdot d$	1,481.00
Daily Average Liquid Surface Temperature	(e)	T_{LA}	°R	533.10
Constant in Vapor Pressure Equation	(f)	A	-	11.54
Constant in Vapor Pressure Equation	(f)	B	°R	5,050.29
Vapor Pressure at Daily Average Liquid Surface Temperature	-	P_{VA}	psia	1.00E-02
Average Vapor Molecular Weight	(g)	M_V	lb/lb-mole	130.00
Ideal Gas Constant	-	R	$psia \cdot ft^3$/ lb-mole·°R	10.73
Vapor Density	-	W_V	lb/ft^3	2.27E-04
Atmospheric Pressure	-	P_A	psia	14.70
Breather Vent Vacuum Setting	(h)	P_{BV}	psig	-0.03
Breather Vent Pressure Setting	(h)	P_{BP}	psig	0.03
Breather Vent Pressure Setting Range	-	ΔP_B	psig	6.00E-02
Daily Ambient Temperature Range	-	ΔT_A	°R	22.83
Daily Vapor Temperature Range	-	ΔT_V	°R	33.84
Average Daily Maximum Liquid Surface Temperature	(i)	T_{LX}	°R	541.56
Average Daily Minimum Liquid Surface Temperature	(j)	T_{LN}	°R	524.64

Emission Calculation Table 4
3,000-Gallon Diesel Fuel Storage Tank Potential VOC Emissions
PowerSecure, Inc./QuikTrip Distribution

Description	Reference Factor	Abbreviation	Unit	Diesel Storage Tank
Vapor Pressure at the Average Daily Max Liq Surface Temperature	(k)	P_{VX}	psi	9.11
Vapor Pressure at the Average Daily Min Liq Surface Temperature	(l)	P_{VN}	psi	6.75
Daily Vapor Pressure Range	(m)	ΔP_V	psi	2.37
Vapor Space Expansion Factor	(n)	K_E	-	0.22
Vented Vapor Saturation Factor	(o)	K_S	-	1.00
Vapor Molecular Weight	-	M_V	lb/lb-mole	130.00
Annual Throughput Rate	-	V_Q	gallons/yr	64,500.00
			bbl/yr	1,535.71
			ft^3/yr	8,622.40
Turnover Factor	(p)	K_N	-	1.00
Working Loss Product Factor	(q)	K_P	-	1.00
Vent Setting Correction Factor	(r)	K_B	-	1.00
Standing Loss	(s)	L_S	lb/yr	7.21
Working Loss	(t)	L_W	lb/yr	1.96
Maximum Short-Term Working Loss	(u)	L_{MAX}	lb/hr	0.17
Total Routine Losses (i.e., VOC PTE Rates for Diesel Tank)	(v)	L_T	tons/yr	4.58E-03

[(a)] AP-42 Chapter 7.1 Table 7.1-6 for medium gray paint color in new condition.

[(b)] Annual average, minimum and maximum temperatures are for Waxahachie, TX (closest city to Midlothian with representative historical weather data) obtained from https://www.usclimatedata.com/climate/waxahachie/texas/united-states/ustx1430. Equation 1-30 ((T_{AX}+T_{AN})/2) on page 7.1-26 of AP-42 Chapter 7.1 was used.

[(c)] Equation 1-31 (TAA+0.003*α_s*I) on page 7.1-27 of AP-42 Chapter 7.1 was used.

[(d)] Total solar insolation factor was obtained for Dallas-Fort Worth, TX from AP-42 Chapter 7.1 Table 7.1-7.

[(e)] Equation 1-28 (0.4T_{AA}+0.6T_B+0.005*α*I) on page 7.1-26 of AP-42 Chapter 7.1 was used.

[(f)] Each constant, A and B, was derived from the equation in Figure 7.1-15. While there were no RVP values provided in AP-42 Table 7.1-4 for distillate fuel, the average RVP values for light naphtha were used as an estimate and were obtained from AP-42 Table 7.1-4.

[(g)] The vapor molecular weight at 60 °F for distillate fuel oil No. 2 was obtained from AP-42 Chapter 7.1 Table 7.1-2.

[(h)] Specific information on the settings for the breather vent pressure setting and vacuum setting was not readily available; therefore, 0.03 psig for P_{BP} and -0.03 psig for P_{BV} were assumed as typical values, pursuant to guidance provided in AP-42 Chapter 7.1.

[(i)] Derived from the equation in Figure 7.1-17

[(j)] Derived from the equation in Figure 7.1-17

[(k)] Calculated by substituting T_{LX} into equation 1-25 from AP-42 Chapter 7.1.

[(l)] Calculated by substituting T_{LN} into equation 1-25 from AP-42 Chapter 7.1.

[(m)] Equation 1-9 (P_{VX}-P_{VN}) on page 7.1-18 of AP-42 Chapter 7.1 was used.

[(n)] Equation 1-5 (($\Delta T_V/T_{LA}$)+((ΔP_V-ΔP_B)/(P_A-P_{VA}))) on page 7.1-17 of AP-42 Chapter 7.1 was used.

[(o)] Equation 1-21 (1/(1+0.053*P_{VA}*H_{VO})) on page 7.1-22 was used.

[(p)] When turnovers are less than or equal to 36, then K_N =1, pursuant to guidance provided in AP-42 Chapter 7.1.

[(q)] For all organic liquids except crude oils, K_P = 1, pursuant to guidance provided in AP-42 Chapter 7.1.

[(r)] For a vent setting range up to plus or minus 0.03 psig, K_B=1

[(s)] Equation 1-2 (365*V_V*W_V*K_E*K_S) on page 7.1-16 of AP-42 Chapter 7.1 was used.

[(t)] Equation 1-35 (V_Q*K_N*K_P*W_V*K_B) on page 7.1-28 of AP-42 Chapter 7.1 was used.

[(u)] VOC short-term maximum emission rate uses Equation 1 from page 1 of TCEQ's APDG 6250v1 *Estimating Short Term Emission Rates from Fixed Roof Tanks*. The vapor pressure of distillate fuel was obtained at 95 °F in AP-42 Chapter 7.1, Table 7.1-2.

[(v)] VOC PTE rates for the tank were annualized over the year and were calculated assuming that the breathing losses occur 8,760 hours per year, while the working losses occur 500 hours per year. It is assumed that fugitive emissions of HAPs are negligible.

Sample Engine Emissions Calculations

Descriptions of the methodology and a sample calculation for each pollutant are provided below for each engine. For presentation purposes, the sample calculations may round intermediate values or conversion factors.

Particulate Matter

The particulate matter (PM), PM less than 10 microns (PM_{10}), and PM less than 2.5 microns ($PM_{2.5}$) emissions factors were provided by the vendor. To be conservative, a 25% margin was added to present a not to exceed (NTE) value. The vendor-provided PM emissions factor assumes that PM = PM_{10} = $PM_{2.5}$ and accounts for both the filterable and condensable portions of PM. The emissions factor was multiplied by the engine rating to calculate the short-term (i.e., lb/hr) emissions rate. The short-term emissions rate was multiplied by 500 hours per year to calculate the annual (i.e., tons/year) emissions rate. For example, PM emissions for each engine was calculated as follows:

$$0.018\frac{g\ PM}{kW-hr} * 1.25 * \frac{kW}{1.36\ hp} * 931\ bhp * \frac{lb}{453.59\ g} = 3.40E^{-2}\frac{lb\ PM}{hr} \quad [1]$$

$$3.40E^{-2}\frac{lb\ PM}{hr} * \frac{500\ hr}{yr} * \frac{1\ ton}{2{,}000\ lb} = 8.49E^{-3}\frac{ton\ PM}{yr} \quad [2]$$

Nitrogen Oxides

The nitrogen oxides (NO_X) emissions factor was provided by the vendor. To be conservative, a 25% margin was added to present a NTE value. The emissions factor was multiplied by the engine rating to calculate the short-term (i.e., lb/hr) emissions rate. The short-term emissions rate was multiplied by 500 hours per year to calculate the annual (i.e., tons/year) emissions rate. For example, NO_X emissions for the engine was calculated as follows:

$$0.31\frac{g\ NO_X}{kW-hr} * 1.25 * \frac{kW}{1.36\ hp} * 931\ bhp * \frac{lb}{453.59\ g} = 0.59\frac{lb\ NO_X}{hr} \quad [3]$$

$$0.59\frac{lb\ NO_X}{hr} * \frac{500\ hr}{yr} * \frac{1\ ton}{2{,}000\ lb} = 0.15\frac{ton\ NO_X}{yr} \quad [4]$$

Volatile Organic Compounds

The volatile organic compounds (VOC) emissions factor was provided by the vendor. To be conservative, a 25% margin was added to present a NTE value. The emissions factor was multiplied by the engine rating to calculate the short-term (i.e., lb/hr) emissions rate. The short-term emissions rate was multiplied by 500 hours per year to calculate the annual (i.e., tons/year) emissions rate. For example, VOC emissions for the engine was calculated as follows:

$$0.003\,\frac{g\ VOC}{kW-hr} * 1.25 * \frac{kW}{1.36\ hp} * 931\ bhp * \frac{lb}{453.59\ g} = 5.66E^{-3}\,\frac{lb\ VOC}{hr} \quad [5]$$

$$5.66E^{-3}\,\frac{lb\ VOC}{hr} * \frac{500\ hr}{yr} * \frac{1\ ton}{2{,}000\ lb} = 1.42E^{-3}\,\frac{ton\ VOC}{yr} \quad [6]$$

Carbon Monoxide

The carbon monoxide (CO) emissions factor was provided by the vendor. To be conservative, a 25% margin was added to present a NTE value. The emissions factor was multiplied by the engine rating to calculate the short-term (i.e., lb/hr) emissions rate. The short-term emissions rate was multiplied by 500 hours per year to calculate the annual (i.e., tons/year) emissions rate. For example, CO emissions for the engine was calculated as follows:

$$0.09\,\frac{g\ CO}{kW-hr} * 1.25 * \frac{kW}{1.36\ hp} * 931\ bhp * \frac{lb}{453.59\ g} = 0.17\,\frac{lb\ CO}{hr} \quad [7]$$

$$0.17\,\frac{lb\ CO}{hr} * \frac{500\ hr}{yr} * \frac{1\ ton}{2{,}000\ lb} = 4.25E^{-2}\,\frac{ton\ CO}{yr} \quad [8]$$

Sulfur Dioxide

The sulfur dioxide (SO_2) emissions factor was obtained from the *United States Environmental Protection Agency (U.S. EPA) AP-42: Compilation of Air Emission Factors (AP-42)* Chapter 3.4 Table 3.4-1, using a sulfur content of 15 parts per million ppm (ppm), which is inherent in ultra-low sulfur diesel (ULSD). The SO_2 emissions factor assumes that all of the sulfur in the fuel is converted to SO_2. The emissions factor was multiplied by the engine rating to calculate the short-term (i.e., lb/hr) emissions rate. The short-term emissions rate was multiplied by 500 hours per year to calculate the annual (i.e., tons/year) emissions rate. For example, SO_2 emissions for the engine was calculated as follows:

$$8.09E^{-3}\,\frac{lb\ SO_2}{hp-hr} * 0.0015\ wt\%\ S * 931\ bhp = 1.13E^{-2}\,\frac{lb\ SO_2}{hr} \quad [9]$$

$$1.13E^{-2}\,\frac{lb\ SO_2}{hr} * \frac{500\ hr}{yr} * \frac{1\ ton}{2{,}000\ lb} = 2.83E^{-3}\,\frac{ton\ SO_2}{yr} \quad [10]$$

Sulfuric Acid

The sulfuric acid mist (H_2SO_4) short term emission rates (lb/hr) were based both on the sulfur content (i.e., 15 ppm) of ULSD and engineering judgement. The H_2SO_4 emissions factor was conservatively estimated based on a 10% molar conversion of SO_2 to sulfur trioxide (SO_3) and 100% conversion of SO_3 to H_2SO_4. For example, H_2SO_4 was calculated as follows:

$$8.09E^{-3}\,\frac{lb\ SO_2}{hp-hr} * 0.0015\ wt\%\ S * 0.1\ \frac{\frac{98.1\ lb\ H_2SO_4}{lbmol}}{\frac{64\ lb\ SO_2}{lbmol}} * 931\ bhp$$
$$= 1.73E^{-3}\,\frac{lb\ H_2SO_4}{hr} \quad [11]$$

$$1.73E^{-3}\,\frac{lb\ H_2SO_4}{hr} * \frac{500\ hr}{yr} * \frac{1\ ton}{2{,}000\ lb} = 4.33E^{-4}\,\frac{ton\ H_2SO_4}{yr} \quad [12]$$

Ammonia

The ammonia (NH_3) emissions factor for selective catalytic reduction (SCR) control was obtained from Table 5-5*: SCR and SNCR Ammonia Emission Factors*, for use with ULSD as fuel, provided in the *Development and Selection of Ammonia Emission Factors, Final Report*, dated August 1994, prepared by the U.S. EPA. To be conservative, a 25% margin was added to present a NTE value. The emissions factor was multiplied by the fuel supply to calculate the short-term (i.e., lb/hr) emissions rate. The short-term emissions rate was multiplied by 500 hours per year to calculate the annual (i.e., tons/year) emissions rate. For example, NH_3 emissions for the engine was calculated as follows:

$$1.4\,\frac{lb\ NH_3}{1\ kgallon} * 1.25 * 43\,\frac{gallon}{hr} * \frac{1\ kgallon}{1{,}000\ gallon} = 7.53E^{-2}\,\frac{lb\ NH_3}{hr} \quad [13]$$

$$7.53E^{-2}\,\frac{lb\ NH_3}{hr} * \frac{500\ hr}{yr} * \frac{1\ ton}{2{,}000\ lb} = 1.88E^{-2}\,\frac{ton\ NH_3}{yr} \quad [14]$$

Polycyclic Aromatic Hydrocarbons and Hazardous Air Pollutants

The polycyclic aromatic hydrocarbons (PAH) and hazardous air pollutants (HAPs) emissions factors were obtained from AP-42 Chapter 3.4 Table 3.4-3 and AP-42 Chapter 3.4 Table 3.4-4, respectively. The emissions factors were multiplied by the engine rating in MMBtu/hr to calculate the short-term (i.e., lb/hr) emissions rates. The short-term emissions rates were multiplied by 500 hours per year to calculate the annual (i.e., tons/year) emissions rate. For example, the acenaphthene emissions for the engine was calculated as follows:

$$4.68E^{-6}\,\frac{lb\ \text{Acenaphthene}}{MMBtu} * 5.9\,\frac{MMBtu}{hr} = 2.76E^{-5}\,\frac{lb\ \text{Acenaphthene}}{hr} \quad [15]$$

$$2.76E^{-5}\,\frac{lb\ \text{Acenaphthene}}{hr} * \frac{500\ hr}{yr} * \frac{1\ ton}{2{,}000\ lb} = 6.89E^{-6}\,\frac{ton\ \text{Acenaphthene}}{yr} \quad [16]$$

Sample Tank Emissions Calculations

For a detailed description of the methodology and sample calculations for the tank associated with the Project, please refer to the information and footnotes included in Emission Calculation Table 4.

Volatile Organic Compounds

VOC emissions from the tank have been quantified using equations and guidance from AP-42 Chapter 7.1. The estimated short-term and long-term VOC emissions from the one 3,000-gallon tank has been included in Emission Calculation Table 4. Furthermore, the Maximum Short-Term Working Loss emissions (L_{MAX}) have been calculated using Equation 1 from page 1 of the TCEQ Air Permit Reviewer Reference Guide APDG 6250 (APDG 6250v1) *Estimating Short Term Emission Rates from Fixed Roof Tanks*. To calculate the L_{MAX}, the throughput of the tank was multiplied by the vapor molecular weight of the VOC, and the vapor pressure of the tank contents at the worst-case temperature. Then the value was divided by the ideal gas constant and the worst-case liquid surface temperature, assuming 95 °F, consistent with TCEQ guidance. For example, the L_{MAX} VOC emissions for the tank were calculated as follows:

$$\frac{3{,}000\ \frac{gal}{hr} * \left(130 \frac{lb}{lbmol} * 0.019\ \text{psia}\right)}{(80.273 \frac{psia * gal}{lbmol * R} * 554.67\ \text{R})} = 0.17\ \frac{lb\ \text{VOC}}{hr} \qquad [17]$$

Executive Summary

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit the operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project. The Facility details are provided below.

QuikTrip Corporation
Midlothian, TX
RN106208655/CN600241673

Introduction

This Application is submitted via the State of Texas Environmental Electronic Reporting System (STEERS) in accordance with the provisions of 30 Texas Administrative Code (TAC) Chapter 116, Subchapter B: *NSR Permits* and consists of the following information. The bolded items are included in this section:

- Process Description
- ALL4 Quality Professional (AQP) Seal
- TCEQ 20833a: PI-1 – *General Application, Version 4.0*
- Electronic Modeling Evaluation Workbook (EMEW)
- Figures
  - Facility Location Map
  - Plot Plan
  - Process Flow Diagram
- Regulatory Applicability Analyses
- Best Available Control Technology (BACT) Determinations
- Summary of Emissions and Emissions Calculations
- Sample Calculations
- **Equipment Tables**
  - **TCEQ 10166: Table 7(b) – *Horizontal Fixed Roof Storage Tank Summary***
  - **TCEQ 10169: Table 7(e) – *Chemical Data Information***
  - **TCEQ 10195: Table 29 – *Reciprocating Engines***
- Engine and Fuel Specifications

Should you have any questions related to this submittal or require additional information, please contact Tanner Henson at thenson@all4inc.com or 281-937-7553 x308 or me at Krudd@quiktrip.com or 918-615-7233.

Texas Commission on Environmental Quality
Table 7(b)
Horizontal Fixed Roof Storage Tank Summary

I. Tank Identification ***(Use a separate form for each tank)***	
Applicant's Full Name: ***QuikTrip Corporation***	
Location *(indicate on plot plan and provide coordinates):* ***32.436887, -97.048632***	
Tank No.: ***1***	Emission Point No. (EPN) *(from flow diagram)*: ***TK-1***
FIN: ***TK-1***	CIN: ***N/A***
Status: ☒ New Tank ☐ Altered Tank ☐ Relocation ☐ Change of Service	
Previous Permit No., Permit by Rule No., or Exemption No.: ***N/A***	
II. Tank Physical Characteristics	
Dimensions – ***Rectangular***	
Shell Length *(ft.)*: **Length (ft):** ***33.75 ft***	Diameter *(ft.):* ***Height (ft): 2.80 ft*** **Width (ft):** ***8.25 ft***
Nominal Capacity or Working Volume *(gallons)*: ***3,000 (Working Volume)***	Turnovers per year: ***21.5***
Net Throughput *(gallons/year)*: ***64,500***	Maximum Filling Rate *(gallons/hour)*: ***3,000 gal/hour***
Is the tank underground?	☐ YES ☒NO
Paint Characteristics	
Shell Color/Shade: ☐ White/White ☐ Aluminum/Specular ☐ Aluminum/Diffuse ☐ Gray/Light ☒ Gray/Medium ☐ Red/Primer ☐ Other:_____	
Shell Condition: ☒ Good ☐ Poor	
Breather Vent Settings	
Combination Vent Valve Number: ***N/A***	
Combination Vent Valve Pressure Setting *(psig)*: ***N/A***	
Combination Vent Valve Vacuum Setting *(psig)*: ***N/A***	
SPECIFY "Atmosphere" or "Discharging" to *(name of abatement device)*: ***N/A***	
Pressure Vent Valve Number: ***1***	
Pressure Vent Valve Pressure Setting *(psig)*: ***~0.5 psig***	
SPECIFY "Atmosphere" or "Discharging" to *(name of abatement device)*: ***Atmosphere***	
Vacuum Vent Valve Number: ***N/A***	
Vacuum Vent Valve Pressure Setting *(psig)*: ***N/A***	

Texas Commission on Environmental Quality
Table 7(b)
Horizontal Fixed Roof Storage Tank Summary

II. Tank Physical Characteristics *(continued)*				
Breather Vent Settings *(continued)*				
Open Vent Valve Number: ***1***				
SPECIFY "Atmosphere" or "Discharging" to *(name of abatement device)*: ***Atmosphere***				
III. Liquid Properties of Stored Material				
Chemical Category: ☐ Organic Liquid		☒ Petroleum Distillates	☐ Crude Oils	
☒ Single *(Complete Section III.1.)*		☐ Multi-Component Liquid *(Complete Section III.2.)*		
1. Single Component Information				
Chemical Name: ***Distillate Fuel Oil No. 2 [Ultra Low Sulfur Diesel (ULSD)]***				
CAS Number: ***68476-30-2***				
Average Liquid Surface Temperature *(˚F)*: ***74.23***				
True Vapor Pressure at Average Liquid Surface Temperature *(psia)*: ***0.01***				
Liquid Molecular Weight: ***130 lb/lb-mole***				
2. Multiple Component Information – *N/A*				
Mixture Name:				
Average Liquid Surface Temperature *(˚F)*:				
Minimum Liquid Surface Temperature (*˚F*)*:*				
Maximum Liquid Surface Temperature *(˚F)*:				
True Vapor Pressure at Average Liquid Surface Temperature *(psia)*:				
True Vapor Pressure at Minimum Liquid Surface Temperature *(psia)*:				
True Vapor Pressure at Maximum Liquid Surface Temperature *(psia)*:				
Liquid Molecular Weight:				
Vapor Molecular Weight:				
Chemical Components Information				

Chemical Name	CAS No.	Percent of Total Liquid Weight *(typical)*	Percent of Total Vapor Weight *(typical)*	Molecular Weight

Texas Commission on Environmental Quality
Table 7(e)
Chemical Data Information

I. Chemical Identification (use a separate form for each chemical not in the Tanks 2.0 database.)						
Chemical Name: ***Distillate No. 2 Fuel Oil (ULSD)***						
CAS Number: ***68476-30-2***						
Category: ☐ Crude Oil ☒ Petroleum Distillates ☐ Organic Liquids						
Molecular Weight: ***130 lb/lb-mole***						
Liquid Density at 60 °F (*lb/gal*): ***7.1***						
II. Vapor Pressure Information (Fill in one or more options completely.)						
Option 1: *Enter Vapor Pressure (psia) for each temperature*						
40 ˚F *(psia)*	50 ˚F *(psia)*	60 ˚F *(psia)*	70 ˚F *(psia)*	80 ˚F *(psia)*	90 ˚F *(psia)*	100 ˚F *(psia)*
0.0031	***0.0045***	***0.0065***	***0.0090***	***0.012***	***0.016***	***0.022***

Option 2: *Enter Constants for Antoine's Equation (using ˚C)* – ***N/A***		

Option 3: *Constants for Antoine's Equation (using ˚K)* – ***N/A***	

Option 4: *Enter Reid Vapor Pressure (psia) and ASTM slope. This option for* ***Crude Oils and Petroleum Distillates ONLY.*** – ***N/A***	
Reid Vapor Pressure (psia) (Crude Oil, Petroleum Distillates)	**ASTM Slope (Petroleum Distillates ONLY)**

Provide source of vapor pressure data: ***AP-42 Section 7 Table 7.1-2***
If **Options** above are not used, please provide alternate data used and data source.

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data

Manufacturer:	Model No.	Serial No.	Manufacture Date:
Volvo	***TWD1673GE***	***TBD***	***2019***
Rebuilds Date:	No. of Cylinders:	Compression Ratio:	EPN:
N/A	***6***	***16.8:1***	***EG-1***

Application: ☐ Gas Compression ☒ Electric Generation ☐ Refrigeration ☒ Emergency/Stand by

☐ 4 Stroke Cycle ☐ 2 Stroke Cycle ☐ Carbureted ☐ Spark Ignited ☐ Dual Fuel ☒ Fuel Injected

☒ Diesel ☐ Naturally Aspirated ☐ Blower /Pump Scavenged ☐ Turbo Charged and I.C. ☒ Turbo Charged

☐ Intercooled ☐ I.C. Water Temperature ☐ Lean Burn ☐ Rich Burn

Ignition/Injection Timing: Fixed: ***TBD*** Variable:

Manufacture Horsepower Rating: ***931*** Proposed Horsepower Rating: ***931***

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (ºF)	Exit Velocity (FPS)
15	***0.67***	***903***	***232.3***

II. Fuel Data

Type of Fuel: ☐ Field Gas ☐ Landfill Gas ☐ LP Gas ☐ Natural Gas ☐ Digester Gas ☒ Diesel

Fuel Consumption (BTU/bhp-hr):***43 gal/hr*** Higher Heating Value: ***137,000 Btu*** Lower Heating Value ***N/A***

Sulfur Content (grains/100 scf - weight %): ***0.0015%***

III. Emission Factors (Before Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
Not Available		***N/A***									

Source of Emission Factors: ☒ Manufacturer Data ☒ AP-42 ***for SO_2, Formaldehyde and PM*** ☐ Other (specify): ***fractions***

IV. Emission Factors (Post Control) – *Refer to the Emissions Calculations*

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
0.29	***≤37***	***0.08***	***≤20***	***5.50E-3***	***N/A***	***2.76E-3***	***≤1***	***2.91E-4***	***N/A***	***1.65E-2***	***N/A***

Method of Emission Control: ☐ NSCR Catalyst ☐ Lean Operation ☐ Parameter Adjustment

☐ Stratified Charge ☐ JLCC Catalyst ☒ Other (Specify): ***SCR part of Tier 4 Final System***

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ☐ Yes ☒ No

V. Federal and State Standards (Check all that apply)

☐ NSPS JJJJ ☒ MACT ZZZZ ☒ NSPS IIII ☒ Title 30 Chapter 117 - List County: ***Ellis***

VI. Additional Information

1. Submit a copy of the engine manufacturer's site rating or general rating specification data. ***Manufacturer information is provided in the additional space attachment in STEERS.***
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents. ***Fuel supplier information is provided in the additional space attachment in STEERS.***
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable). ***Manufacturer information is provided in the additional space attachment in STEERS.***

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data			
Manufacturer: ***Volvo***	Model No. ***TWD1673GE***	Serial No. ***TBD***	Manufacture Date: ***2018***
Rebuilds Date: ***N/A***	No. of Cylinders: ***6***	Compression Ratio: ***16.8:1***	EPN: ***EG-2***

Application: ☐ Gas Compression ☒ Electric Generation ☐ Refrigeration ☒ Emergency/Stand by

☐ 4 Stroke Cycle ☐ 2 Stroke Cycle ☐ Carbureted ☐ Spark Ignited ☐ Dual Fuel ☒ Fuel Injected

☒ Diesel ☐ Naturally Aspirated ☐ Blower /Pump Scavenged ☐ Turbo Charged and I.C. ☒ Turbo Charged

☐ Intercooled ☐ I.C. Water Temperature ☐ Lean Burn ☐ Rich Burn

Ignition/Injection Timing: Fixed: ***TBD*** Variable:

Manufacture Horsepower Rating: ***931*** Proposed Horsepower Rating: ***931***

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (ºF)	Exit Velocity (FPS)
15	***0.67***	***903***	***232.3***

II. Fuel Data

Type of Fuel: ☐ Field Gas ☐ Landfill Gas ☐ LP Gas ☐ Natural Gas ☐ Digester Gas ☒ Diesel

Fuel Consumption (BTU/bhp-hr):***43 gal/hr*** Higher Heating Value: ***137,000 Btu*** Lower Heating Value ***N/A***

Sulfur Content (grains/100 scf - weight %): ***0.0015%***

III. Emission Factors (Before Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
Not Available		***N/A***									

Source of Emission Factors: ☒ Manufacturer Data ☒ AP-42 ***for SO_2, Formaldehyde and PM fractions*** ☐ Other (specify):

IV. Emission Factors (Post Control) – *Refer to the Emissions Calculations*

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
0.29	***≤37***	***0.08***	***≤20***	***5.50E-3***	***N/A***	***2.76E-3***	***≤1***	***2.91E-4***	***N/A***	***1.65E-2***	***N/A***

Method of Emission Control: ☐ NSCR Catalyst ☐ Lean Operation ☐ Parameter Adjustment

☐ Stratified Charge ☐ JLCC Catalyst ☒ Other (Specify): ***SCR part of Tier 4 Final System***

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ☐ Yes ☒ No

V. Federal and State Standards (Check all that apply)

☐ NSPS JJJJ ☒ MACT ZZZZ ☒ NSPS IIII ☒ Title 30 Chapter 117 - List County: ***Ellis***

VI. Additional Information

1. Submit a copy of the engine manufacturer's site rating or general rating specification data. ***Manufacturer information is provided in the additional space attachment in STEERS.***
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents. ***Fuel supplier information is provided in the additional space attachment in STEERS.***
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable). ***Manufacturer information is provided in the additional space attachment in STEERS.***

Texas Commission on Environmental Quality
Table 29 Reciprocating Engines

I. Engine Data			
Manufacturer: ***Volvo***	Model No. ***TWD1673GE***	Serial No. ***TBD***	Manufacture Date: ***2018***
Rebuilds Date: ***N/A***	No. of Cylinders: ***6***	Compression Ratio: ***16.8:1***	EPN: ***EG-3***

Application: ☐ Gas Compression ☒ Electric Generation ☐ Refrigeration ☒ Emergency/Stand by

☐ 4 Stroke Cycle ☐ 2 Stroke Cycle ☐ Carbureted ☐ Spark Ignited ☐ Dual Fuel ☒ Fuel Injected

☒ Diesel ☐ Naturally Aspirated ☐ Blower /Pump Scavenged ☐ Turbo Charged and I.C. ☒ Turbo Charged

☐ Intercooled ☐ I.C. Water Temperature ☐ Lean Burn ☐ Rich Burn

Ignition/Injection Timing: Fixed: ***TBD*** Variable:

Manufacture Horsepower Rating: ***931*** Proposed Horsepower Rating: ***931***

Discharge Parameters

Stack Height (Feet)	Stack Diameter (Feet)	Stack Temperature (ºF)	Exit Velocity (FPS)
15	***0.67***	***903***	***232.3***

II. Fuel Data

Type of Fuel: ☐ Field Gas ☐ Landfill Gas ☐ LP Gas ☐ Natural Gas ☐ Digester Gas ☒ Diesel

Fuel Consumption (BTU/bhp-hr):***43 gal/hr*** Higher Heating Value: ***137,000 Btu*** Lower Heating Value ***N/A***

Sulfur Content (grains/100 scf - weight %): ***0.0015%***

III. Emission Factors (Before Control)

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
Not Available		***N/A***									

Source of Emission Factors: ☒ Manufacturer Data ☒ AP-42 ***for SO_2, Formaldehyde and PM fractions*** ☐ Other (specify):

IV. Emission Factors (Post Control) – *Refer to the Emissions Calculations*

NO_X		CO		SO_2		VOC		Formaldehyde		PM10	
g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv	g/hp-hr	ppmv
0.29	***≤37***	***0.08***	***≤20***	***5.50E-3***	***N/A***	***2.76E-3***	***≤1***	***2.91E-4***	***N/A***	***1.65E-2***	***N/A***

Method of Emission Control: ☐ NSCR Catalyst ☐ Lean Operation ☐ Parameter Adjustment

☐ Stratified Charge ☐ JLCC Catalyst ☒ Other (Specify): ***SCR part of Tier 4 Final System***

Note: *Must submit a copy of any manufacturer control information that demonstrates control efficiency.*

Is Formaldehyde included in the VOCs? ☐ Yes ☒ No

V. Federal and State Standards (Check all that apply)

☐ NSPS JJJJ ☒ MACT ZZZZ ☒ NSPS IIII ☒ Title 30 Chapter 117 - List County: ***Ellis***

VI. Additional Information

1. Submit a copy of the engine manufacturer's site rating or general rating specification data. ***Manufacturer information is provided in the additional space attachment in STEERS.***
2. Submit a typical fuel gas analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents. ***Fuel supplier information is provided in the additional space attachment in STEERS.***
3. Submit description of air/fuel ratio control system (manufacturer information is acceptable). ***Manufacturer information is provided in the additional space attachment in STEERS.***

Executive Summary

QuikTrip Distribution (QuikTrip) retained PowerSecure, Inc. (PowerSecure) to permit the operation of three new generator sets (gensets) for both emergency and non-emergency use (Project) at its Distribution Center (Facility), located at 4200 Railport Parkway in Midlothian, TX. Each genset is driven by a diesel fuel-fired Reciprocating Internal Combustion Engine (RICE). This submittal is the Minor New Source Review (NSR) Permit Application (Application) for the proposed Project. The Facility details are provided below.

QuikTrip Corporation
Midlothian, TX
RN106208655/CN600241673

Introduction

This Application is submitted via the State of Texas Environmental Electronic Reporting System (STEERS) in accordance with the provisions of 30 Texas Administrative Code (TAC) Chapter 116, Subchapter B: *NSR Permits* and consists of the following information. The bolded items are included in this section:

- Process Description
- ALL4 Quality Professional (AQP) Seal
- TCEQ 20833a: PI-1 – *General Application, Version 4.0*
- Electronic Modeling Evaluation Workbook (EMEW)
- Figures
  - Facility Location Map
  - Plot Plan
  - Process Flow Diagram
- Regulatory Applicability Analyses
- Best Available Control Technology (BACT) Determinations
- Summary of Emissions and Emissions Calculations
- Sample Calculations
- Equipment Tables
  - TCEQ 10166: Table 7(b) – *Horizontal Fixed Roof Storage Tank Summary*
  - TCEQ 10169: Table 7(e) – *Chemical Data Information*
  - TCEQ 10195: Table 29 – *Reciprocating Engines*
- **Engine and Fuel Specifications**

Should you have any questions related to this submittal or require additional information, please contact Tanner Henson at thenson@all4inc.com or 281-937-7553 x308 or me at Krudd@quiktrip.com or 918-615-7233.

VOLVO PENTA

NO: 164044

EXHAUST EMISSION DECLARATION

The emission data in this declaration are measured according to the test procedures specified below and on one member engine of the engine type. Emission data may vary among production engines.

TECHNICAL SPECIFICATION

Engine type:	TWD1673 GE
Specification:	
Module No:	
Rated crankshaft power *):	685 kW
Rated speed:	1800 rpm

*) Stand-by power without fan acc. to ISO 3046.

TEST INFORMATION

Test conditions	40 CFR part 1039
Test identification	29008623
Test date	September 10, 2014
Test cycle	D2 - 5-mode US constant speed test cycle

EXHAUST EMISSIONS (weighted cycle)

CO (g/kWh)	0,09
HC (g/kWh)	0,003
NOx (g/kWh)	0,31
PM (g/kWh)	0,018

EXHAUST EMISSIONS (per cycle mode)

Mode	#	1	2	3	4	5
Power	(kW)	699	526	351	176	70
NOx	(g/h)	204	147	148	28	46
HC	(g/h)	0	0	0	0	1
CO	(g/h)	141	106	74	60	123
CO_2	(kg/h)	448	332	227	125	66
NOx	(ppm)	35	29	37	10	23
HC	(ppm)	0	0	0	0	1
CO	(ppm)	20	15	12	10	13
CO engine out	(ppm)	42	37	31	36	105
CO_2	(%)	8,6	7,3	6,1	4,7	3,6

Gothenburg 2014-10-24

Hanna Österlindh

AB Volvo Penta
47 436, Engine Emission Certification

Important

This Technical Data Sheet and the corresponding Installation Instructions provide important information to ensure the installed engine will operate according to the design specification in the Volvo Penta application for certification.

Requirements marked with ⚠ re considered as critical for exhaust emissions compliance according to the design specification in the Volvo Penta application for certification.

Failing to follow and meet these instructions and requirements when installing a certified engine in a piece of nonroad equipment for use in the United States violates U.S. federal law (40 CFR 1068.105(b)), subject to fines or other penalities as described in the Clean Air Act.

General

In-line four stroke diesel engine with direct injection. Rotation direction, anti-clockwise viewed towards flywheel.
Turbocharged

Number of cylinders			6
Displacement, total		litre in^3	16,12 983,9
Firing order			1-5-3-6-2-4
Bore		mm in	144 5,67
Stroke		mm in	165 6,50
Compression ratio			16,8:1
Wet weight (Not including after treatment system)	Engine only	kg lb	1810 3990
	Engine incl. cooling system and air filtration system	kg lb	2217 4888
	Frame	kg lb	550 1213
	Compensator and Mixer pipe	kg lb	25 55
	EATS Muffler	kg lb	188 414

Performance			rpm	1500	1800
Prime Power		without fan	kW	NA	625
			hp	NA	850
		with fan	kW	NA	595
			hp	NA	809
Standby Power		without fan	kW	NA	685
			hp	NA	932
		with fan	kW	NA	655
			hp	NA	891
Torque at:	Prime Power		Nm	NA	3316
			lbft	NA	2445
	Standby Power		Nm	NA	3634
			lbft	NA	2680
Mean piston speed			m/s	NA	9,9
			ft/sec	NA	32,6
Effective mean pressure at:	Prime Power		MPa	NA	2,6
			psi	NA	375
Effective mean pressure at:	Standby Power		MPa	NA	2,8
			psi	NA	411
Max combustion pressure at:	Prime Power		MPa	NA	22
			psi	NA	3191
Max combustion pressure at:	Standby Power		MPa	NA	22,5
			psi	NA	3263
Total mass moment of inertia, J (mR^2) with flywheel			kgm^2	2,50	
			$lbft^2$	59,3	
Total mass moment of inertia, J (mR^2) without flywheel			kgm^2	1,92	
			$lbft^2$	45,6	
Friction Power			kW		51
			hp		69,36
Derating due to altitude - see Technical Diagrams					

Engine noise emission

Test Standards: ISO 3744-1981 (E) sound power
Tolerance ± 0.75 dB(A)

		rpm	1500	1800
Measured sound power Lw	No load	dB(A)	NA	118,1
	Prime Power	dB(A)	NA	119,1
	Standby Power	dB(A)	NA	118,9
Calculated sound pressure Lp at 1 m	No load	dB(A)	NA	101,1
	Prime Power	dB(A)	NA	102,1
	Standby Power	dB(A)	NA	101,9

Unsilenced exhaust noise

Data calculated as sound pressure Lp.
Assumed microphone distance 1 m

	rpm	1500	1800
Prime Power	dB(A)	NA	
Standby Power	dB(A)	NA	

Test conditions for load acceptance data

Warm engine.	**Generator**		**Model**		**Type of AVR**		
	Stamford		HCM534F1		MX341		
AVR Settings	UFRO (Hz):	57	DIP (%)*:	50	DWELL (%)*:	N/A	
	Stability (%)*:	According t	Voltage (V):	400	Load factor:	1.0	

Applies to Stamford nomenclature,
(%)* : % of max potentiometer setting range
Load acceptance performance can vary due to actual alternator inertia, voltage regulator, type of load and local ambient conditions.

Abbreviation:	**Full name:**	**Descriptions**
AVR	Automatic Voltage Regulator	Generator performance and safty control unit
UFRO	Under Frequency Roll Off	Overheating protection at under frequency
DIP		Controls the slope of voltage drop when the UFRO is active
DWELL		Controls the slope of voltage recovery when the UFRO is active.

Single step load performance at 1500 rpm - PRIME (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20					20-100				
0-40					40-100				
0-50					50-100				
0-60					60-100				
0-x	7 (G3)				x-100				
0-x	10 (G2)				x-100				
0-80*									
0-100*									
100-0									

Single step load performance at 1500 rpm - STAND BY (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20					20-100				
0-40					40-100				
0-50					50-100				
0-60					60-100				
0-x	7 (G3)				x-100				
0-x	10 (G2)				x-100				
0-80*									
0-100*									
100-0									

Single step load performance at 1800 rpm - PRIME (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	2,6	1,4	0,9	0,6	20-100	10,2	2,7	24,3	2,2
0-40	5,2	1,8	8,7	1,3	40-100	6,9	2,4	15,4	1,6
0-52	7 (G3)	2,2	13,6	1,8	52-100	5,5	2,2	11,3	1,5
0-60	8,6	2,3	18,6	1,9	60-100	4,6	2,0	7,7	1,5
0-68	10 (G2)	2,6	23,0	2,0	68-100	3,9	1,8	4,6	1,0
0-80	13,4	3,1	30,8	2,5	80-100	2,7	1,4	1,9	0,7
0-100	18,0	3,6	40,1	3,0					
100-0	12,0	2,6	5,7	1,4					

Single step load performance at 1800 rpm - STAND BY (Resistiv load)

Load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)	Remaining load (%)	Speed diff (%)	Speed Recovery time (s)	Voltage diff (%)	Voltage Recovery time (s)
0-20	2,8	1,3	1,0	0,6	20-100	11,2	5,0	28,2	2,8
0-40	5,6	2,0	11,1	1,3	40-100	7,3	2,8	18,1	2,0
0-48	7 (G3)	2,1	14,2	1,7	48-100	6,4	2,5	15,3	2,0
0-60	9,8	2,7	22,8	2,0	60-100	4,8	2,2	9,5	1,5
0-62	10 (G2)	2,6	23,4	1,9	62-100	4,8	2,1	9,0	1,5
0-80	15,0	3,3	34,9	2,8	80-100	2,9	1,5	2,4	0,9
0-100	19,9	6,3	43,9	3,5					
100-0	13,7	2,7	7,8	1,9					

Cold start performance			rpm	1500	1800
Time from start to stay within 0.5% of no load speed at ambient temperature:	°C	20	s	NA	4,3
		5	s	NA	5,3
		-15 *	s	NA	5,3
		-30 **	s	NA	5,7
		Min start temp*	°C	-31,0	

* With manifold heater 4 kW engaged, lubrication oil 15W/40 and block heater.

** With manifold heater 4 kW engaged, lubrication oil 5W/30 and block heater, Fuel MK-1.

Block heater type	Make	Power kW	Engaged hours	Cooling water temp engine block
Volvo part No: 22454340 P01	Calix	1.5 kW	10h ambient temp-30 C	-2°C 28°F

Lubrication system			rpm	1500	1800
Lubricating oil consumption	Prime Power		litre/h US gal/h	NA	0,10 0,026
	Standby Power		litre/h US gal/h	NA	0,11 0,029
Oil system capacity including filters			litre US gal	48 12,7	
Oil sump capacity:		max	litre US gal	42 11,1	
		min	litre US gal	32 8,5	
Oil change intervals/specifications:	VDS-3*		h	500	
			h		
			h		
Engine angularity limits:		front up	°	30	
		front down	°	30	
		side tilt	°	30	
Oil pressure at rated speed			kPa psi	399 58	
Lubrication oil temperature in oil sump:		max	°C °F	130 266	
Oil filter micron size			µ	40	

* See also general section in the sales guide

Fuel system		rpm	1500	1800
Prime Power Specific **fuel** consumption at:	25%	g/kWh lb/hph	NA	227 0,368
	50%	g/kWh lb/hph	NA	202 0,327
	75%	g/kWh lb/hph	NA	195 0,316
	100%	g/kWh lb/hph	NA	195 0,316
% adBlue consumption at: (Compare to Fuel consumption by Volyme)	25%	%	NA	6,4
	50%	%	NA	6,7
	75%	%	NA	7,2
	100%	%	NA	6,4

Standby Power Specific **fuel** consumption at:	25%	g/kWh lb/hph	NA	223 0,361
	50%	g/kWh lb/hph	NA	201 0,326
	75%	g/kWh lb/hph	NA	195 0,316
	100%	g/kWh lb/hph	NA	197 0,319
% adBlue consumption at: (Compare to Fuel consumption by Volyme)	25%	%	NA	6,6
	50%	%	NA	6,7
	75%	%	NA	7,2
	100%	%	NA	6,1

Fuel system	rpm	1500	1800
Fuel to conform to	ASTM D975 (2D)		
System supply flow at:	litre/h US gal/h	NA	210,0 55,5
Fuel supply line max restriction (Measured at fuel inlet connection)	kPa psi	NA	30,0 4,4
Fuel supply line max pressure, engine stopped	kPa psi	NA	0,0 0,0
System return flow	litre/h US gal/h	NA	25,0 6,6
Fuel return line max restriction (Measured at fuel return connection)	kPa psi	NA	20,0 2,9
Maximum allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F	NA	60 140
Prefilter / Water separator micron size	µ	10	
Fuel filter micron size	µ	5	
Governor type/make, standard	Volvo/EMS 2.3		
Injection pump type/make	UNIT INJECTOR HYBRID		

Fuel system		rpm	1500	1800
Prime Power Specific **fuel** consumption at:	25%	g/kWh lb/hph	NA	227 0,368
	50%	g/kWh lb/hph	NA	202 0,327
	75%	g/kWh lb/hph	NA	195 0,316
	100%	g/kWh lb/hph	NA	195 0,316
% adBlue consumption at: (Compare to Fuel consumption by Volyme)	25%	%	NA	6,4
	50%	%	NA	6,7
	75%	%	NA	7,2
	100%	%	NA	6,4

Standby Power Specific **fuel** consumption at:	25%	g/kWh lb/hph	NA	223 0,361
	50%	g/kWh lb/hph	NA	201 0,326
	75%	g/kWh lb/hph	NA	195 0,316
	100%	g/kWh lb/hph	NA	197 0,319
% adBlue consumption at: (Compare to Fuel consumption by Volyme)	25%	%	NA	6,6
	50%	%	NA	6,7
	75%	%	NA	7,2
	100%	%	NA	6,1

Fuel system	rpm	1500	1800
Fuel to conform to	ASTM D975 (2D)		
System supply flow at:	litre/h US gal/h	NA	210,0 55,5
Fuel supply line max restriction (Measured at fuel inlet connection)	kPa psi	NA	30,0 4,4
Fuel supply line max pressure, engine stopped	kPa psi	NA	0,0 0,0
System return flow	litre/h US gal/h	NA	25,0 6,6
Fuel return line max restriction (Measured at fuel return connection)	kPa psi	NA	20,0 2,9
Maximum allowable inlet fuel temp (Measured at fuel inlet connection)	°C °F	NA	60 140
Prefilter / Water separator micron size	µ	10	
Fuel filter micron size	µ	5	
Governor type/make, standard	Volvo/EMS 2.3		
Injection pump type/make	UNIT INJECTOR HYBRID		

Intake and exhaust system			rpm	1500	1800
Air consumption at: (+25°C and 100kPa)	Prime Power		m^3/min cfm		48,1 1699
	Standby Power		m^3/min cfm		51,1 1805
⚠ **See front page for important information** Max allowed air intake restriction including piping			kPa psi		3 0,4
Air filter restriction clean Volvo Penta filter			kPa psi		1,4 0,2
Heat rejection to exhaust at:		Prime Power	kW BTU/min		458 26072
		Standby Power	kW BTU/min		521 29623
Exhaust gas temperature after turbine at:		Prime Power	°C °F		455 851
		Standby Power	°C °F		484 903
⚠ **See front page for important information** Max allowable back pressure in exhaust line (after turbine) Pipe dimension Ø: mm		Prime Power	kPa psi		19 2,7
		Standby Power	kPa psi		20 2,9
⚠ **See front page for important information** Max allowable temperature drop between turbine and SCR muffler inlet.		Prime Power	Δ°C Δ°F		10 18
		Standby Power	Δ°C Δ°F		10 18
SCR muffler pressure drop (at exhaust gas flow and exhaust temp given)		Prime Power	kPa psi		9 1,3
		Standby Power	kPa psi		10 1,5
Pre-catalyst pressure drop		Prime Power	kPa psi		NA NA
		Standby Power	kPa psi		NA NA
Exhaust gas flow at: (temp and pressure after turbine at the corresponding power setting)		Prime Power	m^3/min cfm		126,6 4471
		Standby Power	m^3/min cfm		137,8 4866

Cooling system			rpm	1500	1800
Heat rejection radiation from engine at:		Prime Power	kW BTU/min		26 1479
		Standby Power	kW BTU/min		29 1649
Coolant		Volvo Penta coolant "ready mix or Volvo Penta coolant mixed with fresh water 40/60			
Radiator cooling system type			Closed circuit		
Standard radiator core area			m² foot²	1,68 18,08	
Fan diameter			mm in	965 37,99	
Fan power consumption			kW hp		30 41
Fan drive ratio				1.04:1	
Coolant capacity,	Engine only		litre US gal	33 8,72	
	CACs (Charge Air Coolers)		litre US gal	10 2,64	
	Coolant radiators incl piping, Engine circuit		litre US gal	48 12,68	
	Coolant radiators incl piping, CAC- circuit		litre US gal	48 12,68	
	Expansion tank, Engine circuit		litre US gal	20 5,28	
	Expansion tank, CAC circuit		litre US gal	7 1,85	
Coolant pump			drive/ratio	Belt / 1,85:1	
Coolant pump , CAC circuit			drive/ratio	Belt / 2,29:1	
Thermostat, Engine circuit	Start to open		°C °F	82 180	
	Fully open		°C °F	92 198	
Thermostat, CAC circuit	Start to open		°C °F	40 104	
	Fully open		°C °F	52 126	
Maximum static pressure head (expansion tank height + pressure cap setting)			kPa psi	100 14,5	
Minimum static pressure head (expansion tank height + pressure cap setting)			kPa psi	70 10,2	
Standard pressure cap setting			kPa psi	75 10,9	
Maximum top tank temperature			°C °F	107 225	
Charge air pressure (after charge air coolers)			kPa psi	360 52,2	
⚠ **See front page for important information** Max allowed Charge air outlet temp. At air inlet temp. 25°C					
	Prime Power		°C °F		50 122
	Standby Power		°C °F		50 122

OEM cooling system design:

- move of standard radiatorts		**rpm**	**1500**	**1800**
Maximum additional coolant, Engine circuit with standard expansion tank		litre US gal		15 3,96
Maximum additional coolant, CAC circuit with standard expansion tank		litre US gal		5 1,32
Maximum distans in vertikal direction with standard pressure cap (75 kPa)		m ft		2,5 8,20
Maximum additional pressure drop due to move		KPa psi		10 1,5
- replacement of standard radiators				
Heat rejection to coolant **engine radiator** at:	Prime Power	kW BTU/min		223 12682
	Standby Power	kW BTU/min		245 13933
Heat rejection to coolant **CAC radiator** at:	Prime Power	kW BTU/min		208 11829
	Standby Power	kW BTU/min		216 12284
Minimum coolant flow **engine radiator** (at fully open thermostat)		litre/s US gal/s	6 1,59	
Minimum coolant flow **CAC radiator** (at fully open thermostat)		litre/s US gal/s	2,5 0,66	
Maximum coolant pressure drop over **engine radiator** incl. Piping (at coolant flow above)		kPa psi	70 10,2	
Coolant pressure drop over complete engine circuit cooling system (at coolant flow above)		kPa psi	160 23,2	
Coolant pressure drop over complete CAC circuit cooling system (at coolant flow above)		kPa psi	135 19,6	
Nominal coolant pressure before engine circuit coolant pump		kPa psi	30 4,4	
Nominal coolant pressure before CAC circuit coolant pump		kPa psi	30 4,4	

OEM cooling system design: 2-circuit system

- engine coolant circuit		**rpm**	**1500**	**1800**
Heat rejection to coolant **engine coolant circuit:**	Prime Power	kW BTU/min		
	Standby Power	kW BTU/min		
Min coolant flow **engine coolant circuit** (at fully open thermostat)		litre/s US gal/s		
Maximum coolant temperature entering engine		°C F		
Maximum external **engine coolant circuit** restriction, including piping		kPa psi		
Nominal coolant pressure		kPa psi		
- charge air cooler (CAC) coolant circuit				
Heat rejection to coolant **CAC coolant circuit:**	Prime Power	kW BTU/min		
	Standby Power	kW BTU/min		
Minimum coolant flow **CAC coolant circuit**:		litre/s US gal/s		
Maximum coolant temperature entering CAC (at air inlet temperature 25°C)		°C F		
Coolant pressure drop over charge air coolers (at Minimum coolant flow CAC coolant circuit above)		kPa psi		
Nominal CAC coolant pressure		kPa psi		

Cooling performance

Standard fan: Fan ratio: 1 : 1.04 Fan type: FIX

Cooling air flow and external restriction at different radiator air temperatures based on 107°C TTT and 40% antifreeze. Valid at 1 atm. (radiator and cooling fan, see optional equipment)

Engine speed rpm	Air on temp °C	PRIME POWER		STANDBY POWER	
		Air flow m^3/s	External restriction Pa	Air flow m^3/s	External restriction Pa
1800	63	15,2	0		
	62	14,5	100	15,2	0
	61	14,1	200		
	60	13,6	300		
	59			14,5	100
	58			13,9	200
	57			13,6	300

Engine management system

Functionality	Alternatives	Default setting
Governor mode	Isochronous	Isochronous
Governor droop	N/A	N/A
Governor response	Adjustable PID-constants (VODIA)	
Dual speed	Single speed 1800rpm, 60Hz	1800,0
Idle speed	600-1200rpm	900,0
Fine speed adjustment	+- 90 rpm	0,0
Preheating function	On / Off	Off

Engine sensor and switch settings

			Alarm level		Engine protection	
Parameter		**Unit**	**Setting range**	**Default setting**	**Level**	**Action. Default/Alternative**
Oil temp		°C	120 - 130	125	Setting +2.5	Shutdown after 10s
Oil pressure	Low idle 900rpm	kPa	-	170,0	195,0	Shutdown
	1800 rpm	kPa	-	300,0	325,0	Shutdown
Oil level				Min level		
DEF dosing injector failure				On	Low level	Shutdown after 10s
Coolant temp		°C	95 - 101	103	Setting +4	Shutdown after 10s
Coolant level			See cooling system	On	Low level	Shutdown after 10s
Fuel feed pressure	Low idle	kPa		Min level		
	>1400 rpm			Min level		
Water in fuel				Max level		
Crank case pressure		kPa	-	Rapid increase	Rapid increase	Shutdown
Air filter pressure drop		kPa	-	Max level		
		0,0	Alarm level		Engine protection	
Altitude, above sea		m	-	-	-	Automatic derating, see section Smoke, Fuel & Derating

Charge air temp	°C		80	82,5	Shutdown after 10s
Charge air pressure	kPa		25 above demand	35 above demand	Shutdown after 1s
Engine speed	rpm	100 - 120% of rated speed	115% of rated speed	Alarm level	Shutdown
Exhaust Temperature (before SCR volume)	°C		530	550,0	Shutdown after 10s

Engine protection can be disabled. For consequences please see VP International Limited Warranty Policy

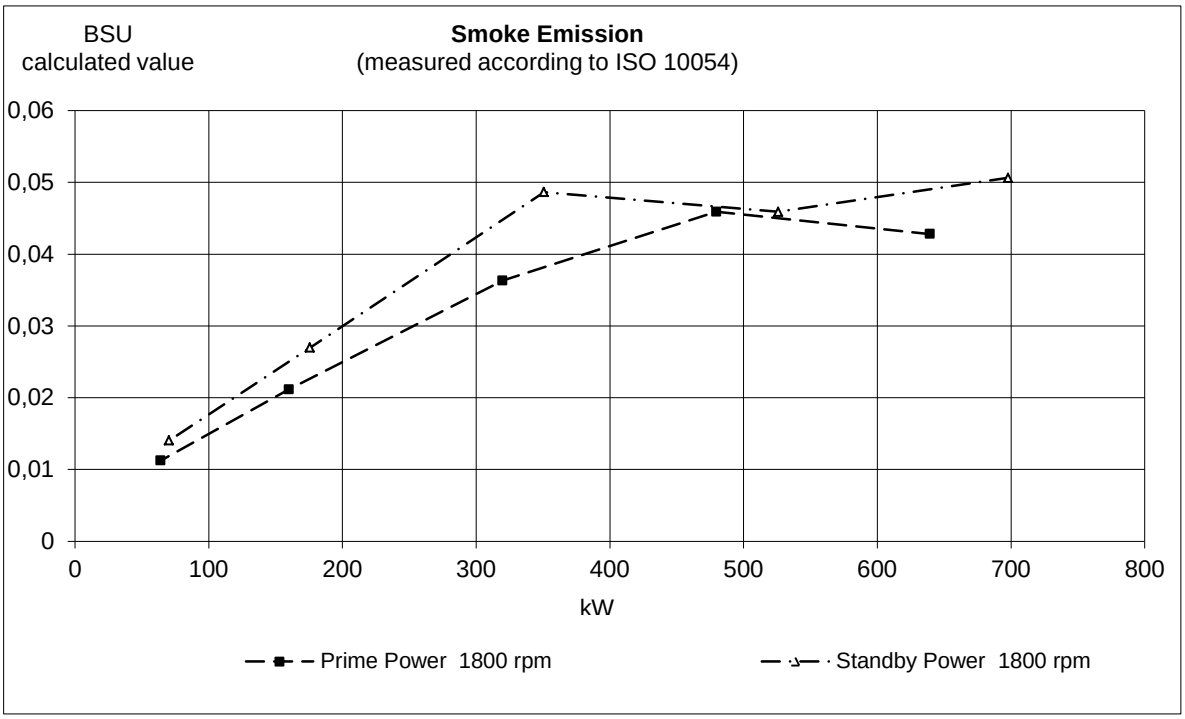
Electrical system

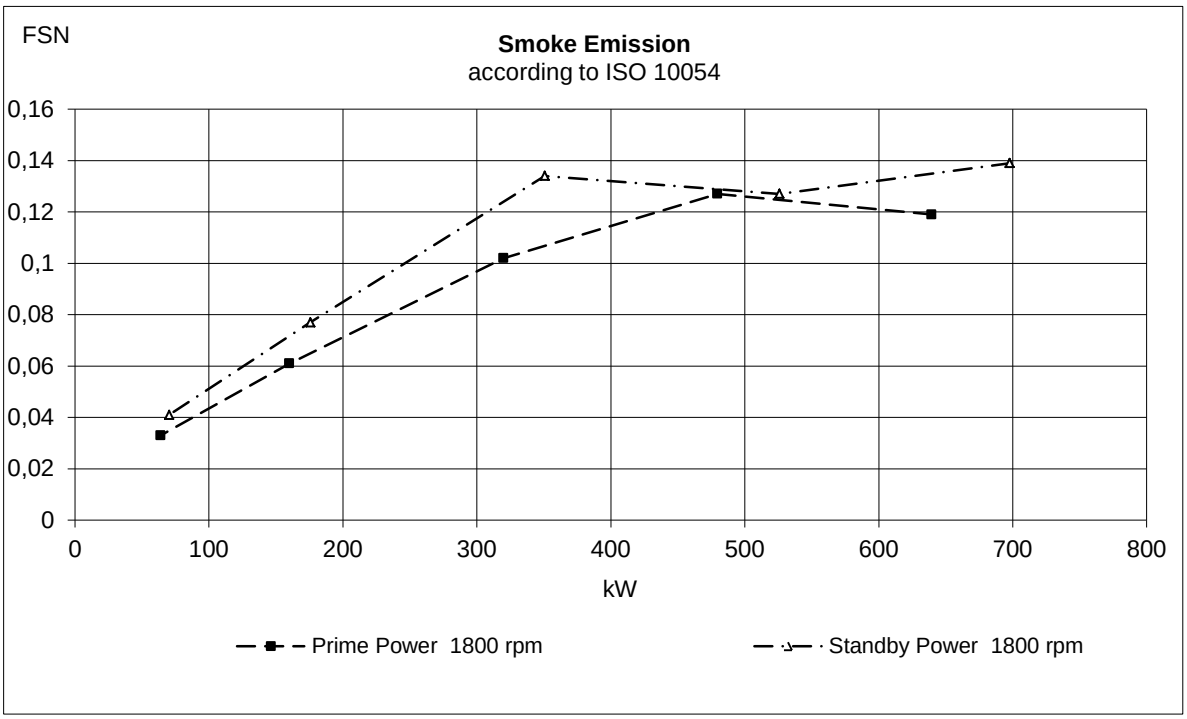
Voltage and type		24V / insulated from earth	
Alternator:	make/output	A	Bosch / 80
	tacho output	Hz/alt. Rev	6
	drive ratio		3,94 : 1
Starter motor		make	Mitsubishi Electric
		type	24V7.0KW12/3.175F
		kW	7,0
Number of teeth on:	flywheel		153
	starter motor		12
Max wiring resistance main circuit		mΩ	
Cranking current at +20°C		A	300
Crank engine speed at 20°C		rpm	155
Starter motor battery capacity:	max	Ah/A	2x225
	min at +5°C	Ah/A	
Inlet manifold heater (at 20 V)		kW	4,0
Power relay for the manifold heater		A	1

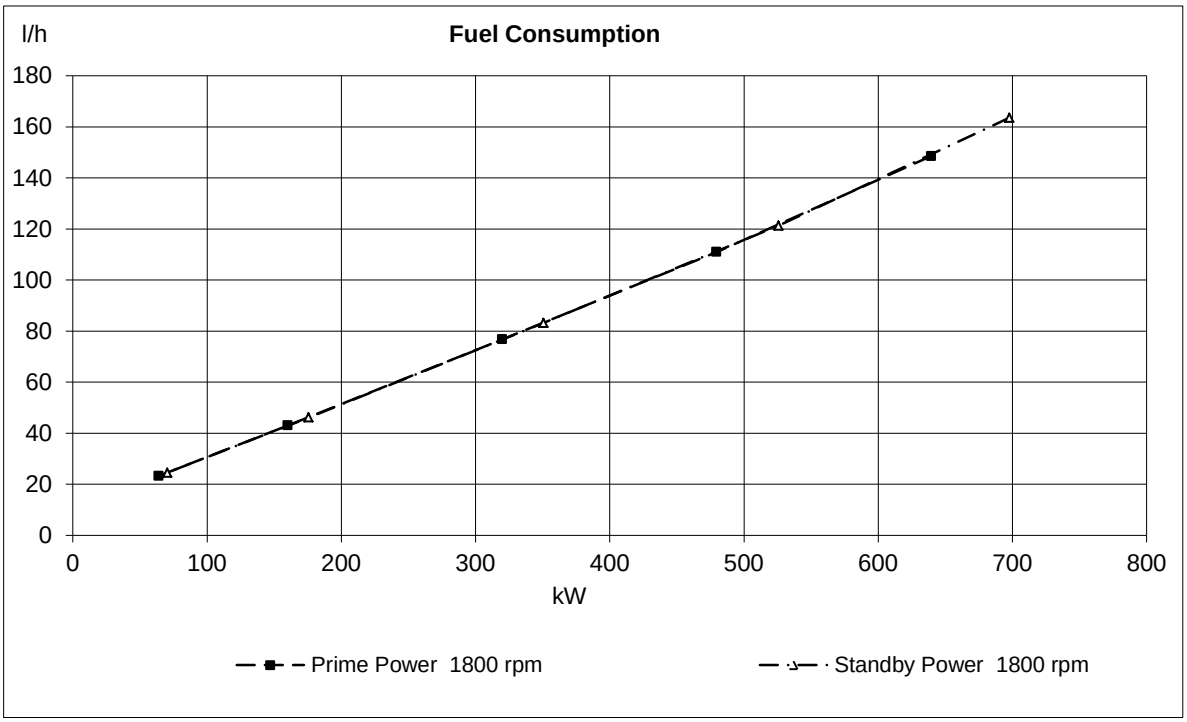
Performance	Power (kW)	Rpm
Prime Power	625	1800
Standby Power	685	1800

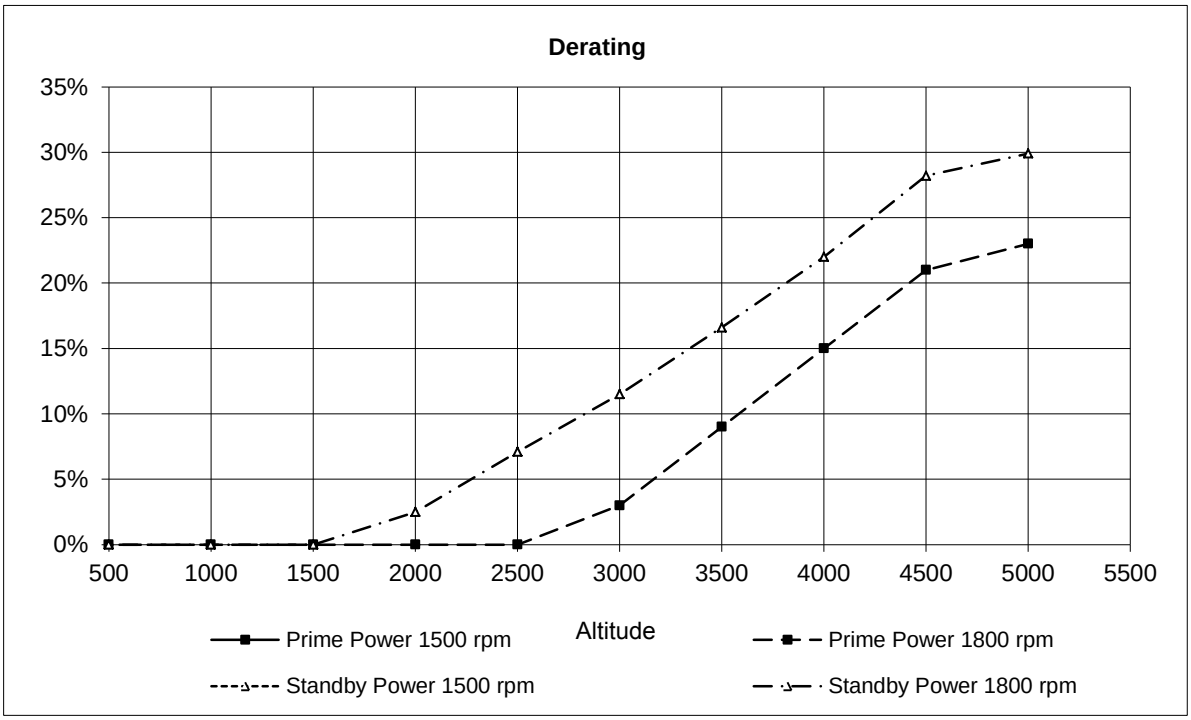
Sensors Alarm	Signal	Range	Alarm switch	Alarm Level	Derating level	Condition/Delay	Derating
Boost pressure	0,5-4,5 V	50-400 kPa	N/A	25kPa above demand	30kPa above demand	1s	Shutdown after delay
Boost temperaure	50-0 kΩ	-40° - 130 °C	N/A	80°C	82.5°C	10s	Shutdown after delay
Coolant level switch	Digital		Alarm when closed	Low	Low	10s	Shutdown after delay
Coolant temperature	50-0 kΩ	-40° - 140 °C	N/A	103°C	107°C	10s	Shutdown after delay
Crankcase pressure	0,5-4,5 V	0-15 kPa	N/A	Rapid pres inc	Rapid pres inc		Shutdown without delay
Engine Speed Cam	Frequency		N/A	Lost sign			
Engine Speed Crank	Frequency		N/A	Lost sign			
Exhaust temp (before SCR volume)			N/A	530°C	550°C	10s	Shutdown after delay
Oil level sensor			N/A	N/A	N/A		
Oil temperature	50-0 kΩ	-40° - 140 °C	N/A	125°C	127.5°C	10s	Shutdown after delay
Water In fuel switch	Digital		Alarm when closed	Water in Fuel			
DEF dosing injector failure	Digital		Alarm when closed	Low	Low	10s	Shutdown after delay

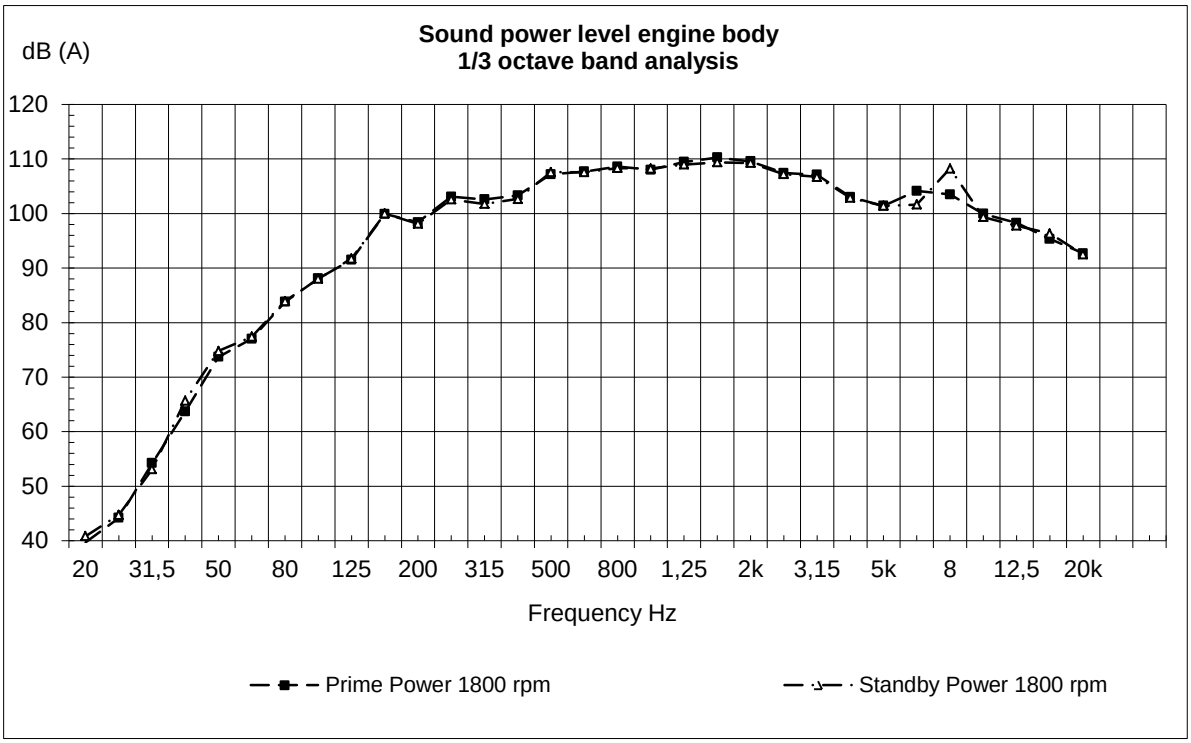
Sensors Alarm	Signal	Range	rpm Map					Condition	Derating
Oil pressure	0,5-4,5V	0-700kPa	**450 rpm**	**500 rpm**	**1000 rpm**	**1450 rpm**	**2000 rpm**		
Alarm Level			-50	50	200	300	300		
Derating Level			-25	75	225	325	325		Shutdown without delay
Fuel pressure	0,5-4,5 V	0-700 kPa	**0 rpm**	**600 rpm**	**1000 rpm**	**1800 rpm**	**1900 rpm**		
Alarm Level			-50	50	75	200	200		
Derating Level			N/A	N/A	N/A	N/A	N/A		

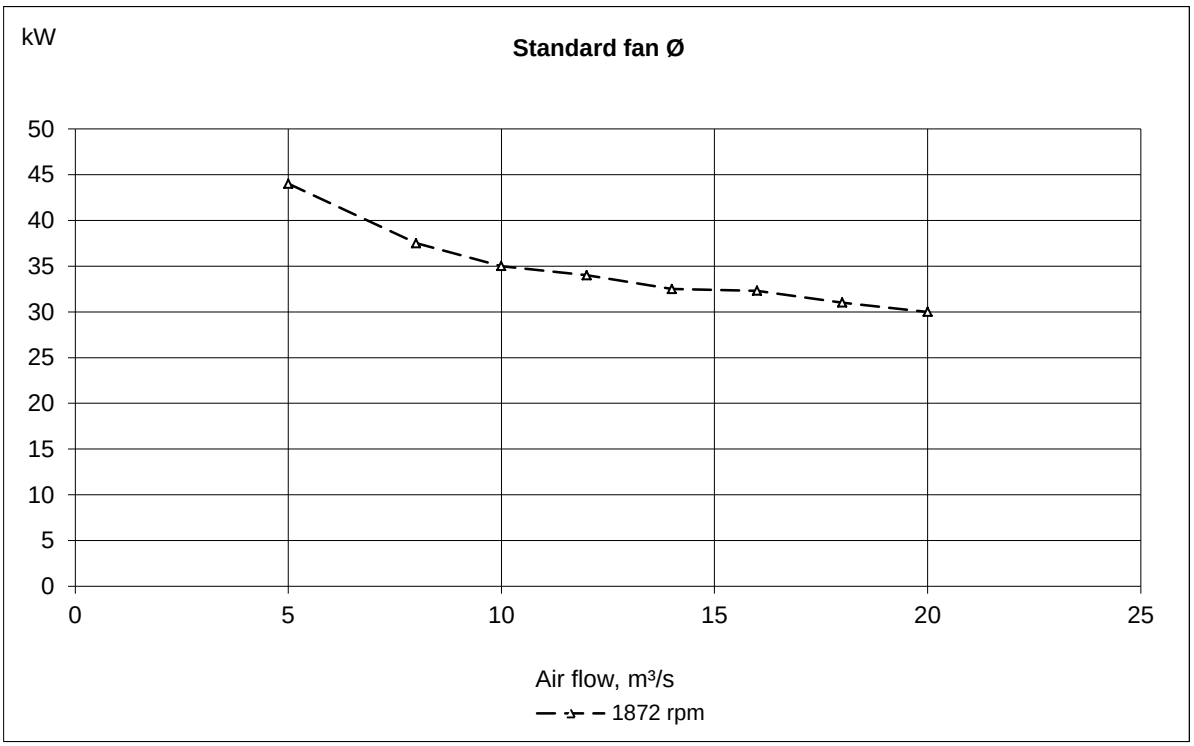

BSU
calculated value
Smoke Emission
(measured according to ISO 10054)
0,06
0,05
0,04
0,03
0,02
0,01
0
0
100
200
300
400
500
600
700
800
kW
Prime Power 1800 rpm
Standby Power 1800 rpm

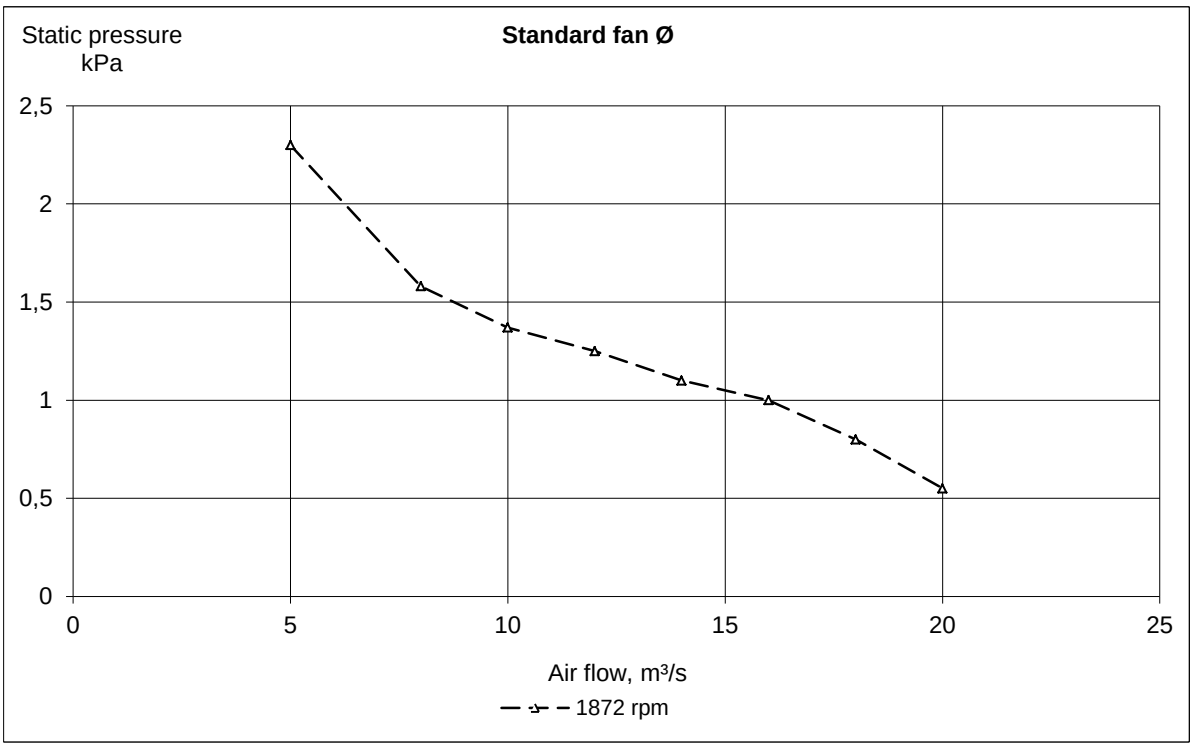

FSN
Smoke Emission
according to ISO 10054
0,16
0,14
0,12
0,1
0,08
0,06
0,04
0,02
0
0
100
200
300
400
500
600
700
800
kW
Prime Power 1800 rpm
Standby Power 1800 rpm


Fuel Consumption
l/h
180
160
140
120
100
80
60
40
20
0
0
100
200
300
400
500
600
700
800
kW
Prime Power 1800 rpm
Standby Power 1800 rpm


Derating
35%
30%
25%
20%
15%
10%
5%
0%
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
5500
Altitude
Prime Power 1500 rpm
Prime Power 1800 rpm
Standby Power 1500 rpm
Standby Power 1800 rpm


Sound power level engine body
1/3 octave band analysis
dB (A)
120
110
100
90
80
70
60
50
40
20
31,5
50
80
125
200
315
500
800
1,25
2k
3,15
5k
8
12,5
20k
Frequency Hz
Prime Power 1800 rpm
Standby Power 1800 rpm


kW
Standard fan Ø
50
45
40
35
30
25
20
15
10
5
0
0
5
10
15
20
25
Air flow, m³/s
1872 rpm


Static pressure
kPa
Standard fan Ø
2,5
2
1,5
1
0,5
0
0
5
10
15
20
25
Air flow, m³/s
1872 rpm

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;

Product Code: 0290MAR019
Chemical Family: Complex Hydrocarbon Substance

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

Manufacturer, Importer, or Responsible Party Name and Address:

MARATHON CANADA MARKETING, Ltd.
Canadian Address Here

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 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/m³ TWA Skin - potential significant contribution to overall exposure by the cutaneous route	-	-	-
Kerosine (petroleum) 8008-20-6	200 mg/m³ 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/m³	10 ppm TWA 50 mg/m³ TWA 15 ppm STEL 75 mg/m³ 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.

Property	**Values (Method)**
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
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 (21°C), 760 mmHg pressure.
Possibility of hazardous reactions	None under normal processing.

Hazardous polymerization Will not occur.

Conditions to avoid Excessive heat, sources of ignition, open flame.

Incompatible Materials Strong oxidizing agents.

Hazardous decomposition products 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 Irritating to skin. 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.

Skin corrosion/irritation Causes skin irritation.
Serious eye damage/eye irritation None known.
Sensitization None known.

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 91-20-3	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed

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
Class:	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 Section 311/312: 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/NDSL 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 SDS contains all of the information required by those 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

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Revision Notes

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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.