PROPOSED

PERMIT APPLICATION REVIEW
TEMPORARY COVERED SOURCE PERMIT (CSP) No. 0580-01-CT
Application for Modification No. 0580-02

Applicant: Kalaka Nui, Inc.

SIC Code: 1429, Crushed and Broken Stone, Not Elsewhere Classified

Location: Various Temporary Sites, State of Hawaii

Proposed initial location: Ohana Nui Circle (Hickam Air Force Base)
UTM Coordinates: 611,058 m East and 2,359,599 m North, NAD-83, Zone 4

Responsible Official: Ms. Nowel Dudoit-Alana, President
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Equipment Description:

Unit	Manufacturer	Model/SN	Manf. Date	Description	Fuel
507 TPH Crushing Plant	Komatsu	Model: BR550JG-1 SN: 1092	2006	plant on tracks 44" x 30" jaw crusher Model: FS4430QA various conveyors	----------
306 hp Diesel Engine	Komatsu	Model: SAA6D125E-2 SN: 211713	2006	drives 507 TPH crushing plant	F.O. No. 2 13.1 gal/hr
350 TPH Crushing Plant	The Screen Machine	Model: 4043T SN: D4043TCJE1789	2005	plant on tracks 40" x 43" impact crusher various conveyors	----------
300 hp Diesel Engine	Caterpillar	Model: C-9 SN: CLJ07720	2005	drives 350 TPH crushing plant	F.O. No. 2 15 gal/hr
265 TPH Crushing Plant	Komatsu	Model: BR380JG-1 SN:1339	2006	plant on tracks 42" x 22" jaw crusher Model: KCJ4222 various conveyors	----------
180 hp Diesel Engine	Komatsu	Model: SAA6D102E2 SN: 26383368	2006	drives 265 TPH crushing plant	F.O. No. 2 10 gal/hr
400 TPH Screening Plant	Spyder	Model: 516T SN: D516TSPYF2JF1938	2006	plant on tracks 5' x 15' two deck screen 8 yd^3 hopper various conveyors	----------

1. Background

1.1 Kalaka Nui, Inc. submitted a permit modification on November 20, 2006 to add a 507 TPH jaw crushing plant and a 400 TPH screening plant to the existing permit for a 350 TPH

impact crushing plant. Each crushing and screening plant is mobile and moves on tracks. For the initial application to modify the permit, there are no hour or fuel restrictions proposed by the applicant to limit operation of the plants.

1.2 Pictures from a site inspection of Kalaka Nui, Inc. on January 10, 2006 at Hickam Air Force Base are shown in Enclosure (1). The site inspection disclosed a Komatsu model BR380JG-1 jaw crushing plant that the company intends to add to the permit. The November 20, 2006 permit application indicated a model BR550JG-1 jaw crushing plant for permitting.

1.3 Kalaka Nui, Inc. submitted an amendment to the November 20, 2006 permit application to add a 265 TPH Komatsu model BR380JG-1 crushing plant. This plant was observed during the site inspection referenced in Paragraph 1.2 and is in addition to the 507 TPH Komatsu model BR550JG-1 crushing plant originally reported in the initial permit application. For the new application submittal, a 3,400 hour per year operating restriction is proposed for all the crushing plants and a 2,000 hour per year operating restriction is proposed for the screening plant. The restrictions limit the facility below the major source threshold as defined in Hawaii Administrative Rules (HAR) §11-60.1 of 100 tons per year (TPY) for particulate as worst-case. The diesel engine stacks for units powering the 265 TPH and 507 TPH plants are directed horizontally and an air modeling assessment shows that the hour restriction is necessary to demonstrate compliance with the air standards.

1.4 Per telephone conversation with Kalaka Nui, Inc. personnel on April 19, 2007, the following information was disclosed:

a. The serial number for the model BR550JG-1 jaw crushing plant is 1092;
b. The serial number for the diesel engine servicing the model BR550JG-1 jaw crushing plant is 21173; and
c. The serial number for the BR380JG-1 crushing plant is 1339.

1.5 Per telephone conversation with Kalaka Nui, Inc. personnel on April 27, 2007, the serial number for the diesel engine servicing the 350 TPH impact crushing plant is CLJ07720.

2. Applicable Requirements

2.1 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 5 - Covered Sources
  - Subchapter 6 - Fees for Covered Sources, Noncovered Sources, and Agricultural Burning
    - 11-60.1-111 Definitions
    - 11-60.1-112 General Fee Provisions for Covered Sources
    - 11-60.1-113 Application Fees for Covered Sources
    - 11-60.1-114 Annual Fees for Covered Sources
  - Subchapter 8 - Standards of Performance for Stationary Sources

11-60.1-161(27) Standards of Performance for Non-metallic Mineral Processing Plants
Subchapter 10 - Field Citations

2.2.1 40 Code of Federal Regulations (CFR), Part 60 - New Source Performance Standards (NSPS), Subpart OOO - Standards of Performance for Non-metallic Mineral Processing Plants is applicable to this facility. The federal regulations apply to portable stone crushing plants with capacities greater than 150 TPH that commence construction, reconstruction, or modification after August 31, 1983. The 350 TPH, 507 TPH, and 265 TPH, mobile crushing plants meet this criteria and are, therefore, subject to Subpart OOO. The 400 TPH screening plant is also subject to Subpart OOO because the plant will be operated with the crushing plants as a worst-case scenario.

2.2.2 40 CFR, Part 60 – NSPS, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines is not applicable to the diesel engine generators because the units are mobile.

2.3 The facility is not a major source for hazardous air pollutants (HAPs) and is not subject to National Emissions Standards for Hazardous Air Pollutants (NESHAPS) or Maximum Achievable Control Technology (MACT) requirements under 40 CFR, Parts 61 and 63.

2.4 The purpose of Compliance Assurance Monitoring (CAM) is to provide reasonable assurance that compliance is being achieved with large emission units that rely on air pollution control device equipment to meet an emissions limit or standard. Pursuant to 40 CFR, Part 64, for CAM to be applicable, the emissions unit must: (1) be located at a major source; (2) be subject to an emissions limit or standard; (3) use a control device to achieve compliance; (4) have potential pre-control emissions that are greater than the major source level; and (5) not otherwise be exempt from CAM. CAM is not applicable because this facility is not a major source.

2.5 Prevention of Significant Deterioration (PSD) review applies to new major stationary sources and major modifications to these types of sources. This facility is not a major stationary source as defined in the PSD regulations because the facility does not belong to the source categories specified in HAR §11-60.1-131 under definition of a major PSD source and maximum potential emissions of any air pollutant are below 250 TPY. As such, PSD review is not required.

2.6 Annual emissions reporting is required because this facility is a covered source.

2.7 The consolidate emissions reporting rule (CERR) is not applicable because emissions from the facility do not exceed reporting levels pursuant to 40 CFR 51, Subpart A (see table below).

CERR APPLICABILITY			
Pollutant	Facility Emissions (8,760 hr/yr with water sprays)	CERR Triggering Levels (TPY)	
		1 year cycle (type A sources)	3 year cycle (type B sources)
PM_{10}	25.7	≥ 100	≥ 250
SO_2	4.7	≥ 100	≥ 2,500
NO_X	14.7	≥ 100	≥ 2,500
VOC	0.8	≥ 100	≥ 250
CO	2.1	≥ 1,000	≥ 2,500

2.8 A best available control technology (BACT) analysis is required for the permit modification to add a 507 TPH crushing plant with 306 hp diesel engine, 265 TPH jaw crushing plant with 180 hp diesel engine, and 400 TPH screening plant because potential emissions from these plants are above significant levels as defined in HAR, Section 11- 60.1 for particulate matter (see table below). A majority of the particulate emissions are from operations to screen soil. As per discussion with the applicant's consultant on April 27, 2007, the wet suppression methods proposed in the application to control fugitive dust are considered BACT for particulate for the mobile crushing and screening plants being added to the permit.

BACT APPLICABILITY		
Pollutant	Emissions (TPY)	Significant Level (TPY)
SO_2	2.8	40
NO_X	8.0	40
CO	1.0	100
VOC	0.5	40
PM	92.5	25
PM_{10}	24.1	15

a: Based on emissions from 507 TPH and 265 TPH crushing plants operated at 3,400 hr/yr and 400 TPH screening plant operated at 2,000 hr/yr.

2.9 The facility is a synthetic minor source because emissions exceed major source thresholds for continuous operation (8,760 hr/yr).

3. Insignificant Activities

3.1 Insignificant activities identified by the application are listed as follows:

a. A 175 gallon fuel storage tank servicing the 300 hp diesel engine for the 350 TPH crushing plant is an insignificant activity in accordance with HAR §11-60.1-82(f)(1).

b. A 160 gallon fuel storage tank servicing the 306 hp diesel engine for the 507 TPH crushing plant is an insignificant activity in accordance with HAR §11-60.1-82(f)(1).

c. A 106 gallon fuel storage tank servicing the 180 hp diesel engine for the 265 TPH crushing plant is an insignificant activity in accordance with HAR §11-60.1-82(f)(1).

d. An 82 kW engine servicing the mobile screening plant is an insignificant activity pursuant to HAR§11-60.1-82(f)(2) as follows:

(82 kW)(226 g/kW-hr)(kg/1,000 g)(2.2 lb/kg)(gal/7.05 lb) = 5.8 gal/hr
(5.8 gal/hr)(140,000 Btu/gal)(MMBtu/Btu) = 0.812 MMBtu/hr

4. Air Pollution Controls

4.1 Water sprays for the 350 TPH mobile crushing plant are located at the following points:

a. At the grizzly feeder;
b. At the transfer point to the under-conveyor; and

c. At the discharge to stockpile.

4.2 A water spray bar for the 507 TPH mobile crushing plant is located at the jaw crusher.

4.3 Water sprays for the 265 TPH mobile crushing plant are located at the following points:

a. At the grizzly feeder;
b. At the end of main conveyor; and
c. At the end of the side conveyor.

4.4 Water spray will be applied as necessary to the feed material and/or screen for the 400 TPH mobile screening plant when the screen is operated as a stand-alone unit and screening soil.

5. Alternate Operating Scenarios

5.1 There were no alternate operating scenarios proposed by the applicant.

6. Project Emissions

6.1 Emissions were determined for the diesel engines servicing the mobile crushing plants. Emissions of NO_X, CO, VOC, PM, and PM_{10} were based on emissions data from manufacturer's specifications. It was assumed that 96% of the total particulate was PM_{10} and 90% of the total particulate was $PM_{2.5}$ based on information from AP-42, Appendix B.2, Table B.2-2 for gasoline and diesel fired internal combustion engines. The HAP emissions were based on emission factors from AP-42, Section 3.3 (10/96), Gasoline and Diesel Industrial Engines. A mass balance calculation was used to determine SO_2 emissions based on the maximum allowable fuel sulfur content of 0.5% by weight and the fuel consumption at 100% load for each engine. An operating time of 3,400 hours per year was assumed for the calculations. Emission estimates are shown in Enclosure (2) and summarized below.

DIESEL ENGINES								
Pollutant	Engine Emission Rate lb/hr (g/s)			Engine Emissions (TPY)				
				3,400 hr/yr			All Engines	
	Engine hp			Engine hp			3,400 hr/yr	8,760 hr/yr
	300	306	180	300	306	180		
SO_2	1.057 (0.133)	0.923 (0.117)	0.704 (0.089)	1.8	1.6	1.2	4.7	12.1
NO_X	3.950 (0.499)	3.100 (0.391)	1.565 (0.198)	6.7	5.3	2.7	14.7	37.9
CO	0.630 (0.080)	0.370 (0.047)	0.216 (0.027)	1.1	0.6	0.4	2.1	5.4
VOC	-------	--------	-------	0.3	0.3	0.2	0.8	2.1
PM	0.060 (0.008)	0.330 (0.042)	0.047 (0.006)	0.1	0.6	0.1	0.8	2.1
PM_{10}	0.058 (0.007)	0.317 (0.040)	0.045 (0.006)	0.1	0.5	0.1	0.7	1.8
$PM_{2.5}$	--------	--------	0.042 (0.005)	0.1	0.5	0.1	0.7	1.8
HAPs	--------	--------		0.023	0.020	0.015	0.058	0.149

6.2 Particulate emissions from the crushing and screening plants were based on emission factors from AP-42, Section 11.19.2 (8/04), Crushed Stone Processing and Pulverized Mineral Processing, except that for screening of fines, the uncontrolled emission factor was used and a 35% control efficiency was assumed for wetting soil prior to screening. The controlled emission factors were used for crushing, screening, and conveyor transfer points. It was assumed that 51% PM was PM_{10} and 15% PM was $PM_{2.5}$ based on information from AP-42, Appendix B.2.2. Uncontrolled emission factors were used for truck loading and unloading operations and a 70% control efficiency for water sprays was applied to determine emissions from the crushing plants. An operating time of 3,400 hr/yr was used to determine emissions for the crushing plants. A 2,000 hr/yr operating time was used to determine emissions for the screening plant. The rated capacity of the equipment was used to determine maximum potential emissions. Emissions from the crushing and screening plants are shown in Enclosure (3) and summarized below.

CRUSHING AND SCREENING PLANTS						
Pollutant	Emissions (TPY)				Total Plant Emissions (TPY)	
	Crushing Plants			Screening Plant		
	3,400 hr/yr			2,000 hr/yr	limited 3,400 hr/yr and 2,000 hr/yr	no limits 8,760 hr/yr
	350 TPH	507 TPH	265 TPH	400 TPH		
PM	0.7	1.1	0.6	78.1	80.5	231.2
PM_{10}	0.4	0.5	0.3	18.8	20.0	57.4
$PM_{2.5}$	0.07	0.1	0.06	11.7	11.9	34.2

a: Used controlled emission factor. Assumed 70% control for use of water spray if no controlled emission factor provided, except for screening soil worst-case the uncontrolled emission factor was used and a 0.35% control efficiency was applied to account for the applicant's proposal to wet soil prior to screening.

b: Increased proposed emissions by 8,760/3,050 based on average plant operation proposed that is 3,050 hours per year.

6.3 Particulate emissions from stockpiles were determined by using emission factors from AP-42, Section 13.2.4 (1/95), Aggregate Handling and Storage Piles. It was assumed that the screening plant operated 2,000 hours per year and each crushing plant operated 3,400 hours per year based on what was proposed by the applicant. Emissions were also based on a 15 mph average wind speed, K value for PM_{10} of 0.35, K value for PM of 0.74, K value for $PM_{2.5}$ of 0.11, and a mean 0.7% moisture content for stone quarrying and processing. A 70% control efficiency was applied to account for use of a water truck to control fugitive dust. Emissions are shown in Enclosure (4) and summarized in the table below.

STORAGE PILES							
Pollutant	Emission Factor (lb/ton)	Emission Rate (TPY)					
		Crushing Plants (TPH)			Screening Plant (TPH)	Total	
		350	507	265	400	limited 3,400 hr/yr and 2,000 hr/yr[a]	no limits 8,760 hr/yr[b]
PM	7.127×10^{-3}	1.3	1.8	1.0	0.9	5.0	14.4
PM_{10}	3.371×10^{-3}	0.6	0.9	0.5	0.4	2.4	6.9
$PM_{2.5}$	1.059×10^{-3}	0.2	0.3	0.1	0.1	0.7	2.0

a: Assumed 70% control for use of water truck.

b: Increased proposed emissions by 8,760/3,050 based on average plant operation proposed that is 3,050 hours per year.

6.4 Emissions from vehicle travel on unpaved roads were calculated using the emission factor equation for vehicles traveling on unpaved surfaces at industrial sites. The equation was obtained from AP-42, Section 13.2.2 (12/03) Unpaved Roads. Equation (1a) emission factor was extrapolated to annual average uncontrolled conditions using Equation (2). Emission rates were based on the following assumptions:

a. A distance of 16,097 vehicle miles traveled per year based on 3,400 hr/yr operation of each crushing plant and 2,000 hr/yr operation for the screener, a total of 3,714,701 tons/yr of material processed, a truck hauling capacity of 27 tons, and a 0.117 mile two way travel distance for the trucks;
b. A k value for PM, PM_{10}, and $PM_{2.5}$ of 4.9, 1.5, and 0.23, respectively based on data for industrial roads;
c. An a value for PM, PM_{10}, and $PM_{2.5}$ of 0.7, 0.9, and 0.9, respectively based on data for industrial roads;
d. A b value for PM, PM_{10}, and $PM_{2.5}$ of 0.45 based on data for industrial roads;
e. An s (silt content of road) value of 3.9% based on information from AP-42, Section 13.2.2 – Unpaved Roads Related Information
   www.epa.gov//ttn/chief/ap42/ch13/related/c13s02-2.html
f. A W (mean vehicle weight) value of 27 tons;
g. A p (# of days with 0.01" of rain/year) value of 96 based on climate parameters for Honolulu;
h. A 70% control efficiency was applied to account for use of a water truck;
i. Vehicle travel emissions are listed as follows:

VEHICLE TRAVEL ON UNPAVED ROADS			
Pollutant	Emission Factor (lb/VMT)	Emission Rate (TPY)	
		Crushing Plants and Screening Plants 3,400 hr/yr and 2,000 hr/yr[a]	Crushing Plants and Screening Plants 8,760 hr/yr[b]
		limited	no limits
PM	4.420	10.7	30.7
PM_{10}	1.081	2.6	7.5
$PM_{2.5}$	0.166	0.4	1.1

a: Assumed 70% control for use of water spray.
b: Increased proposed emissions by 8,760/3,050 based on average plant operation proposed that is 3,050 hours per year.

6.5 Total emissions from the facility are shown below.

TOTAL EMISSIONS		
Pollutant	Potential Emissions (TPY) (limited with water sprays)	Potential Emissions (TPY) (no limits with water sprays)
SO_2	4.7	12.1
NO_X	14.7	37.9
CO	2.1	5.4
VOC	0.8	2.1
PM	97	278.4
PM_{10}	25.7	73.6
$PM_{2.5}$	13.7	39.1
Total HAPS	0.058	0.149

7. Air Quality Assessment

7.1 An ambient air quality impact analysis (AAQIA) was performed for the 306 hp and 180 hp diesel engines. The 300 hp diesel engine is an existing source with no modifications and was not included in the modeling assessment. The 300 hp diesel engine, though, was assumed to be part of the background concentrations for the assessment. The Environmental Protection Agency's (EPA's) ISCST3 model was used. Although there is an EPA requirement for using AERMOD at this time, use of ISC instead of AERMOD is acceptable at this time because the application for a covered source permit was received prior to December 9, 2006. Assumptions for the model included:

a. The use of a rural dispersion coefficient.
b. Terrain elevation data using the Ewa topographic quadrant file 0006 DEM was applied to the model.
c. EPA building profile input program (BPIP) was used to evaluate effects of down wash from the mobile crushing plants and screening plant.
d. Meteorological data from Honolulu International Airport data (1995) was used.
e. Receptors were placed in 30 meter increments along a 910 meter x 990 meter area centered around the diesel engines.
f. Horizontal stack parameters per EPA guidance were used and included the following:

   i. Setting stack exit velocity to 0.001 m/s; and
   ii. Increasing the stack diameter so that the flow rate is the same as actual flow rate at 0.001 m/s velocity.

7.2 Background concentrations of PM_{10}, CO, and SO_2 used for the analysis were collected in 2005 from the Honolulu air quality monitoring station. The background NO_2 concentration for the analysis was collected in 2005 from the Kapolei monitoring station.

7.3 The table below lists the emission rates and stack parameters used in the air modeling assessment, except that a value of zero was entered for the emission rate of each pollutant from the 300 hp diesel engine because this unit is an existing source that was not modeled.

SOURCE	STACK	EMISSION RATES (g/s)				STACK PARAMETERS			
		NO_X	SO_2	CO	PM_{10}	Height (ft)	Temp. ^{O}K (^{O}F)	Dia. (m)	Velocity (m/s)
300 hp Engine	1	short- term 0.499 annual 0.194	short- term 0.132 annual 0.051	0.079	short- term 0.008 annual 0.003	13.5	696 (793)	0.108	107.5
306 hp Engine	2	short- term 0.391 annual 0.152	short- term 0.116 annual 0.045	0.047	short- term 0.040 annual 0.016	12	730 (855)	0.086 actual 34.336 horizontal	160.0 actual 0.001 horizontal
180 hp Engine	3	short- term 0.198 annual 0.077	short- term 0.089 annual 0.035	0.027	short- term 0.006 annual 0.002	11	793 (968)	0.076 actual 25.48 horizontal	112.4 actual 0.001 horizontal

7.4 The predicted concentrations in the table below are based on full capacity operation of the diesel engines. It was assumed that the diesel engines operated 3,400 hr/yr. Results from the air modeling assessment in the table below show compliance with state and federal ambient air quality standards.

PREDICTED AMBIENT AIR QUALITY IMPACTS						
AIR POLLUTANT	AVERAGING TIME	IMPACT (ug/m^3)[a]	BACKGROUND (ug/m^3)	TOTAL IMPACT (ug/m^3)	AIR STANDARD	PERCENT STANDARD
SO_2	3 –Hour 24 – Hour Annual	1091 341.5 33	75 23 1	1,166 364.5 34	1,300 365 80	90 99.9 43
NO_2	Annual	41	9	50	70	71
CO	1 – Hour 8 – Hour	465 269	3,876 1,610	4,341 1,879	10,000 5,000	33 36
PM_{10}	24 – Hour Annual	80 5	64 15	144 20	150 50	96 40

a: Impacts are based on 1st highest high model output, except for 24-hour SO_2 and PM_{10} outputs that were based on 2nd highest high model output.

b: The NO_2 impact was based on the ozone limiting method as follows:

84 ug/m^3 > 34 ug/m^3 (background ozone concentration from Sand Island in 2005). Therefore, the equipment is O_3 limited since there is insufficient ozone to convert all the NO to NO_2.

It was assumed that 90% of the nitrogen oxides discharged from the stack form NO and 10% of the nitrogen oxides form NO_2; therefore, NO_2 impact is:

$$84(0.1) = 8.4\ ug/m^3$$

It was additionally assumed that the NO_2 produced from the reaction between NO from the stacks and background ozone is as follows:

$$(\text{background } O_3)\ (NO_2/O_3) = 34(46/48) = 32.6\ ug/m^3$$
$$\text{Total } NO_2 \text{ impact} = 8.4\ ug/m^3 + 32.6\ ug/m^3 = \underline{41\ ug/m^3}$$

8. Significant Permit Conditions

8.1 40 CFR, Part 60, Subpart OOO provisions are applicable to the crushing and screening plants because the crushing plants have a capacity greater than 150 TPH and each plant was built after 1983.

Reason for 8.1: The requirements were incorporated into the permit based on applicability to federal standards as indicated in Paragraph 2.2.1.

8.2 The total operating hours of each crushing plant with diesel engine shall not exceed 3,400 hours in any rolling twelve-month (12-month) period.

8.3 The total operating hours the screening plant with diesel engine shall not shall not exceed 2,000 hours in any rolling twelve-month (12-month) period.

Reason for 8.2 and 8.3: These requirements are necessary to prevent the facility from triggering major source thresholds and for compliance with the ambient air quality standards.

8.4 Incorporate minimum stack height requirements for the diesel engines.

Reason 8.4: The AAQIA was based on the stack heights reported by the applicant.

9. Conclusion and Recommendation

9.1 Actual emissions from this facility should be lower than estimated. Maximum potential emissions were based on worst-case conditions assuming maximum rated capacities of the diesel engines, crushing plants, and screening plant. Actual capacity will vary depending on product size and type of material processed and will likely be lower than maximum rated capacity. The permit requires the use of a water spray system for compliance with fugitive emission limits and the wetting of soil prior to screening if soil is processed by the screening plant. The permit also requires a water truck to control fugitive dust at sites where the plants are located. Recommend issuance of the temporary covered source permit subject to the significant permit conditions, 30-day public comment period, and 45-day review by EPA.

Mike Madsen
April 27, 2007