PROPOSED

CSP 0700–01-C

COVERED SOURCE AIR PERMIT (CSP) ENGINEERING REVIEW
INITIAL APPLICATION NO. **0700-01**

REVIEWER PR
DATE 08.27.2008

FACILITY Tom's Backhoe & Excavation Co., Inc.
195 TPH Mobile Jaw Crusher with 160 HP Diesel Engine

LOCATION Various Temporary Sites, States of Hawaii
Hana Highway, Hana, Maui, TMK: (2) 1-3-004: 001

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EQUIPMENT

One (1) 195 TPH BL-Pegson Jaw Crusher
Model No. Metro Trak, Serial No. QM10381
Manufacturing Date: 2000
Production = 195 TPH

One (1) 160 HP Caterpillar Diesel Engine
Model No. 3116TA, Serial No. 2MR01700
Fuel Consumption = 7.7 gal/hr; Fuel Oil No. 2 (0.5% Sulfur Content)
Exhaust Diameter = 0.1016m, Height = 3.2m
Velocity = 53.4391 m/s; Actual Flow Rate = 0.4332 m^3/s; Temp = 676K

One (1) Read 480 TPH Power Screen
Model No. 1997 Nordberg CV90D, Serial No. CV90D1503
Production Capacity = 480 TPH

PERMIT BACKGROUND

Equipment was recently purchased from Pineridge Farms Inc. and thus supporting information retrieved from CAB Permit 0507.

The applicant proposes an operating limit of 2,080 hours per rolling 12-month period for the mobile jaw crusher, Power Screen, and supporting diesel engine.

PROCESS BACKGROUND

This operation will provide rock aggregate to the Hana Community. It will be used for "leaching fields" for IWS or "septic systems". It will be used for road constructions.

APPLICABLE REQUIREMENTS

Hawaii Administrative Rules (HAR)

- Title 11 Chapter 59, Ambient Air Quality Standards
- Title 11 Chapter 60.1, Air Pollution Control
  - Subchapter 1, General Requirements
  - Subchapter 2, General Prohibitions
    - 11-60.1-31 Applicability
    - 11-60.1-32 Visible Emissions
    - 11-60.1-33 Fugitive Dust
    - 11-60.1-38 Sulfur Oxides from Fuel Combustion
  - Subchapter 4, Noncovered Sources
  - Subchapter 6, Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
    - 11-60.1-111 Definitions
    - 11-60.1-117 General fee provisions for noncovered sources
    - 11-60.1-118 Application fees for noncovered sources
    - 11-60.1-119 Annual fees for noncovered sources
  - Subchapter 10, Field Citations

This source is **subject to NSPS** (New Source Performance Standards).

40 CFR Part 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines is not applicable since this engine was manufactured before July 11, 2005, also, no modifications were performed to the proposed diesel engine after July 11, 2005.

40 CFR Part 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE NESHAP) – applicable to stationary RICE located at major and area sources of HAP emissions. This subpart **is not applicable** since this is not an existing source.

40 CFR Part 60. Subpart OOO – National Emission Standards for Nonmetallic Mineral Processing Plants, **is applicable** to the mobile crusher because equipment was manufactured after 1983 and the primary crusher has a capacity greater than 150 TPH. (COVERED SOURCE)

This source is **not subject to NESHAPS** (National Emission Standards for Hazardous Air Pollutants for Source Categories) as no hazardous air pollutants are emitted at significant levels (>= 10 TPY HAP or >= 25 TPY for total HAPs) and this source is not listed under 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants) or 40 CFR 63 applicable to this facility.

This source is **not subject to MACT** (Maximum Achievable Control Technology) since the source is not a major source of hazardous air pollutants (HAPS) emissions (>10 TPY single hap or >25 TPY for total haps).

This source is **not subject to PSD** (Prevention of Significant Deterioration) requirements because it is not a major stationary source as defined in 40 CFR 52.21 and HAR Title 11, Chapter 60.1, Subchapter 7; (criteria air pollutant > 100 or 250 TPY as applicable).

This source is **not subject to CAM** (compliance assurance monitoring) since the proposed equipment is not classified as a major source (criteria pollutant > 100 TPY); has no pre-control device potential emissions exceeding applicable major source thresholds; nor fitted with an “active” air pollution control device; and not or not part of a facility with total emissions exceeding major source threshold.

This source is **not subject to CERR** (Consolidated Emissions Reporting Requirements) since 40 CFR Part 51, Subpart A – Emissions Inventory Reporting Requirements, determines CERR based on facility wide emissions of each air pollutant at the CERR triggering levels. The emissions do not exceed respective CERR threshold levels. As such, emissions data will not be required to be inputted into the National Emissions Inventory (NEI) database.

The Clean Air Branch requests annual emissions reporting from those facilities that have facility wide emissions exceeding the DOH reporting level(s). Based on current emissions, the facility **is subject to annual emissions reporting** due to *PM30 (TSP)* exceeding the DOH reporting thresholds.

This source **is subject to BACT** (Best Available Control Technology) analysis because net emissions from the proposed facility exceed significant emissions levels. BACT analysis is required for new noncovered sources and significant modifications to noncovered sources that have the potential to emit or increase emissions above significant levels.

TOTAL EMISSIONS

Total facility emissions are summarized within the immediate table below.

Table 1: Total Facility Emissions and Trigger Levels (TPY)					
Pollutant	**Proposed Emissions based on Limited Hours of Operation**	**Emissions based on 8,760 hr/yr (ANNUAL – NO LIMIT)**	**Significant BACT Level**	**CERR Level**	**DOH Level**
CO	**1.04**	**4.39**	100	1000	250
NOx	**4.84**	**20.37**	40	100	25
PM-30(TSP)	**29.2**	**77.46**	25	-	25
PM-10	**6.47**	**24.00**	15	100	25
PM-2.5	**0.26**	**0.42**	-	100	-
SOx	**0.55**	**2.33**	40	100	25
TOC/VOC	**0.38**	**1.62**	40	100	25
HAPs	**0.01**	**0.02**	-	5	5

Proposed emissions are based on the following hours of operation:

Equipment	Limited Hours of Operation
Mobile Jaw Crusher	**2,080** hr/yr
Diesel Engine	**2,080** hr/yr
Power Screener	**2,080** hr/yr

INSIGNIFICANT ACTIVITIES (CSP) / EXEMPTIONS (NSP)

No proposed alternative operating scenario.

ALTERNATIVE OPERATING SCENERIOS

No proposed alternative operating scenario.

FACILITY EMISSIONS CALCULATIONS

Emission Calculations for 160 HP Diesel Engine Generator

Generator Diesel Consumption = 7.7 gallons/hour,
Proposed Limited Operating Hours = 2,080 hours/year

Annual Diesel Max Consumption = Diesel Consumption X Operating Hours
= (7.7 gallons/hour)(2,080 hours/year)
= 16,016 gallons/year

Diesel #2 Heat Value = 137,000 BTU/gal, From AP-42, Volume 1, 5th ed, App. A
Density of Diesel Fuel = 7.1 lb/gal

Diesel #2 Annual Heat Capacity = Diesel Consumption X Diesel Heat Value
= (7.7 gal/hr)(137,000 BTU/gal)(8,760 hr/yr)(10E-6 MMBTU/BTU)
= 9,240.9 MMBTU/yr

Diesel #2 Limited Annual Heat Capacity = (7.7 gal/hr)(137,000 BTU/gal)(2,080 hr/yr)(10E-6 MMBTU/BTU) Proposed Limit: 2,080 hrs/yr
= 2,194.2 MMBTU/yr limited

For **NOx**,

Emission Factor = 4.41 lb/MMBtu

Potential Annual Emission = Emission Factor X Annual Heat Capacity
= (4.41 lbs/MMBtu)(9,240.9 MMBTU/yr)(1/2000 Ton/lbs)
= **20.37 TPY or 0.58 g/s**

Limited Operation Emission = Emission Factor X Annual Heat Capacity
= (4.41 lbs/MMBtu)(2,194.2 MMBTU/yr limited)(1/2000 Ton/lbs)
= **4.84 TPY (limited)**

For **CO**,

Emission Factor = 0.95 lb/MMBtu

Potential Annual Emission = Emission Factor X Annual Heat Capacity
= (0.95 lbs/MMBtu)(9,240.9 MMBTU/yr)(1/2000 Ton/lbs)
= **4.39 TPY or 0.13 g/s**

Limited Operation Emission = Emission Factor X Annual Heat Capacity
= (0.95 lbs/MMBtu)(2,194.2 MMBTU/yr limited)(1/2000 Ton/lbs)
= **1.04 TPY (limited)**

For **PM10**,

Emission Factor = 0.31 lb/MMBtu

Potential Annual Emission = Emission Factor X Annual Heat Capacity
= (0.31 lbs/MMBtu)(9,240.9 MMBTU/yr)(1/2000 Ton/lbs)
= **1.43 TPY or 0.04 g/s**

Limited Operation Emission = Emission Factor X Annual Heat Capacity
= (0.31 lbs/MMBtu)(2,194.2 MMBTU/yr limited)(1/2000 Ton/lbs)
= **0.34 TPY (limited)**

For **VOC/TOC**,

Emission Factor = 0.35 lb/MMBtu

Potential Annual Emission = Emission Factor X Annual Heat Capacity
= (0.35 lbs/MMBtu)(9,240.9 MMBTU/yr)(1/2000 Ton/lbs)
= **1.62 TPY or 0.05 g/s**

Limited Operation Emission = Emission Factor X Annual Heat Capacity
= (0.35 lbs/MMBtu)(2,194.2 MMBTU/yr limited)(1/2000 Ton/lbs)
= **0.38 TPY (limited)**

For **SOx (SULFUR)**,

Emission Factor = 0.101 lb/MMBtu X 0.5% Fuel Oil No. 2
= 0.101 lb/MMBtu X 5
= 0.505 lb/MMBtu

Potential Annual Emission = Emission Factor X Annual Heat Capacity
= (0.505 lbs/MMBtu)(9,240.9 MMBTU/yr)(1/2000 Ton/lbs)
= **2.33 TPY or 0.07 g/s**

Limited Operation Emission = Emission Factor X Annual Heat Capacity
= (0.505 lb/MMBtu)(2,194.2 MMBTU/yr limited)(1/2000 Ton/lbs)
= **0.55 TPY (limited)**

For **HAPs**,

Emission Factor = EF(Benzene + Toluene + Xyelene + Propylene + Formaldehyde + Acetaldehyde + Acrolein)
= 0.0042 lb/MMBtu

Potential Annual Emission = Emission Factor X Annual Heat Capacity
= (0.0042 lbs/MMBtu)(9,240.9 MMBTU/yr)(1/2000 Ton/lbs)
= **0.0194 TPY or 0.00056 g/s**

Limited Operation Emission = Emission Factor X Annual Heat Capacity
= (0.0042 lbs/MMBtu)(2,194.2 MMBTU/yr limited)(1/2000 Ton/lbs)
= **0.0046 TPY (limited)**

Note: The following emission factors are obtained from AP-42, Table 3.3-1 10/96 edition, Emission Factors For Uncontrolled Gasoline and Diesel Industrial Engines. Sulfur emission factor from AP-42, Table 3.4-1 10/96 edition, Gaseous Emission Factors for Large Stationary Diesel and all Stationary Dual-Fuel Engines.

Emission Calculations for 195 TPH Mobile Crusher

Production Rate x Average Density = 195.0 ton/hr
Control Type: Water (70% Controlled)

For **PM2.5**,

Emission Factors
= 1.30 E-05 lb/ton, Grizzly to Jaw
= 1.00 E-04 lb/ton, Jaw Crushing
= 1.30 E-05 lb/ton, Crushing to Conveyor
= 1.30 E-05 lb/ton, Conveyor to Stockpile

Potential Annual Emission = Density X Emission Factor X Operation Time
= (195.0 ton/hr)(1.30 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0111 TPY, Grizzly to Jaw
= (195.0 ton/hr)(1.00 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0085 TPY, Jaw Crushing
= (195.0 ton/hr)(1.30 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0111 TPY, Crushing to Conveyor
= (195.0 ton/hr)(1.30 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0111 TPY, Conveyor to Stockpile
NET = **0.0418 TPY or 1.20 E-03 g/s**

Limited Operation Emission = NET, annual X Limited Operation Time X Control Factor
= (0.0418 TPY)(2,080/8,760 hours/year)(1 - 70%)
= **0.0030 TPY (limited, controlled)**

For **PM10**,

Emission Factors
= 1.60 E-05 lb/ton, Truck Unloading
= 1.10 E-03 lb/ton, Grizzly to Jaw
= 2.40 E-03 lb/ton, Jaw Crushing
= 1.10 E-03 lb/ton, Crushing to Conveyor
= 1.10 E-03 lb/ton, Conveyor to Stockpile

Potential Annual Emission = Density X Emission Factor X Operation Time
= (195.0 ton/hr)(1.60 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0137 TPY, Truck Unloading
= (195.0 ton/hr)(1.10 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0094 TPY, Grizzly to Jaw
= (195.0 ton/hr)(2.40 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0205 TPY, Jaw Crushing
= (195.0 ton/hr)(1.10 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0094 TPY, Crushing to Conveyor
= (195.0 ton/hr)(1.10 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.0094 TPY, Conveyor to Stockpile

NET = **0.0624 TPY or 1.80 E-03 g/s**

Limited Operation Emission = NET, annual X Limited Operation Time
= (0.0624 TPY)(2,080/8,760 hours/year)(1 - 70%)
= **0.0044 TPY (limited, controlled)**

For **TSP**,

Emission Factors
= 3.00 E-03 lb/ton, Grizzly to Jaw
= 5.40 E-03 lb/ton, Jaw Crushing
= 3.00 E-03 lb/ton, Crushing to Conveyor
= 3.00 E-03 lb/ton, Conveyor to Stockpile

Potential Annual Emission = Density X Emission Factor X Operation Time
= (195.0 ton/hr)(3.00 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 2.56 TPY, Truck Unloading
= (195.0 ton/hr)(5.40 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 4.61 TPY, Truck Loading
= (195.0 ton/hr)(3.00 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 2.56 TPY, Grinding
= (195.0 ton/hr)(3.00 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 2.56 TPY, Conveyor Transfer
NET = **12.29 TPY or 0.35 g/s**

Limited Operation Emission = NET, annual X Limited Operation Time
= (12.29 TPY)(2,080/8,760 hours/year)(1 - 70%)
= **0.88 TPY (limited, controlled)**

Emission Calculations for 480 TPH Mobile Screen (FUGITIVE)

Production Rate x Average Density	= 480.0 ton/hr
Control Type:	None (0% Controlled)

For **PM2.5**,

Emission Factors
= 1.3 E-05 lb/ton, Feeder to Screen
= 5.0 E-05 lb/ton, Screen
= 1.3 E-05 lb/ton, Screen to Stacker 1
= 1.3 E-05 lb/ton, Stacker 1 to Stockpile

Potential Annual Emission = Density X Emission Factor X Operation Time
= (480.0 ton/hr)(1.30 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.027 TPY, Feeder to Screen
= (480.0 ton/hr)(5.00 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.105 TPY, Screen
= (240.0 ton/hr)(1.30 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.014 TPY, Screen to Stacker 1
= (240.0 ton/hr)(1.30 E-05 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 0.014 TPY, Stacker 1 to Stockpile
NET **= 0.16 TPY or 0.0046 g/s**

Limited Operation Emission = NET, annual X Limited Operation Time X Control Factor
= (0.16 TPY)(2,080/8,760 hours/year)(0%)
= **0.04 TPY (limited)**

For **PM10**,

Emission Factors
= 1.1 E-03 lb/ton, Feeder to Screen
= 8.7 E-03 lb/ton, Screen
= 1.1 E-03 lb/ton, Screen to Stacker 1
= 1.1 E-03 lb/ton, Stacker 1 to Stockpile

Potential Annual Emission = Density X Emission Factor X Operation Time
= (480.0 ton/hr)(1.1 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 2.31 TPY, Feeder to Screen
= (480.0 ton/hr)(8.7 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 18.29 TPY, Screen
= (240.0 ton/hr)(1.1 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 2.31 TPY, Screen to Stacker 1
= (240.0 ton/hr)(1.1 E-03 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 2.31 TPY, Stacker 1 to Stockpile
NET **= 22.91 TPY or 0.66 g/s**

Limited Operation Emission = NET, annual X Limited Operation Time X Control Factor
= (22.91 TPY)(2,080/8,760 hours/year)(0%)
= **5.44 TPY (limited)**

For **TSP**,

Emission Factors
= 0.003 lb/ton, Feeder to Screen
= 0.025 lb/ton, Screen
= 0.003 lb/ton, Screen to Stacker 1
= 0.003 lb/ton, Stacker 1 to Stockpile

Potential Annual Emission = Density X Emission Factor X Operation Time
= (480.0 ton/hr)(0.003 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 6.31 TPY, Feeder to Screen
= (480.0 ton/hr)(0.025 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 52.56 TPY, Screen
= (240.0 ton/hr)(0.003 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 3.15 TPY, Screen to Stacker 1
= (240.0 ton/hr)(0.003 lb/ton)(8,760 hr/yr)(ton/2000 lb) = 3.15 TPY, Stacker 1 to Stockpile
NET **= 65.17 TPY or 1.87 g/s**

Limited Operation Emission = NET, annual X Limited Operation Time X Control Factor
= (65.17 TPY)(2,080/8,760 hours/year)(0%)
= **15.47 TPY (limited)**

Note: The following emission factors are obtained from AP-42, 11.19.2-2 8/04 edition, Emission Factors for Crushed Stone Processing Op.

Emission Calculations for Stockpiles (ALL)

AP-42, 13.2.4.3 Equation 1:

Efficiency Factor	= k(0.0032) x $[(U/5)^{1.3} / (M/2)^{1.4}]$	
U, wind speed	= 15 mph,	AP42, Table 13.2.4-1
M, moisture content	= 40%, compost	
	= 14%, soil (clay/dirt mixture)	
	= 2.525%, all	AP42, Table 13.2.4-1
Production	= (195 TPH)(2,080 hr/yr) = 405,600 TPY	

For **PM2.5**,

k, particle size multiplier	= 0.11
Efficiency Factor	= k(0.0032) x $[(U/5)^{1.3} / (M/2)^{1.4}]$ = (0.11)(0.0032)$[(15/5)^{1.3} / (2.525/2)^{1.4}]$ = 0.0011 lb/ton
Emission	= Compost Production x Emission Factor = (405,600 TPY)(0.0011 lb/ton)(1/2000 ton/lb) = **0.22 TPY**

For **PM10**,

k, particle size multiplier	= 0.35
Efficiency Factor	= k(0.0032) x $[(U/5)^{1.3} / (M/2)^{1.4}]$ = (0.35)(0.0032)$[(15/5)^{1.3} / (2.525/2)^{1.4}]$ = 0.0034 lb/ton
Emission	= Compost Production x Emission Factor = (405,600 TPY)(0.0034 lb/ton)(1/2000 ton/lb) = **0.69 TPY**

For **TSP**,

k, particle size multiplier	= 0.74
Efficiency Factor	= k(0.0032) x $[(U/5)^{1.3} / (M/2)^{1.4}]$ = (0.74)(0.0032)$[(15/5)^{1.3} / (2.525/2)^{1.4}]$ = 0.0071 lb/ton
Emission	= Compost Production x Emission Factor = (405,600 TPY)(0.0071 lb/ton)(1/2000 ton/lb) = **1.44 TPY**

Note: The following emission factors are obtained from AP-42, 13.2.4.3 11/06 edition, Aggregate Handling and Storage Piles.

Emission Calculations for Traffic on Unpaved Roads

Mean Vehicle Weight	= 78,000 lbs, GROSS = 30,000 lbs (15 Tons), TARE
Load Capacity	= 24.0 Tons
Material (Production) to move	= 405,600 TPY
NO. of Loads per year	= Material (Production) to move / Load Capacity = 405,600 TPY / 24.0 T = 16,900 Loads/yr
NO. of Loads (inc. Unloading) per year	= 2 x 16,900 Loads /yr
Distance (Given) Distance (Round Trip)	= 0.0189 mi = 2 x 0.0189 mi
Speed	= 10 mph = 0.1667 mi/min
Trip Time	= Distance x Speed = (0.0189 mi)(1/0.1667 min/mi)(60 sec/min) = 6.8 sec
Load Time (Given)	= 120 sec
NO. of Round Trip(s) per hour	= 1 Hour / 2 x (Trip Time + Load Time) = (1 hr)(60 min/hr)(60 sec/min)/(2*(6.8 sec + 120 sec)) = 14.2 RT/hr
NO. of Trip(s) per year	= 2 x Number of Loads = 2(16,900 Loads/yr) = 33,800 Trips/yr
Vehicle Miles Traveled per hour	= (Distance, Round Trip)(NO. of Round Trips per hour) = (2 x 0.0189 mi)(14.2 RT/hr) = 0.54 VMT/hr
Vehicle Miles Traveled per year	= (Distance, Given)(NO. of Loads inc. Unloading per year) = (0.0189 mi)(2 x 16,900 Loads /yr) = 638.8 VMT/yr
Precipitation Factor (p)	= 43 days, Pu'u Anahulu
Emission Factor, Unpaved	= $k(s/12)^a(W/3)^b/(M/0.2)^c * [(365-p)/365]$, where k, a, b: Industrial Road Constants s: surface material silt content (%) W: mean vehicle weight (T)
PM Control Efficiency	= 70%, based on direct water spraying during aggregate delivery

For **PM2.5**,

Emission Factor, Unpaved	= $k(s/12)^a(W/3)^b/(M/0.2)^c * [(365-p)/365]$ = $0.15(15/12)^{0.9}(27/3)^{0.45}[(365-43)/365]$ = 0.44 lb/VMT
Potential Annual Emissions	= (Vehicle Miles Traveled per year) x (Emission Factor, Unpaved) = (638.8 VMT/yr)(0.44 lb/VMT)(1/2000 T/lb) = **0.14 TPY or 0.004 g/s**
Limited Operation Emission	= Potential Annual Emissions X Limited Operation Time X Control Factor = (0.14 TPY)(2,080/8,760 hours/year)(1 - 70%) = **0.01 TPY (limited, controlled)**

For **PM10**,

Emission Factor, Unpaved = $k(s/12)^a(W/3)^b/(M/0.2)^c * [(365-p)/365]$
= $1.5(15/12)^{0.9}(27/3)^{0.45}[(365-43)/365]$
= 4.35 lb/VMT

Potential Annual Emissions = (Vehicle Miles Traveled per year) x (Emission Factor, Unpaved)
= (638.8 VMT/yr)(4.35 lb/VMT)(1/2000 T/lb)
= **1.39 TPY or 0.04 g/s**

Limited Operation Emission = Potential Annual Emissions X Limited Operation Time X Control Factor
= (1.39 TPY)(2,080/8,760 hours/year)(1 - 70%)
= **0.10 TPY (limited, controlled)**

For **TSP**,

Emission Factor, Unpaved = $k(s/12)^a(W/3)^b/(M/0.2)^c * [(365-p)/365]$
= $4.9(15/12)^{0.7}(27/3)^{0.45}[(365-43)/365]$
= 17.45 lb/VMT

Potential Annual Emissions = (Vehicle Miles Traveled per year) x (Emission Factor, Unpaved)
= (638.8 VMT/yr)(17.45 lb/VMT)(1/2000 T/lb)
= **5.57 TPY or 0.16 g/s**

Limited Operation Emission = Potential Annual Emissions X Limited Operation Time X Control Factor
= (5.57 TPY)(2,080/8,760 hours/year)(1 - 70%)
= **0.40 TPY (limited, controlled)**

Note: The following emission factors are obtained from AP-42, 13.2.2, 11/06 update, Unpaved Roads.

AIR QUALITY ASSESSMENT

An ambient air quality analysis (AAQA) was conducted for the diesel engine to demonstrate compliance with state and national ambient air quality standards. EPA approved SCREEN3 method was used. Results attached to review.

The predicted concentrations assumes operation at proposed limited hours of operation, and using fuel oil no. 2 with 0.5% sulfur content. Based on these assumptions, the facility should comply with State and Federal AAQS for CO, SO2, NO2, and PM10 as shown below (Pb and H2S assumed to be negligible).

Air Pollutant	Emissions (g/s)	Averaging Time	Impact * ($\mu g/m^3$)	Background ** ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	SAAQS ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)	Compared to SAAQS
CO	**0.004**	**1-hr**	**2.5**	**2850**	**2853**	**10000**	**40000**	**28.5%**
		8-hr	**1.8**	**1967**	**1969**	**5000**	**10000**	**39.4%**
NO2	**0.58**	**Annual**	**13.1**	**9**	**22**	**70**	**100**	**31.4%**
SO2	**0.07**	**3-hr**	**4.0**	**451**	**455**	**1300**	**1300**	**35.0%**
		24-hr	**1.8**	**161**	**163**	**365**	**365**	**44.7%**
		Annual	**0.2**	**11**	**11**	**80**	**80**	**13.8%**
PM10	**0.04**	**24-hr**	**10.1**	**72**	**82**	**150**	**150**	**54.7%**
		Annual	**1.2**	**22**	**23**	**50**	**50**	**46.0%**
PM2.5	**N/A**	**24-hr**	**N/A**	**10**	**N/A**	**N/A**	**35**	**N/A%**
		Annual	**N/A**	**5**	**N/A**	**N/A**	**15**	**N/A%**

For **CO**,

1-hr Impact = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor)
= (0.004 g/s)(634.2 $\mu g/m^3$) = **2.5 $\mu g/m^3$**

8-hr Impact = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor)
= (0.004 g/s)(634.2 $\mu g/m^3$)(0.7) = **1.8 $\mu g/m^3$**

For **NO2**,

Annual Impact = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor) X (Limited Operation Time) X … … (Tier2 multiplier)
= (0.58 g/s)(634.2 $\mu g/m^3$)(0.2)(2080/8760)(0.75) = **13.1 $\mu g/m^3$**

For **SO2**,

3-hr Impact = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor)
= (0.07 g/s)(634.2 $\mu g/m^3$)(0.9) = **4.0 $\mu g/m^3$**

24-hr Impact = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor)
= (0.07 g/s)(634.2 $\mu g/m^3$)(0.4) = **1.8 $\mu g/m^3$**

Annual = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor) X (Limited Operation Time)
= (0.07 g/s)(634.2 $\mu g/m^3$)(0.2)(2080/8760) = **0.2 $\mu g/m^3$**

For **PM10**,

24-hr Impact = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor)
= (0.04 g/s)(634.2 $\mu g/m^3$)(0.4) = **10.1 $\mu g/m^3$**

Annual = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor) X (Limited Operation Time)
= (0.04 g/s)(634.2 $\mu g/m^3$)(0.2)(2080/8760) = **1.2 $\mu g/m^3$**

For **PM2.5**,

24-hr Impact = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor)
= (N/A g/s)(634.2 $\mu g/m^3$)(0.4) = **N/A $\mu g/m^3$**

Annual = (Emissions) X (Maximum 1-Hr Concentration) X (Avg Time Scaling Factor) X (Limited Operation Time)
= (N/A g/s)(634.2 $\mu g/m^3$)(0.2)(2080/8760) = **N/A $\mu g/m^3$**

Impact is calculated from the product of pollutant emissions and the Screen3 model result for 1 g/s: Maximum 1-Hr Concentration = **634.2 μg/m^3** @ 59m from the point source (based on a 0 to 1,000 meter domain). Building downwash not incorporated in model (supporting information attached by applicant: email correspondence & site map).

* Applied EPA scaling factors of 0.9, 0.7, and 0.4 for the 3-hour, 8-hour, and 24-hour concentrations are used, respectively.
A scaling factor of 0.2 is used for annual concentrations.
Conversion of NO to NO2 factors a Tier2 multiplier value of 0.75.

** Background Concentration obtained from "Annual Summary 2006 Hawaii Air Quality Data". Representative data for the island of: **MAUI.**

For: 1-Hour Carbon Monoxide: Oahu, Honolulu – Maximum 1st High (NO DATA, MOST CONSERVATIVE)
For: 8-Hour Carbon Monoxide: Oahu, University – Maximum 1st High (NO DATA, MOST CONSERVATIVE)

For: Annual Nitrogen Dioxide: Oahu, Kapolei – (NO DATA, MOST CONSERVATIVE)

For: 3-Hour Sulfur Dioxide: Hawaii, Hilo – Maximum 1st High (MOST CONSERVATIVE)
For: 24-Hour Sulfur Dioxide: Hawaii, Hilo – Maximum 1st High (MOST CONSERVATIVE)
For: Annual Sulfur Dioxide: Hawaii, Kona – Annual Mean (MOST CONSERVATIVE)

For: 24-Hour Particulate Matter 10: Maui, Kihei – Maximum 1st High (REPRESENTATIVE)
For: Annual Particulate Matter 10: Maui, Kihei – Annual Mean (REPRESENTATIVE)

For: 24-Hour Particulate Matter 2.5: Oahu, Honolulu – Maximum 1st High (NO DATA, MOST CONSERVATIVE)
For: Annual Particulate Matter 2.5: Oahu, Sand Island – Annual Mean (NO DATA, MOST CONSERVATIVE)

160 HP Diesel Engine Stack Parameters

Exhaust Diameter = 0.1016m; Height = 3.2m; Actual Flow Rate = 0.4332 m^3/s; Temp = 676K

FACILITY IDENTIFICATION

A major source as defined in Section 11-60.1-1 of HAR Title 11, has the potential to emit any HAP of 10 TPY or more, or 25 TPY or more of any combination of HAPs, or 100 TPY or more of any air pollutant. Calculated emission(s) do not exceed these limits and thus, this facility **is not classified** as a major source.

A synthetic minor source is a facility that is potentially major (as defined in HAR 11-60.1-1), but is made nonmajor through federally enforceable permit conditions. This facility **is not classified** as a synthetic minor source because potential emissions do exceed the major source threshold when the facility is operated at its maximum capacity continuously for 8,760 hours per year.

The facility is subject to NSPS, Subpart OOO and **is classified** as a Covered Source.

CONCLUSION

Based on the information submitted by Tom's Backhoe and Excavation, Inc., it is the determination of the Department of Health (DOH) that the proposed facility will be in compliance with the Hawaii Administrative Rules (HAR), Chapter 11-60.1 and State and Federal ambient air quality standards.

Issuance of an initial CSP No. 0700-01-C is recommended based on the proposed operating restrictions by the applicant on the 195 TPH mobile jaw crusher and 160 hp diesel engine servicing the jaw crusher to reduce particulate emissions and meet state ambient air quality standards (SAAQS).