

LA-UR-18-29465

Approved for public release; distribution is unlimited.

Title:	No Permit Required Application - TA-46 Diesel Engines for Engine Fuel Testing Project
Author(s):	Stockton, Marjorie Bloomhardt
Intended for:	Environmental Regulatory Document
Issued:	2018-10-29 (rev.1)

Disclaimer:

Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the Los Alamos National Security, LLC for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. By approving this article, the publisher recognizes that the U.S. Government retains nonexclusive, royalty-free license to publish or reproduce the published form of this contribution, or to allow others to do so, for U.S. Government purposes. Los Alamos National Laboratory requests that the publisher identify this article as work performed under the auspices of the U.S. Department of Energy. Los Alamos National Laboratory strongly supports academic freedom and a researcher's right to publish; as an institution, however, the Laboratory does not endorse the viewpoint of a publication or guarantee its technical correctness.



Environmental Protection & Compliance Division (EPC-DO)

Environmental Compliance Programs (EPC-CP)

PO Box 1663, K490

Los Alamos, New Mexico 87545

(505) 667-0666

Date: **OCT 05 2018**
Symbol: EPC-DO:18-359
LAUR: 18-29465

Locates Action No.:

Mr. Ted Schooley
Permit Program Manager
New Mexico Environment Department
525 Camino de los Marquez, Suite 1
Santa Fe, NM 87505-1816

SUBJECT: IDEA ID No. 856 – Los Alamos National Laboratory, No Permit Required Application – TA-46 Diesel Engines for Engine Fuel Testing Project

Dear Mr. Schooley:


Los Alamos National Laboratory is requesting review of this No Permit Required (NPR) application. This request is regarding the proposed installation and use of four new small diesel engines for a diesel engine testing activity designed to take place at LANL Technical Area (TA)-46. This work will comprise the testing and operation of up to four commercial off-the-shelf Tier 4 diesel engines rated for 10kW or less. The end goal of this work is to optimize engine operating strategies, evaluate the potential for these strategies to extend engine lifetime, reduce fuel consumption, and minimize air emissions. In practice, these engines use commercially available diesel fuels and are tested using specified experimental protocols where engines will operate continuously for time periods ranging from 1 to 150 hours. Individual engine operating time is not expected to exceed 200 hours in a given month.

We have evaluated in a conservative manner the maximum air emissions which could be emitted from these engines, assuming 8760 hours/year operation of all four engines, and have determined an air quality construction or New Source Review (NSR) permit is not required under 20.2.72 NMAC – Construction Permits. All required permit application forms and supporting information for an NPR request are included in the attached enclosure.

The enclosed emission calculations demonstrate maximum annual emissions from the combined four engines with each engine operated 8760 hours/year would be 1.65 tons/yr NO_x, 1.54 tons/yr CO, 1.65 tons/yr VOC, 0.27 tons/yr SO_x, and 0.09 tons/yr PM/PM₁₀/PM_{2.5}.

Thank you for consideration of this request. Please contact Marjorie Stockton at (505) 665-3289 with any questions you may have.

Sincerely,


Taunia Van Valkenburg
Group Leader

TSVV/SLS/MBS:jdm

Enclosure(s): 1) No Permit Required Application – TA-46 Diesel Engines

Copy: Adrienne L. Nash, LASO-NS-LP, (E-File)

David Rhodes, EM-LA (E-File)

Hai Shen, EM-LA, (E-File)

Richard Kacich, DIR, (E-File)

Craig Leasure, PADOPS, (E-File)

Amy De Palma, PADOPS, (E-File)

Taylor Valdez, PADOPS, (E-File)

William R. Mairson, ADESH, (E-File)

John Bretzke, ADESH, (E-File)

Enrique Torres, EPC-DO, (E-File)

Jennifer Payne, EPC-DO, (E-File)

Steven L. Story, EPC-CP, (E-File)

Stephen J. Obrey, C-CDE, (E-File)

Timothy A. Dolan, LC-ESH, (E-File)

lasomailbox@nnsa.doe.gov, (E-File)

emla.docs@em.doe.gov, (E-File)

locatesteam@lanl.gov, (E-File)

epc-correspondence@lanl.gov, (E-File)

EPC-CP Permit Application File

Enclosure 1

**No Permit Required Application for
TA-46 Diesel Engines**

EPC-DO-18-359

LA-UR 18-29465

Date: OCT 05 2018

Mail Application To: New Mexico Environment Department Air Quality Bureau Permits Section 525 Camino de los Marquez, Suite 1 Santa Fe, New Mexico, 87505 Phone: (505) 476-4300 Fax: (505) 476-4375 www.env.nm.gov/aqb		For Department use only: AIRS No.:
--	---	--

Universal Air Quality Permit Application

Use this application for NOI, NSR, or Title V sources.

Use this application for: the initial application, modifications, technical revisions, and renewals. For technical revisions, complete Sections, 1-A, 1-B, 2-E, 3, 9 and any other sections that are relevant to the requested action; coordination with the Air Quality Bureau permit staff prior to submittal is encouraged to clarify submittal requirements and to determine if more or less than these sections of the application are needed. Use this application for streamline permits as well. For NOI applications, submit the entire UA1, UA2, and UA3 applications on a single CD (no copies are needed). For NOIs, hard copies of UA1, Tables 2A, 2D & 2F, Section 3 and the signed Certification Page are required.

This application is submitted as (check all that apply): ☒ Request for a No Permit Required Determination (no fee)

Updating an application currently under NMED review. Include this page and all pages that are being updated (no fee required).

Construction Status: Not Constructed Existing Permitted (or NOI) Facility Existing Non-permitted (or NOI) Facility

Minor Source: a NOI 20.2.73 NMAC 20.2.72 NMAC application or revision 20.2.72.300 NMAC Streamline application

Title V Source: Title V (new) Title V renewal TV minor mod. TV significant mod. TV Acid Rain: New Renewal

PSD Major Source: PSD major source (new) minor modification to a PSD source a PSD major modification

Acknowledgements:

✓ I acknowledge that a pre-application meeting is available to me upon request. Title V Operating, Title IV Acid Rain, and NPR applications have no fees.

\$500 NSR application Filing Fee enclosed **OR** The full permit fee associated with 10 fee points (required w/ streamline applications).

Check No.: in the amount of \$0

✓ I acknowledge the required submittal format for the hard copy application is printed double sided 'head-to-toe', 2-hole punched (except the Sect. 2 landscape tables is printed 'head-to-head'), numbered tab separators. Incl. a copy of the check on a separate page.

This facility qualifies to receive assistance from the Small Business Environmental Assistance program (SBEAP) and qualifies for 50% of the normal application and permit fees. Enclosed is a check for 50% of the normal application fee which will be verified with the Small Business Certification Form for your company.

This facility qualifies to receive assistance from the Small Business Environmental Assistance Program (SBEAP) but does not qualify for 50% of the normal application and permit fees. To see if you qualify for SBEAP assistance and for the small business certification form go to https://www.env.nm.gov/aqb/sbap/small_business_criteria.html).

Citation: Please provide the **low level citation** under which this application is being submitted: **NO PERMIT REQUIRED DETERMINATION**

(e.g. application for a new minor source would be 20.2.72.200.A NMAC, one example for a Technical Permit Revision is 20.2.72.219.B.1.b NMAC, a Title V acid rain application would be: 20.2.70.200.C NMAC)

Section 1 – Facility Information

Section 1-A: Company Information

1 Facility Name: U.S. Department of Energy(DOE)/Los Alamos National Laboratory	AI # if known (see 1 st 3 to 5 #s of permit IDEA ID No.): 856	Updating Permit/NOI #: 2195
	Plant primary SIC Code (4 digits): 9711	
	Plant NAIC code (6 digits): 928110	
a Facility Street Address (If no facility street address, provide directions from a prominent landmark): Laboratory is bounded by towns of Los Alamos and White Rock, NM		
2 Plant Operator Company Name: Los Alamos National Security, LLC	Phone/Fax: (505) 606-0105/(505) 665-9096	

a	Plant Operator Address: P.O. Box 1663, Los Alamos, NM, 87545	
b	Plant Operator's New Mexico Corporate ID or Tax ID: 2680007	
3	Plant Owner(s) name(s): U.S. Department of Energy, National Nuclear Security Administration	Phone/Fax: (505) 667-6691
a	Plant Owner(s) Mailing Address(s): 3747 West Jemez Road, Los Alamos, NM 87544	
4	Bill To (Company): Los Alamos National Security, LLC	Phone/Fax: (505) 665-9827
a	Mailing Address: P.O. Box 1663, MS K490, Los Alamos, NM, 87545	E-mail: tauniav@lanl.gov
5	✓ Preparer: Consultant: Marjorie Stockton	Phone/Fax: (505) 665-3289/(505) 665-8858
a	Mailing Address: P.O. Box 1663, MS J978, Los Alamos, NM, 87545	E-mail: mstockton@lanl.gov
6	Plant Operator Contact: Taunia Van Valkenburg	Phone/Fax: (505) 665-9827
a	Address: P.O. Box 1663, MS K490, Los Alamos, NM, 87545	E-mail: tauniav@lanl.gov
7	Air Permit Contact: Steve Story	Title: AQC Team Leader, EPC-CP
a	E-mail: story@lanl.gov	Phone/Fax: (505) 665-2169
b	Mailing Address: P.O. Box 1663, MS J978, Los Alamos, NM, 87545	

Section 1-B: Current Facility Status

1.a	Has this facility already been constructed? ✓ Yes No	1.b If yes to question 1.a, is it currently operating in New Mexico? ✓ Yes No
2	If yes to question 1.a, was the existing facility subject to a Notice of Intent (NOI) (20.2.73 NMAC) before submittal of this application? Yes ✓ No	If yes to question 1.a, was the existing facility subject to a construction permit (20.2.72 NMAC) before submittal of this application? ✓ Yes No
3	Is the facility currently shut down? Yes ✓ No	If yes, give month and year of shut down (MM/YY): N/A
4	Was this facility constructed before 8/31/1972 and continuously operated since 1972? ✓ Yes No	
5	If Yes to question 3, has this facility been modified (see 20.2.72.7.P NMAC) or the capacity increased since 8/31/1972? Yes No ✓ N/A	
6	Does this facility have a Title V operating permit (20.2.70 NMAC)? ✓ Yes No	If yes, the permit No. is: P100-R2M2
7	Has this facility been issued a No Permit Required (NPR)? ✓ Yes No	If yes, the NPR No. is: 2195A, 2195Q, 2195S, 2195T, 2195U, 2195V, 2195L, 2195X
8	Has this facility been issued a Notice of Intent (NOI)? ✓ Yes No	If yes, the NOI No. is: 2597
9	Does this facility have a construction permit (20.2.72/20.2.74 NMAC)? ✓ Yes No	If yes, the permit No. is: 632, 634-M2, 1081-M1-R6, 2195, 2195B-M3, 2195F-R4, 2195H, 2195N-R2, 2195P-R2
10	Is this facility registered under a General permit (GCP-1, GCP-2, etc.)? ✓ Yes No	If yes, the register No. is: GCP-3-2195G

Section 1-C: Facility Input Capacity & Production Rate for FUEL TEST ENGINES

1	What is the facility's maximum input capacity, specify units (reference here and list capacities in Section 20, if more room is required)			
a	Current	Hourly:	Daily:	Annually:
b	Proposed	Hourly: 38.6 hp-hr	Daily: 926.4 hp-day	Annually: 338136 hp-yr
2	What is the facility's maximum production rate, specify units (reference here and list capacities in Section 20, if more room is required)			

a	Current	Hourly: N/A	Daily: N/A	Annually: N/A
b	Proposed	Hourly: N/A	Daily: N/A	Annually: N/A

Section 1-D: Facility Location Information

1	Section: 17	Range: 6E	Township: 19N	County: Los Alamos	Elevation (ft): 7010
2	UTM Zone: 12 or √ 13			Datum: NAD 27 √ NAD 83 WGS 84	
a	UTM E (in meters, to nearest 10 meters): 384245			UTM N (in meters, to nearest 10 meters): 3968440	
b	AND Latitude (deg., min., sec.): 35° 51' 12"			Longitude (deg., min., sec.): 106° 16' 55"	
3	Name and zip code of nearest New Mexico town: Los Alamos 87545				
4	Detailed Driving Instructions from nearest NM town (attach a road map if necessary): Southern border of Los Alamos, NM				
5	The facility is 2 (distance) miles south (direction) of Los Alamos (nearest town).				
6	Status of land at facility (check one): Private Indian/Pueblo Federal BLM Federal Forest Service <input checked="" type="checkbox"/> Other (specify) Federal Department of Energy				
7	List all municipalities, Indian tribes, and counties within a ten (10) mile radius (20.2.72.203.B.2 NMAC) of the property on which the facility is proposed to be constructed or operated: Los Alamos County, Sandoval County, Santa Fe County, Rio Arriba County, City of Espanola, San Ildefonso Pueblo, Santa Clara Pueblo, Jemez Pueblo, Pojoaque Pueblo, Cochiti Pueblo				
8	20.2.72 NMAC applications only: Will the property on which the facility is proposed to be constructed or operated be closer than 50 km (31 miles) to other states, Bernalillo County, or a Class I area (see www.env.nm.gov/aqb/modeling/class1areas.html)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No (20.2.72.206.A.7 NMAC) If yes, list all with corresponding distances in kilometers: Bandelier Wilderness Area (approximately 6 km from TA-46)				
9	Name nearest Class I area: Bandelier Wilderness Area (the wilderness portion of Bandelier National Monument)				
10	Shortest distance (in km) from facility boundary to the boundary of the nearest Class I area (to the nearest 10 meters): 6 km (TA--46)				
11	Distance (meters) from the perimeter of the Area of Operations (AO is defined as the plant site inclusive of all disturbed lands, including mining overburden removal areas) to nearest residence, school or occupied structure: N/A				
12	Method(s) used to delineate the Restricted Area: N/A "Restricted Area" is an area to which public entry is effectively precluded. Effective barriers include continuous fencing, continuous walls, or other continuous barriers approved by the Department, such as rugged physical terrain with steep grade that would require special equipment to traverse. If a large property is completely enclosed by fencing, a restricted area within the property may be identified with signage only. Public roads cannot be part of a Restricted Area.				
13	Does the owner/operator intend to operate this source as a portable stationary source as defined in 20.2.72.7.X NMAC? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> A portable stationary source is not a mobile source, such as an automobile, but a source that can be installed permanently at one location or that can be re-installed at various locations, such as a hot mix asphalt plant that is moved to different job sites.				
14	Will this facility operate in conjunction with other air regulated parties on the same property? <input checked="" type="checkbox"/> No <input type="checkbox"/> Yes If yes, what is the name and permit number (if known) of the other facility?				

Section 1-E: Proposed Operating Schedule (The 1-E.1 & 1-E.2 operating schedules may become conditions in the permit.)

1	Facility maximum operating ($\frac{\text{hours}}{\text{day}}$): 24	($\frac{\text{days}}{\text{week}}$): 7	($\frac{\text{weeks}}{\text{year}}$): 52	($\frac{\text{hours}}{\text{year}}$): 8760
2	Facility's maximum daily operating schedule (if less than 24 $\frac{\text{hours}}{\text{day}}$)? Start: N/A		AM <input type="checkbox"/> PM <input type="checkbox"/>	End: N/A AM <input type="checkbox"/> PM <input type="checkbox"/>
3	Month and year of anticipated start of construction: October 2018			
4	Month and year of anticipated construction completion: October 2018			
5	Month and year of anticipated startup of new or modified facility: November 2018			

7	<p>Affected Programs to include Other States, local air pollution control programs (i.e. Bernalillo) and Indian tribes:</p> <p>Will the property on which the facility is proposed to be constructed or operated be closer than 80 km (50 miles) from other states, local pollution control programs, and Indian tribes and pueblos (20.2.70.402.A.2 and 20.2.70.7.B)? If yes, state which ones and provide the distances in kilometers: Taos Pueblo (69), Picuris Pueblo (56), Jicarilla Apache (67), Ohkay Owingeh Pueblo (19), Santa Clara Pueblo (10), San Ildefonso Pueblo (5), Pojoaque Pueblo (13), Nambe Pueblo (24), Tesuque Pueblo (19), Cochiti Pueblo (13), Santa Domingo Pueblo (27), Zia Pueblo (30), San Felipe Pueblo (38), Santa Ana Pueblo (40), Jemez Pueblo (19), Sandia Pueblo (61), Laguna Pueblo (77), Bernalillo County (56).</p>
---	--

Table 2-B: Insignificant Activities¹ (20.2.70 NMAC) OR Exempted Equipment (20.2.72 NMAC)

All 20.2.70 NMAC (Title V) applications must list all Insignificant Activities in this table. All 20.2.72 NMAC applications must list Exempted Equipment in this table. If equipment listed on this table is exempt under 20.2.72.202.B.5, include emissions calculations and emissions totals for 20.2.B.5 "similar functions" units, operations, and activities in Section 6, Calculations. Equipment and activities exempted under 20.2.72.202 NMAC may not necessarily be Insignificant under 20.2.70 NMAC (and vice versa). Unit & stack numbering must be consistent throughout the application package. Per Exemptions Policy 02-012.00 (see http://www.env.nm.gov/aqb/permit/aqb_pol.html), 20.2.72.202.B NMAC Exemptions do not apply, but 20.2.72.202.A NMAC exemptions do apply to NOI facilities under 20.2.73 NMAC. List 20.2.72.301.D.4 NMAC Auxiliary Equipment for Streamline applications in Table 2-A. The List of Insignificant Activities (for TV) can be found online at <http://www.env.nm.gov/aqb/forms/InsignificantListTitleV.pdf>. TV sources may elect to enter both TV Insignificant Activities and Part 72 Exemptions on this form.

Unit Number	Source Description	Manufacturer	Model No.	Max Capacity	List Specific 20.2.72.202 NMAC Exemption (e.g. 20.2.72.202.B.5)		Date of Manufacture /Reconstruction ² Date of Installation /Construction ²	For Each Piece of Equipment, Check One	
					Insignificant Activity citation (e.g. IA List Item #1.a)	IA List			
TA-46-24-BHW- 1	Existing Comfort Boiler	Cleaver Brooks	P723-40W	1.68 MMBTU/hr	20.2.72.202.B.1		1965	X Existing (unchanged)	To Be Removed
			16590				1965	New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
TA-46-24-BHW- 2	Existing Comfort Boiler	Kewanee	2X	1.34 MMBTU/yr	20.2.72.202.B.1		1963	X Existing (unchanged)	To Be Removed
			M-5453				1963	New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced
								X Existing (unchanged)	To Be Removed
								New/Additional	Replacement Unit
								To Be Modified	To Be Replaced

¹ Insignificant activities exempted due to size or production rate are defined in 20.2.70.300.D.6, 20.2.70.7.Q NMAC, and the NMED/AQB List of Insignificant Activities, dated September 15, 2008. Emissions from these insignificant activities do not need to be reported, unless specifically requested.

² Specify date(s) required to determine regulatory applicability.

X This Table was intentionally left blank because it would be identical to Table 2-E.

missions

[illegible]

PMIO

Specify fuel characteristics and usage. Unit and stack numbering must correspond throughout the application package.

Printed 10/4/2018 10:20 AM

Section 3

Application Summary

The **Application Summary** shall include a brief description of the facility and its process, the type of permit application, the applicable regulation (i.e. 20.2.72.200.A.X, or 20.2.73 NMAC) under which the application is being submitted, and any air quality permit numbers associated with this site. If this facility is to be collocated with another facility, provide details of the other facility including permit number(s). In case of a revision or modification to a facility, provide the lowest level regulatory citation (i.e. 20.2.72.219.B.1.d NMAC) under which the revision or modification is being requested. Also describe the proposed changes from the original permit, how the proposed modification will affect the facility's operations and emissions, de-bottlenecking impacts, and changes to the facility's major/minor status (both PSD & Title V).

Routine or predictable emissions during Startup, Shutdown, and Maintenance (SSM): Provide an overview of how SSM emissions are accounted for in this application. Refer to "Guidance for Submittal of Startup, Shutdown, Maintenance Emissions in Permit Applications (http://www.env.nm.gov/aqb/permit/app_form.html) for more detailed instructions on SSM emissions.

This No Permit Required Determination application is for a diesel engine testing activity designed to take place at LANL Technical Area (TA)-46. This work will comprise the testing and operation of up to four commercial off-the-shelf (COTS) Tier 4 diesel generators rated for 10kW or less. The end goal of this work is to optimize engine operating strategies, evaluate the potential for these strategies to extend engine lifetime, reduce fuel consumption, and minimize air emissions. In practice, these engines use commercially available diesel fuels and are tested using specified experimental protocols where engines will operate continuously for time periods ranging from 1 to 150 hours. Individual engine operating time is not expected to exceed 200 hours in a given month.

While two of these small engines would individually qualify as exempt sources under 20 NMAC 2.72.202.B.5 (potential emission rate of no more than ½ ton per year), the group of engines operating together do not qualify for this exemption. Maximum potential emissions were calculated and summed for the combined four engines assuming each engine operated 8760 hours/year. Resulting maximum potential emissions are 1.65 tons/yr NO_x, 1.54 tons/yr CO, 1.65 tons/yr VOC, 0.27 tons/yr SO_x, and 0.09 tons/yr PM/PM₁₀/PM_{2.5}.

LANL operates under Title V Operating Permit P100-R2M2, and numerous 2.72 Construction Permits. These engines will be installed and operated at LANL's TA-46, Building 24. There are no other permitted emission sources at TA-46. As shown in Table 2-B of the application forms, the only other nearby emission sources are two small natural-gas fired comfort boilers at TA-46, Building 24, which are exempt sources under 2.72.202.B.1.

Routine and predictable emissions during startup, shutdown, and maintenance for these small engines are expected to be similar to emissions during routine operation.

Section 6

EMISSION CALCULATIONS

PRID 18P-0201 - TA-46 FUEL TESTING PROJECT - Tier 4 Nonroad Diesel Engine

EPA Tier 4 Emissions Standards (8-19 kw engine)

	(g/kwh)	(g/bhp-hr)
NMHC + NOx	7.5	5.60
CO	6.6	4.9
Sox*		0.93
PM	0.40	0.3
VOC	7.50	5.6

The emission factors for NOx and VOC are for NMHC + NOx, so are actually double counted here.

*SOx emission factor from AP-42, Table 3.3-1

EPA Tier 4 Emissions Standards (<8 kw engine)

	(g/kwh)	(g/bhp-hr)
NMHC + NOx	7.5	5.6
CO	8.0	6
Sox*		0.93
PM	0.40	0.3
VOC	7.50	5.6

Size of Engine

Derated for altitude:

Derated for altitude:

9.9	kw
7.82	kw
13.3	hp
10.51	hp

Can derate for altitude 3% per 1,000 ft above sea level
21% derating at 7,000 ft

EMISSIONS FOR 1 9.9kw ENGINE (8760 hr/yr)

	lb/hr	tpy
NMHC + NOx	0.130	0.57
CO	0.113	0.50
SOx	0.022	0.09
PM	0.007	0.03
VOC	0.130	0.57

Size of Engine

Derated for altitude:

Derated for altitude:

4.5	kw
3.56	kw
6	hp
4.74	hp

Can derate for altitude 3% per 1,000 ft above sea level
21% derating at 7,000 ft

EMISSIONS FOR 1 4.5kw ENGINE (8760 hr/yr)

	lb/hr	tpy
NMHC + NOx	0.058	0.26
CO	0.063	0.27
SOx	0.010	0.04
PM	0.003	0.01
VOC	0.058	0.26

TOTAL EMISSIONS FOR 4 ENGINES (Two 9.9 kw and Two 4.5 kw)

	lb/hr	tpy
NMHC + NOx	0.376	1.65
CO	0.352	1.54
SOx	0.062	0.27
PM	0.020	0.09
VOC	0.376	1.65

Section 7

Information Used To Determine Emissions

Information Used to Determine Emissions shall include the following:

If manufacturer data are used, include specifications for emissions units and control equipment, including control efficiencies specifications and sufficient engineering data for verification of control equipment operation, including design drawings, test reports, and design parameters that affect normal operation.

If test data are used, include a copy of the complete test report. If the test data are for an emissions unit other than the one being permitted, the emission units must be identical. Test data may not be used if any difference in operating conditions of the unit being permitted and the unit represented in the test report significantly effect emission rates.

If the most current copy of AP-42 is used, reference the section and date located at the bottom of the page. Include a copy of the page containing the emissions factors, and clearly mark the factors used in the calculations.

If an older version of AP-42 is used, include a complete copy of the section.

If an EPA document or other material is referenced, include a complete copy.

Fuel specifications sheet.

If computer models are used to estimate emissions, include an input summary (if available) and a detailed report, and a disk containing the input file(s) used to run the model. For tank-flashing emissions, include a discussion of the method used to estimate tank-flashing emissions, relative thresholds (i.e., permit or major source (NSPS, PSD or Title V)), accuracy of the model, the input and output from simulation models and software, all calculations, documentation of any assumptions used, descriptions of sampling methods and conditions, copies of any lab sample analysis.

EPA Tier 4 Emission Standards for small diesel engines used for calculating emissions of CO, NO_x, NMHC(VOC), and PM.

AP-42, Table 3.3-1 Emission Factors for Uncontrolled Gasoline and Diesel Industrial Engines used for Sox emission calculations.

Tier 4 Emission Standards

The Tier 4 emission standards—phased-in from 2008 through 2015—introduce substantial reductions of NO_x (for engines above 56 kW) and PM (above 19 kW), as well as more stringent HC limits. CO emission limits remain unchanged from the Tier 2-3 stage.

Engines up to 560 kW. Tier 4 emission standards for engines up to 560 kW are listed in Table 3.

Table 3
Tier 4 Emission Standards—Engines up to 560 kW, g/kWh (g/bhp-hr)

Engine Power	Year	CO	NMHC	NMHC+NO _x	NO _x	PM
kW < 8 (hp < 11)	2008	8.0 (6.0)	-	7.5 (5.6)	-	0.4 ^a (0.3)
8 ≤ kW < 19 (11 ≤ hp < 25)	2008	6.6 (4.9)	-	7.5 (5.6)	-	0.4 (0.3)
19 ≤ kW < 37 (25 ≤ hp < 50)	2008	5.5 (4.1)	-	7.5 (5.6)	-	0.3 (0.22)
	2013	5.5 (4.1)	-	4.7 (3.5)	-	0.03 (0.022)
37 ≤ kW < 56 (50 ≤ hp < 75)	2008	5.0 (3.7)	-	4.7 (3.5)	-	0.3 ^b (0.22)
	2013	5.0 (3.7)	-	4.7 (3.5)	-	0.03 (0.022)
56 ≤ kW < 130 (75 ≤ hp < 175)	2012-2014 ^c	5.0 (3.7)	0.19 (0.14)	-	0.40 (0.30)	0.02 (0.015)
130 ≤ kW ≤ 560 (175 ≤ hp ≤ 750)	2011-2014 ^d	3.5 (2.6)	0.19 (0.14)	-	0.40 (0.30)	0.02 (0.015)

a - hand-startable, air-cooled, DI engines may be certified to Tier 2 standards through 2009 and to an optional PM standard of 0.6 g/kWh starting in 2010

b - 0.4 g/kWh (Tier 2) if manufacturer complies with the 0.03 g/kWh standard from 2012

c - PM/CO: full compliance from 2012; NO_x/HC: Option 1 (if banked Tier 2 credits used)—50% engines must comply in 2012-2013; Option 2 (if no Tier 2 credits claimed)—25% engines must comply in 2012-2014, with full compliance from 2014.12.31

d - PM/CO: full compliance from 2011; NO_x/HC: 50% engines must comply in 2011-2013

Table 3.3-1. EMISSION FACTORS FOR UNCONTROLLED GASOLINE AND DIESEL INDUSTRIAL ENGINES^a

Pollutant	Gasoline Fuel (SCC 2-02-003-01, 2-03-003-01)		Diesel Fuel (SCC 2-02-001-02, 2-03-001-01)		EMISSION FACTOR RATING
	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	Emission Factor (lb/hp-hr) (power output)	Emission Factor (lb/MMBtu) (fuel input)	
NO _x	0.011	1.63	0.031	4.41	D
CO	6.96 E-03 ^d	0.99 ^d	6.68 E-03	0.95	D
SO _x	5.91 E-04	0.084	2.05 E-03	0.29	D
PM-10 ^b	7.21 E-04	0.10	2.20 E-03	0.31	D
CO ₂ ^c	1.08	154	1.15	164	B
Aldehydes	4.85 E-04	0.07	4.63 E-04	0.07	D
TOC					
Exhaust	0.015	2.10	2.47 E-03	0.35	D
Evaporative	6.61 E-04	0.09	0.00	0.00	E
Crankcase	4.85 E-03	0.69	4.41 E-05	0.01	E
Refueling	1.08 E-03	0.15	0.00	0.00	E

^a References 2,5-6,9-14. When necessary, an average brake-specific fuel consumption (BSFC) of 7,000 Btu/hp-hr was used to convert from lb/MMBtu to lb/hp-hr. To convert from lb/hp-hr to kg/kw-hr, multiply by 0.608. To convert from lb/MMBtu to ng/J, multiply by 430. SCC = Source Classification Code. TOC = total organic compounds.

^b PM-10 = particulate matter less than or equal to 10 µm aerodynamic diameter. All particulate is assumed to be ≤ 1 µm in size.

^c Assumes 99% conversion of carbon in fuel to CO₂ with 87 weight % carbon in diesel, 86 weight % carbon in gasoline, average BSFC of 7,000 Btu/hp-hr, diesel heating value of 19,300 Btu/lb, and gasoline heating value of 20,300 Btu/lb.

^d Instead of 0.439 lb/hp-hr (power output) and 62.7 lb/mmBtu (fuel input), the correct emissions factors values are 6.96 E-03 lb/hp-hr (power output) and 0.99 lb/mmBtu (fuel input), respectively. This is an editorial correction. March 24, 2009

SUPPORTING DOCUMENTATION



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
2018 MODEL YEAR
CERTIFICATE OF CONFORMITY
WITH THE CLEAN AIR ACT

OFFICE OF TRANSPORTATION
AND AIR QUALITY
ANN ARBOR, MICHIGAN 48105

Certificate Issued To: Kubota Corporation
(U.S. Manufacturer or Importer)

Certificate Number: JKBXL719KCB-016

Effective Date:
10/10/2017

Expiration Date:
12/31/2018

Issue Date:
10/10/2017

Revision Date:
N/A


Byron J. Bunker, Division Director
Compliance Division

Model Year: 2018

Manufacturer Type: Original Engine Manufacturer

Engine Family: JKBXL719KCB

Mobile/Stationary Indicator: Mobile

Emissions Power Category: $8 \leq kW < 19$

Fuel Type: Diesel

After Treatment Devices: No After Treatment Devices Installed

Non-after Treatment Devices: Engine Design Modification

Pursuant to Section 213 of the Clean Air Act (42 U.S.C. section 7547) and 40 CFR Part 1039, and subject to the terms and conditions prescribed in those provisions, this certificate of conformity is hereby issued with respect to the test engines which have been found to conform to applicable requirements and which represent the following engines, by engine family, more fully described in the documentation required by 40 CFR Part 1039 and produced in the stated model year.

This certificate of conformity covers only those new compression-ignition engines which conform in all material respects to the design specifications that applied to those engines described in the documentation required by 40 CFR Part 1039 and which are produced during the model year stated on this certificate of the said manufacturer, as defined in 40 CFR Part 1039.

It is a term of this certificate that the manufacturer shall consent to all inspections described in 40 CFR 1068 and authorized in a warrant or court order. Failure to comply with the requirements of such a warrant or court order may lead to revocation or suspension of this certificate for reasons specified in 40 CFR Part 1039. It is also a term of this certificate that this certificate may be revoked or suspended or rendered void *ab initio* for other reasons specified in 40 CFR Part 1039.

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



INDUSTRIAL DIESEL ENGINE

KUBOTA SUPER MINI SERIES (2-cylinder)

Z482-E4B

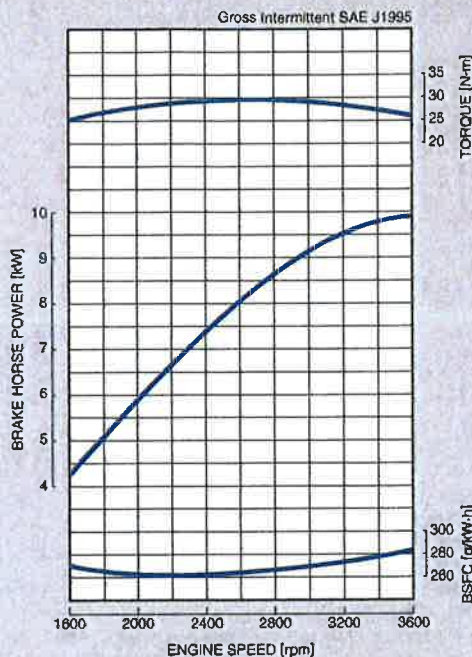
RATED POWER

9.9kW @ 3600rpm



Photograph may show non-standard equipment.

PERFORMANCE CURVE



FEATURES and BENEFITS

Emissions

Kubota Super Mini Series, the most compact multi-cylinder liquid cooled industrial diesel engines, complies with EPA Tier 4 emissions regulations. These are the most stringent emissions regulations in the world in this class.

Kubota engine less than 19kW meets emission standards over the NRTC and also meets the NTE requirements.

Durable Power

The Kubota Super Mini Series has been chosen as a power source for a variety of applications since it was first launched 30 years ago. It has become the benchmark in the compact diesel engine market.

The Z482 engine offers a seamless transition from E3 to E4 by totally maintaining the same performance and physical characteristics of the previous E3 engines.

Clean and Quiet Power

Kubota's original E-TVCS (Three Vortex Combustion System) has been further improved for better emissions.

KUBOTA SUPER MINI SERIES Z482-E4B

GENERAL SPECIFICATION

Model		Z482-E4B
Emission Regulation		Tier 4
Type		Vertical 4-cycle Liquid Cooled Diesel
Number of Cylinders		2
Bore	mm (in)	67 (2.64)
Stroke	mm (in)	68 (2.68)
Displacement	L (cu.in)	0.479 (29.23)
Combustion System		IDI
Intake System		Naturally Aspirated
Maximum Speed	rpm	3600
Output: Gross Intermittent (Industrial Use)	kW	9.9
	hp	13.3
	ps	13.5
Direction of Rotation		Counterclockwise Viewed on Flywheel
Oil Pan Capacity	L (gal)	2.5 (0.66)
Starter Capacity	V-kW	12-0.8
Alternator Capacity	V-A	12-12.5
Output: Stand-by (Generator Use)	kW	8.9
	hp	11.9
	ps	12.1
Output: Continuous (Generator Use)	kW	8.1
	hp	10.9
	ps	11.0
Length	mm (in)	360.6 (14.20)
Width	mm (in)	404.0 (15.91)
Height (1)	mm (in)	564.1 (22.21)
Height (2)	mm (in)	219.0 (8.62)
Dry Weight	kg (lb)	53.1 (117.1)

*Specification is subject to change without notice.

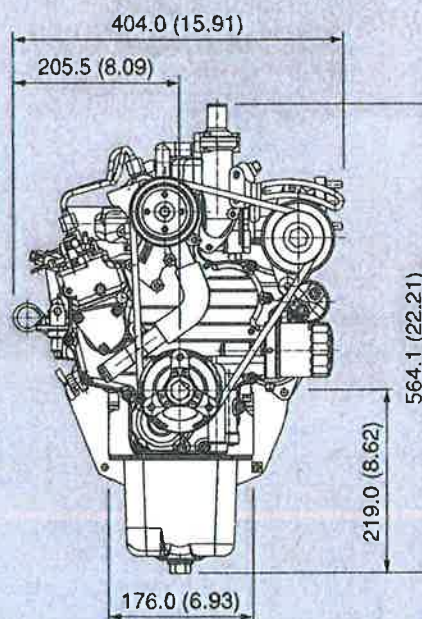
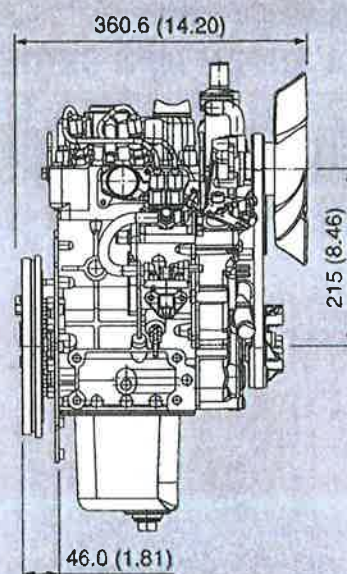
*Output: Gross Intermittent SAE J1995

*Output: Stand-by, Continuous ISO 3046

*Dry weight is according to Kubota's standard specification.

When specification varies, the weight will vary accordingly.

DIMENSIONS



KUBOTA Engine America Corporation

505 Schelter Road, Lincolnshire, IL 60069

Phone: 847-955-2500 Fax: 847-955-2699

www.kubotaengine.com

1396-01-COM '14.04 .STD



INDUSTRIAL DIESEL ENGINE

KUBOTA OC SERIES (1-cylinder)

OC60-E4

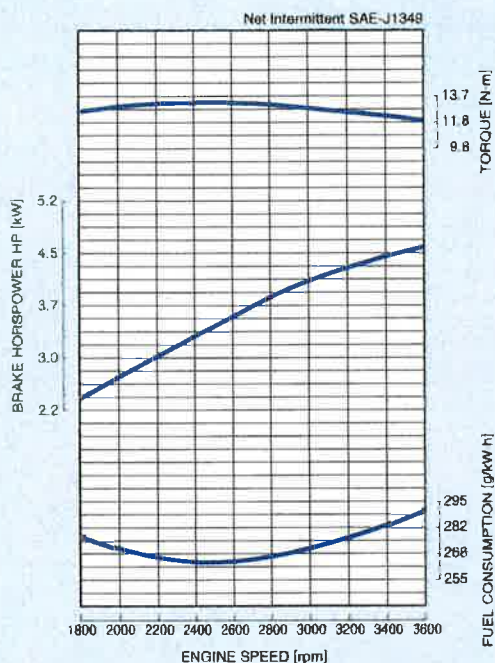
RATED POWER

4.5kW@3600rpm



Photograph may show non-standard equipment.

PERFORMANCE CURVE



FEATURES and BENEFITS

Emissions

The Kubota OC60 engine complies with EPA Tier 4 emissions regulations. These are the most stringent emissions regulations in the world in this class.

Kubota engine less than 19kW also meets emission standards over the NRTC and the NTE requirements.

Durable Power

This engine offers a seamless transition from E3 to E4 by totally maintaining the same performance and physical characteristics of the former E3 engines.

Clean and Quiet Power

The Kubota OC series is an unique engine that has light-weight and compact features of an air-cooled engine together with the low noise, durability and clean exhaust emission of a water-cooled diesel engine. With ACTV (Advanced Cooling Three Vortex) system, the cylinder block is air-cooled, whereas the combustion area of the cylinder head is oil-cooled.

KUBOTA OC SERIES OC60-E4**GENERAL SPECIFICATION**

Net Intermittent SAE-J1349

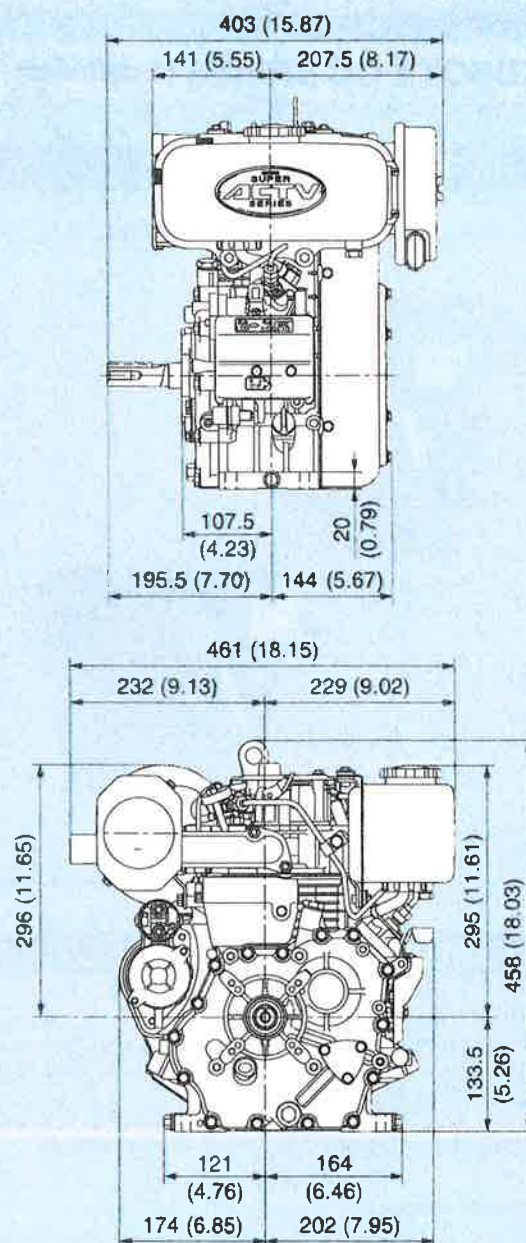
Model		OC60-E4
Emission Regulation		Tier 4
Type		4-cycle Oil-air cooled Diesel
Number of Cylinders		1
Bore	mm (in)	72 (2.83)
Stroke	mm (in)	68 (2.68)
Displacement	L (cu.in)	0.276 (16.84)
Combustion System		IDI (TVCS)
Aspiration		Naturally Aspirated
Maximum Speed	rpm	3600
Output: Net Intermittent	kW	4.5
	hp	6.0
	ps	6.1
Oil Pan Capacity	L (gal)	1.3 (0.34)
Starter Capacity	V-kW	12-0.7
Alternator Capacity	V-A	12-4.0
Length	mm (in)	461 (18.15)
Width	mm (in)	403 (15.87)
Height (1)	mm (in)	458 (18.03)
Dry Weight	kg (lb)	38 (84)

*Specification is subject to change without notice.

*Output: Net Intermittent SAE-J1349

*Dry weight is according to Kubota's standard specification.

When specification varies, the weight will vary accordingly

DIMENSIONS**KUBOTA Engine America Corporation**

505 Schelter Road, Lincolnshire, IL 60069

Phone: 847-955-2500 Fax: 847-955-2699

www.kubotaengine.com

1413-01-COM '14.04' .STD

Section 10

Written Description of the Routine Operations of the Facility

A written description of the routine operations of the facility. Include a description of how each piece of equipment will be operated, how controls will be used, and the fate of both the products and waste generated. For modifications and/or revisions, explain how the changes will affect the existing process. In a separate paragraph describe the major process bottlenecks that limit production. The purpose of this description is to provide sufficient information about plant operations for the permit writer to determine appropriate emission sources.

This No Permit Required Determination application is for a diesel engine testing activity designed to take place at LANL Technical Area (TA)-46. This work will comprise the testing and operation of up to four commercial off-the-shelf (COTS) Tier 4 diesel engines rated for 10kW or less. The end goal of this work is to optimize engine operating strategies, evaluate the potential for these strategies to extend engine lifetime, reduce fuel consumption and minimize air emissions. In practice, these engines use commercially available diesel fuels and are tested using specified experimental protocols where engines will operate continuously for time periods ranging from 1 to 150 hours. Individual engine operating time is not expected to exceed 200 hours in a given month.

We have calculated emissions assuming all four engines are operated 8760 hours per year.

Section 13

Determination of State & Federal Air Quality Regulations

This section lists each state and federal air quality regulation that may apply to your facility and/or equipment that are stationary sources of regulated air pollutants.

Not all state and federal air quality regulations are included in this list. Go to the Code of Federal Regulations (CFR) or to the Air Quality Bureau's regulation page to see the full set of air quality regulations.

Required Information for Specific Equipment:

For regulations that apply to specific source types, in the 'Justification' column **provide any information needed to determine if the regulation does or does not apply. For example**, to determine if emissions standards at 40 CFR 60, Subpart IIII apply to your three identical stationary engines, we need to know the construction date as defined in that regulation; the manufacturer date; the date of reconstruction or modification, if any; if they are or are not fire pump engines; if they are or are not emergency engines as defined in that regulation; their site ratings; and the cylinder displacement.

Required Information for Regulations that Apply to the Entire Facility:

See instructions in the 'Justification' column for the information that is needed to determine if an 'Entire Facility' type of regulation applies (e.g. 20.2.70 or 20.2.73 NMAC).

Regulatory Citations for Regulations That Do Not, but Could Apply:

If there is a state or federal air quality regulation that does not apply, but you have a piece of equipment in a source category for which a regulation has been promulgated, you must **provide the low level regulatory citation showing why your piece of equipment is not subject to or exempt from the regulation. For example** if you have a stationary internal combustion engine that is not subject to 40 CFR 63, Subpart ZZZZ because it is an existing 2 stroke lean burn stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions, your citation would be 40 CFR 63.6590(b)(3)(i). **We don't want a discussion of every non-applicable regulation, but if it is possible a regulation could apply, explain why it does not. For example**, if your facility is a power plant, you do not need to include a citation to show that 40 CFR 60, Subpart OOO does not apply to your non-existent rock crusher.

Regulatory Citations for Emission Standards:

For each unit that is subject to an emission standard in a source specific regulation, such as 40 CFR 60, Subpart OOO or 40 CFR 63, Subpart HH, include the low level regulatory citation of that emission standard. Emission standards can be numerical emission limits, work practice standards, or other requirements such as maintenance. **Here are examples:** a glycol dehydrator is subject to the general standards at 63.764C(1)(i) through (iii); an engine is subject to 63.6601, Tables 2a and 2b; a crusher is subject to 60.672(b), Table 3 and all transfer points are subject to 60.672(e)(1)

Federally Enforceable Conditions:

All federal regulations are federally enforceable. All Air Quality Bureau State regulations are federally enforceable except for the following: affirmative defense portions at 20.2.7.6.B, 20.2.7.110(B)(15), 20.2.7.11 through 20.2.7.113, 20.2.7.115, and 20.2.7.116; 20.2.37; 20.2.42; 20.2.43; 20.2.62; 20.2.63; 20.2.86; 20.2.89; and 20.2.90 NMAC. Federally enforceable means that EPA can enforce the regulation as well as the Air Quality Bureau and federally enforceable regulations can count toward determining a facility's potential to emit (PTE) for the Title V, PSD, and nonattainment permit regulations.

INCLUDE ANY OTHER INFORMATION NEEDED TO COMPLETE AN APPLICABILITY DETERMINATION OR THAT IS RELEVANT TO YOUR FACILITY'S NOTICE OF INTENT OR PERMIT.

EPA Applicability Determination Index for 40 CFR 60, 61, 63, etc: <http://cfpub.epa.gov/adi/>

Table for STATE REGULATIONS:

STATE REGU- LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION: (You may delete instructions or statements that do not apply in the justification column to shorten the document.)
20.2.3 NMAC	Ambient Air Quality Standards NMAAQS	Yes – Facility, No- TA- 46-24 GDE 1-4	Facility	LANL has demonstrated compliance with all ambient air quality standards through facility wide dispersion modeling submitted with Title V Operating permit applications and NSR Construction permit applications. Additional modeling is not required for this No Permit Required Determination application.
20.2.7 NMAC	Excess Emissions	Yes – Facility, No- TA- 46-24 GDE 1-4	Facility	LANL facility-wide is subject to this provision. These four engines are not subject to excess emissions reporting as no emission limits are being sought.
20.2.18 NMAC	Oil Burning Equipment – Particulate Matter	NO	TA-46- 24 GDE 1-4	This regulation does not apply to these engines since they are not boilers or heaters.
20.2.34 NMAC	Oil Burning Equipment – Nitrogen Dioxide	NO	TA-46- 24 GDE 1-4	This regulation does not apply to these engines since they are not boilers or heaters.
20.2.61 NMAC	Smoke & Visible Emissions	Yes	Facility and TA- 46-24 GDE 1- 4	These engines and the facility are subject to this regulation that limits opacity to 20%.
20.2.70 NMAC	Operating Permits	Yes	Facility	LANL operates under Title V Operating Permit P100-R2M2.
20.2.71 NMAC	Operating Permit Fees	Yes	Facility	LANL pays annual Title V Operation Permit fees under their current Title V Permit P100-R2M2
20.2.72 NMAC	Construction Permits	NO	TA-46- 24 GDE 1-4	Construction permit not required because potential emissions from the 4 diesel engines are less than 10 pph and 25 tpy for any regulated pollutant.
20.2.73 NMAC	NOI & Emissions Inventory Requirements	NO	TA-46- 24 GDE 1-4	NOI not required because Potential emissions from the 4 diesel engines are less than 10 tpy of any regulated pollutant. Note – Emission inventory requirements apply to LANL as a whole.
20.2.77 NMAC	New Source Performance	Yes	Facility	LANL complies with all applicable New Source Performance Standards.

Table for Applicable FEDERAL REGULATIONS

FEDERAL REGU- LATIONS CITATION	Title	Applies? Enter Yes or No	Unit(s) or Facility	JUSTIFICATION:
40 CFR 50	NAAQS	Yes – Facility, No- TA- 46-24 GDE 1-4	Facility	LANL has demonstrated compliance with all ambient air quality standards through facility wide dispersion modeling submitted with Title V Operating permit applications and NSR Construction permit applications. Additional modeling is not required for this No Permit Required Determination application.
NSPS 40 CFR 60, Subpart A	General Provisions	Yes	TA-46- 24 GDE 1-4	These engines are subject to 40 CFR 60 Subpart IIII, and therefore the general provisions apply.
NSPS 40 CFR 60 Subpart IIII	Standards of performance for Stationary Compression Ignition Internal Combustion Engines	Yes	TA-46- 24 GDE 1-4	These engines are classified as new, non-emergency Compression Ignition Internal Combustion Engines. They are required to meet Tier 4 emission standards (EPA Emission Certificate included in this application).
MACT 40 CFR 63, Subpart A	General Provisions	Yes	TA-46- 24 GDE 1-4	These engines are subject to 40 CFR 63 Subpart ZZZZ, and therefore the general provisions apply.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE MACT)	Yes	TA-46- 24 GDE 1-4	The RICE NESHAP applies to all existing and new stationary diesel engines. Existing engines are defined as those constructed prior to June 12, 2006. The rule has differing requirements according to engine size as well as whether the engine is located at a major HAP source or area HAP source. LANL is a minor or area HAP source. Although the rule applies to these new engines, a new engine is only required by the RICE NESHAP to meet the applicable engine NSPS and no other NESHAP requirements.