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STATE OF CALIFORNIA

Energy Resources
Conservation and Development Commission

In the Matter of:	**DOCKET NO. 16-AFC-01**
Application For Certification **STANTON ENERGY RELIABILITY CENTER**	**STANTON ENERGY RELIABILITY CENTER, LLC's INITIAL COMMENTS ON THE PRELIMINARY STAFF ASSESSMENT**

Stanton Energy Reliability Center, LLC (SERC, LLC), LLC hereby submits these initial comments on the Preliminary Staff Assessment (PSA) for the Stanton Energy Reliability Center (SERC) published on March 29, 2018. SERC, LLC offers these initial comments in advance of and in preparation for the PSA Workshop currently scheduled for April 18, 2018. These comments are being provided to enable SERC, LLC representatives and Staff to be more productive towards the resolution of substantive issues and to discuss specific language of the proposed Conditions of Certification at the workshop. SERC, LLC will submit final comments on the PSA after the PSA Workshop to capture relevant resolutions and agreements resulting from the workshop discussions.

For proposed changes to the text and conditions of the PSA, we are using the convention of ***bold italic*** for proposed insertions and ~~strikethrough~~ for proposed deletions. Based on our initial review of the PSA, at this time all proposed Conditions of Certification not addressed in these Initial Comments are acceptable to SERC, LLC.

PROJECT DESCRIPTION

Since the filing of the AFC, SERC, LLC has been further refining the design of the SERC. Specifically, the following modifications to the project have been made.

- The southern natural gas pipeline route has been eliminated from the project.

- SERC, LLC will over-excavate loose unconsolidated soils and transport them and the demolition spoils from removing existing asphalt concrete to the Olinda Alpha Landfill in Brea, California.

- The storm water drainage system has been redesigned to accommodate that SERC, LLC will not be able to construct the infiltration basin on SERC Parcel 2 due to easement rights owned by Southern California Edison (SCE) in the area previously identified for location of the infiltration basin.

- SERC, LLC has eliminated the storm water holding tank as it is no longer needed to satisfy detention or retention requirements now satisfied by the new design.

- The warehouse located in the western portion of the project site has been resized and moved westerly and now includes a restroom.

A complete description of each of these changes is described below and SERC, LLC requests that they be included in the Final Staff Assessment.

Southern Gas Route

The southern natural gas pipeline route was included in the AFC as Southern California Gas Company (SoCal Gas) had not completed its study to determine which route would better meet its needs. SoCal Gas has eliminated the southern route and it is no longer proposed as part of the SERC.

Soil Disposal Activities

As identified in the AFC, the site has near-surface unconsolidated soils. Further geotechnical investigation and foundation design optimization has determined that the soils should be over-excavated. The over-excavation results in a fill imbalance necessitating the need for off-site fill disposal. In addition to the export of excess soils, the project will also export the asphalt concrete waste from the demolition of hardscape on the westernmost parcel.

The excess soils and asphalt concrete waste will be exported to the Olinda Alpha Landfill located at 1942 North Valencia Avenue in Brea. The soil exporting activities will require a maximum of 36 truckloads per day (or six truckloads per hour) for approximately five weeks. The asphalt concrete removal will require an average of four truckloads per day for approximately seven days. The truck trips would occur between 9:30 a.m. and 3:30 p.m. These export activities will likely occur in several phases, but will not overlap with each other or with the peak construction activities that were evaluated in the AFC. A large portion of the excess soils will be exported before starting the other main construction activities. Therefore, during the peak export activities, there would be a maximum of 36 truckloads per day, associated with the dirt fill removal. Trucks leaving the site will be limited to no more than 6 per hour.

Orange County Waste and Recycling manages the Olinda Alpha Landfill and has a soils disposal program. SERC, LLC has contacted Ms. Connie Lizarraga and is in the process of filing the appropriate application to allow the disposal of the soils and asphalt.

A traffic analysis of the potential effects of the fill and asphalt disposal activities was performed by Jacobs CH2M and is included in Attachment A. Additionally, Attachment A contains a Revised Appendix 5.1E with revised construction emission that now include the excavation and soil disposal activities. SERC, LLC proposes a new Condition of Certification **WASTE-10** in these Initial Comments on the PSA to ensure the disposal activities will comply with the Orange County Waste and Recycling requirements.

Storm Water Drainage System

Details for SERC's storm water drainage system design were provided in SERC's Responses to Staff's Data Requests A39 through A41. Due to a land use restriction on Parcel 2 of the project site related to a pre-existing easement agreement with SCE, the storm water drainage system had to be re-designed to utilize other areas of the Project site. In general, the primary difference between the former and current designs is that SERC Parcel 1 previously pumped storm waters to an infiltration basin on Parcel 2, whereas the current design utilizes an in-road buried infiltration system for capture and control of all Parcel 1 storm water. Except for some minor relocation of features for Parcel 2, the system for Parcel 2 remains nearly the same as before.

Attachment B contains a revised drawing showing the storm water drainage design, a technical memorandum from WSP, and revised hydrologic and hydraulic calculations demonstrating that the post-construction storm water flows will comply with the requirements of the Orange County Flood Control Agency.

Storm Water Holding Tank and Relocated Demineralized Water Tank

The original project general arrangement submitted with the AFC included a design for the possible use of a storm water detention tank (Item 36 on Parcel 2) to detain storm water and control flows to the Stanton Storm Channel. During the next design iterations it was determined that there is no need for the detention tank and it has been eliminated from the general arrangement. As indicated above in the Storm Water Drainage System discussion, the current design will allow the Project to comply with the requirements of the Orange County Flood Control Agency.

In addition, the demineralized water tank (Item 34 on Parcel 2) was slightly enlarged a d relocated slightly as part of the design optimization and is not located where the storm water detention tank was.

Revised Warehouse Building

During the progression of the SERC design, the need for additional warehouse space has required a revision to the original warehouse proposed in the AFC. The revised warehouse building footprint dimensions have changed from 40 by 40 feet to 30 by 73 feet and in addition, the footprint is now oriented lengthwise along the north-south axis although generally in the same location on Parcel 2. The building height of 15 feet has remained unchanged.

Attachment C contains a memorandum expressing the opinion of Environmental Vision, the visual resource consultant that performed the visual assessment in the AFC, that the modification of the warehouse building does not change their conclusion that the SERC will not result in significant visual impacts.

PSA Project Description

Attachment D contains a proposed revisions and corrections to the PSA Project Description section in redline/strikethrough format.

In addition, Atmospheric Dynamics, Inc. conducted a review of the elimination of the storm water detention tank and resized demineralized water tank as well as the reconfiguration of the warehouse building and determined that these changes do not affect the previous air quality modeling. Air Quality modeling files will be provided to the Staff separately as they are specialized modeling files that cannot be docketed using the Commission docketing system.

AIR QUALITY

Page 4.1-65, Condition of Certification **AQ-SC3**

Staff has proposed Condition of Certification **AQ-SC3** which establishes specific requirements to reduce fugitive dust emissions during construction. SERC, LLC requests that due to the small size of the site, that the requirement to conduct onsite and offsite street sweeping twice daily regardless of actual conditions is unnecessary. SERC, LLC requests the frequency of street sweeping be determined by the onsite Air Quality Construction Mitigation Manager (AQCMM) and has proposed modifying the language accordingly.

I. All paved roads within the construction site shall be swept at ***a frequency determined by the AQCMM*** ~~least twice daily (or less during periods of precipitation)~~ on days when construction activity occurs to prevent the accumulation of dirt and debris.

J. At least the first 500 feet of any paved public roadway exiting the construction site, laydown areas, or construction staging areas, shall be swept at ***a frequency determined by the AQCMM*****,** ~~least twice daily (or less during periods of precipitation)~~**,** on days when construction activity occurs or on any other day when dirt or runoff resulting from the construction site activities is visible on the public roadways.

Page 4.1-69, Condition of Certification **AQ-SC8**

On past projects, Staff has proposed a standard condition of certification (usually **AQ-SC8**) that allows Staff to approve certain modifications to conditions of certification made as a result of modifications to a facility air permit as a Staff-approved amendment. We understand that the Commission is currently proposing to modify its Siting Regulations to authorize Staff to approve such an amendment without the need for Condition of Certification **AQ-SC8**. However, the timing and ultimate approval of those regulations is uncertain and therefore SERC, LLC request Condition of Certification **AQ-SC8** be added to the Final Staff Assessment (FSA).

AQ-SC8 ***The project owner shall comply with all staff (AQ-SC) and district (AQ) conditions of certification. The CPM, in consultation with the District, may approve any change to a condition of certification regarding air quality, as a staff-approved modification, provided that: (1) the project remains in compliance with all applicable laws, ordinances, regulations, and standards, (2) the requested change clearly will not cause the project to result in a significant environmental impact, (3) no additional mitigation or offsets will be required as a result of the change, (4) no existing daily, quarterly, or annual permit limit will be exceeded as a result of the change, and (5) no increase in any daily, quarterly, or annual permit limit will be necessary as a result of the change.***

Verification: ***The project owner shall submit a petition to amend for any proposed change to a condition of certification pursuant to this condition and shall provide the CPM with any additional information the CPM requests to substantiate the basis for approval.***

Pages 4.1-70 through 4.1-89

SERC, LLC has not proposed modifications to the proposed conditions of certification that were incorporated into the PSA from the South Coast Air Quality Management District (SCAQMD) Preliminary Determination of Compliance (PDOC). SERC, LLC has provided comments to the SCAQMD on its PDOC, some of which the SCAQMD is likely to incorporate into the Final Determination of Compliance (FDOC). Therefore, SERC, LLC has not repeated those comments here as we understand the Staff will be incorporating the conditions of the FDOC into the FSA.

BIOLOGY

Page 4.2-46, Condition of Certification **BIO-5**

Staff proposed Condition of Certification **BIO-5** includes standard provisions that must be incorporated into the Worker Environmental Awareness Program (WEAP) that SERC, LLC believes were developed for sites with more sensitive biological resources potential than exists at the SERC urban site. Specifically, SERC, LLC requests the requirement to train delivery personnel and for employees to carry wallet cards be deleted as unnecessary. SERC, LLC requests the following modifications.

BIO-5 The project owner shall develop and implement a project-specific Worker Environmental Awareness Program (WEAP) and shall secure approval for the WEAP from the CPM in consultation with USFWS and CDFW. The WEAP shall be administered to all onsite personnel including surveyors, construction engineers, employees, contractors, contractor's employees, supervisors, inspectors, ***and*** subcontractors~~, and delivery personnel~~. The WEAP shall be implemented during site mobilization, ground disturbance, grading, construction, operation, and closure. The WEAP shall:

1. Be developed by or in consultation with the Designated Biologist and consist of an on-site or training center presentation in which supporting electronic media and written material~~, including wallet-sized cards with summary information on special status~~

~~species and sensitive biological resources,~~ is made available to all participants;

CULTURAL RESOURCES

Pages 4.3-33 and 34, Condition of Certification **CUL-1**

The numbering of the items included in the Verification is incorrect.

Pages 4.3-39 and 40, Condition of Certification **CUL-5**, Verification

SERC, LLC provides the following language modification to the Verification to Condition of Certification **CUL-5**, to conform the language of the Verification to the language of the Condition. The Condition encourages, but does not require, inclusion of Native American presenter in the WEAP materials. Therefore, the Verification should similarly not require it.

Verification:

1. At least 30 days prior to the beginning of ground disturbance, the CRS shall provide the cultural resources WEAP training program draft text and/or training video, ~~including Native American participation,~~ graphics, and the informational brochure, to the CPM for review and approval.

Pages 4.3-40 through 4.3-45, Condition of Certification **CUL-6**

Condition of Certification **CUL-6** requires the use of two cultural resource monitors and requires a full-time Native American Monitor be present for all excavation activity. This condition has evolved over time and is applicable to larger sites with demonstrated Native American artifact potential. The SERC site has neither. Therefore, SERC, LLC requests that these two requirements be deleted as unnecessary and proposes the following language modifications.

CUL-6 CULTURAL RESOURCES MONITORING

The project owner shall ensure that a CRS, alternate CRS, or CRMs shall be on site for all ground disturbance in areas slated for excavation into non-fill (native) sediments. Prior to the start of ground disturbance, the project owner shall notify the CPM and all interested Native Americans of the date on which ground disturbance will ensue. ~~Where excavation equipment is actively removing dirt and hauling the excavated material farther than 50 feet from the location of active excavation, full-time archaeological monitoring shall require at least two monitors per~~

~~excavation area. In this circumstance, one monitor shall observe the location of active excavation and a second monitor shall inspect the dumped material. For excavation areas where the excavated material is dumped no farther than 50 feet from the location of active excavation, one monitor shall observe both the location of active excavation and inspect the dumped material.~~

In the event that the CRS believes that the required number of monitors is not appropriate in certain locations, a letter or e-mail detailing the justification for changing the number of monitors shall be provided to the CPM for review and approval prior to any change in the number of monitors.

~~The project owner shall obtain the services of one or more NAM(s) to monitor construction-related ground disturbance in areas slated for excavation into non-fill (native) sediments~~. ***A Native American Monitor shall be obtained to monitor ground disturbance in areas where Native American artifacts are discovered.*** Preference in selecting a NAM shall be given to Native Americans with traditional ties to the area that will be monitored. If efforts to obtain the services of a qualified NAM are unsuccessful, the project owner shall immediately inform the CPM. The CPM will either identify potential monitors or will allow construction-related ground disturbance to proceed without a NAM.

Verification:

7. Within 15 days of receiving from a local Native American group a request that a NAM be employed, the project owner shall submit a copy of the request and a copy of a response letter to the group notifying them that a NAM has been employed***, if the CRS determines that Native American artifacts have been discovered,*** and identifying the NAM.

HAZARDOUS MATERIALS

Page 4.5-21, Condition of Certification **HAZ-4**

In the Hazardous Materials Management section of the PSA, the Hazardous Materials Management Table 1, Laws, Ordinances, Regulations, and Standards, beginning on Page 4.5-2 provides the citation for the regulation pursuant to storage of aqueous ammonia as Title 22, California Code of Regulations, Chapter 14, Article 10. SERC, LLC believes the

full citation should be “Title 22, California Code of Regulations, **Division 4.5**, Chapter 14, Article 10.”

This regulation, also referenced as “§ 66264.192. Design and Installation of New Tank Systems or Components” provides section (a) as follows (emphasis added):

> (a) **Tanks shall have sufficient shell strength and, for closed tanks, pressure controls (e.g., vents) to assure that they do not collapse or rupture.** The Department will review the design of the tanks, including the foundation, structural support, seams and pressure controls and seismic considerations. The Department shall require that a minimum shell thickness be maintained at all times to ensure sufficient shell strength. Factors to be considered in establishing minimum thickness include the width, height and materials of construction of the tank, and the specific gravity of the waste which will be placed in the tank. **In reviewing the design of the tank and approving a minimum thickness, the Department shall rely upon appropriate industrial design standards and other available information.**

However, nowhere in § 66264.192 is there a prescribed requirement for tanks to be designed according to a particular code, such as **HAZ-4**’s requirement of “The aqueous ammonia storage facility shall be designed to the **ASME Code for Unfired Pressure Vessels, Section VIII, Division 1**.”

Code references and related tank rating pressures pertinent to this discussion are:

- ASME Code for Unfired Pressure Vessels, Section VIII, Division 1 - for design of pressure vessels with pressures in excess of 15 psig
- API 620 - for design of tanks with pressures ranging from 2.5 psig up to 15 psig, and
- API 650 - for design of tanks with pressures ranging from atmospheric pressure up to 2.5 psig

Since SERC will utilize 19% aqueous ammonia, with an approximate vapor pressure of 190 millimeters of mercury (mmHg) (or 3.67 psia) at 77 degrees Fahrenheit, use of API 650 (atmospheric to 2.5 psig) would be an entirely appropriate code. However, SERC proposes the use of API 620 (2.5 psig to 15 psig) to provide an added degree of safety and to maintain consistency with requirements found in numerous other prior CEC decisions. API 620 more than satisfies the requirement of CCR § 66264.192 for “sufficient shell strength”.

In addition, to satisfy that portion of section (a) of CCR § 66264.192 related to pressure controls for prevention of collapse or rupture of the tank, SERC's design will rely on a pressure relief and vacuum control system designed to maintain the storage system at less than 2.5 psig.

Use of this API 620 compliant tank design with pressure/vacuum relief components and secondary containment, has been found acceptable by the Orange County Fire Authority with multiple systems of similar design and features in its territory. As well, storage of aqueous ammonia utilizing API 620 designed tanks has been approved by the California Energy Commission for numerous other projects, some of which include:

07-AFC-9	Canyon Power Plant
07-AFC-06C	Carlsbad Energy Center Project
09-AFC-1	Watson Cogeneration Steam and Electric Reliability Project
09-AFC-4	Oakley Generating Station
12-AFC-02C	Huntington Beach Energy Project

Given these facts, SERC, LLC requests that HAZ-4 be revised to read:

HAZ-4 The aqueous ammonia storage facility shall be designed to the ASME Code for Unfired Pressure Vessels, Section VIII, Division 1 ***if the ammonia storage facility is a pressure vessel, or API 620 if the ammonia storage facility is not a pressure vessel***. ***In the latter case, the storage facility shall include pressure/vacuum relief devices to ensure the storage tank does not collapse or rupture.*** The storage tank shall be protected by a secondary containment that drains to an underground vault via (3) ~~1.25~~ **1** square foot openings capable of holding precipitation from a 24-hour, 25-year storm event plus 100 percent of the capacity of the largest tank within its boundary. The storage tank shall have ammonia detectors positioned to detect an ammonia leak or loss of containment. The final design drawings and specifications for the ammonia storage tank, secondary containment basin, and underground vault shall be submitted to the CPM.

Page 4.5-21, Condition of Certification **HAZ-6**

To provide a secondary delivery route for hazardous materials other than ammonia, SERC, LLC is proposing changes to Staff proposed Condition of Certification **HAZ-6**. The secondary route is necessary to allow easy access to the warehouse which will be adjacent to the Pacific Street entrance to the site. It is noteworthy that for both the Primary

Route and the Secondary Route proposed by SERC, LLC the distance traveled on roadways directly adjacent to residences, after the truck leaves Beach Boulevard, is approximately 620 to 650 feet. Both routes have few adjacent residences.

> **HAZ-6** Prior to initial delivery, the project owner shall direct vendors delivering bulk quantities (>800 gallons per delivery) of hazardous material (e.g., aqueous ammonia, lubricating and insulating oils) to the site to use only the route***s*** approved by the CPM (***Primary Route:*** from ***Interstate 5 or*** State Route 91, exiting on Beach Boulevard and traveling south to Katella Avenue, then east on Katella Avenue and turn left and head north on Dale Avenue to the Stanton entrance. ***Secondary Route: from Interstate 5 or State Route 91, exiting on Beach Boulevard and traveling south to Pacific Street, then east on Pacific Street to its terminus at Fern Avenue and the western Stanton entrance)***. ***The project owner shall use only the Primary Route for deliveries of ammonia.*** The project owner shall obtain approval of the CPM if an alternate route is desired.

Page 4.5-22, Condition of Certification **HAZ-7**

SERC, LLC proposes the following clarifying language to ensure that the Construction Security Plan need only provide security personnel during hours where no construction workers are present.

> 2. security guards ***during hours when construction personnel are not present at the site***;

NOISE

Page 4.7-18, Condition of Certification **NOISE-4**

SERC, LLC proposes two modifications to Condition of Certification **NOISE-4**. The first is to clarify that the timing of the monitoring to demonstrate compliance is intended to take place after commissioning when the facility has completed installation of its noise attenuation measures. The second proposed modification requests that the Commission insert the flexibility language provided for other projects (Mission Rock, Oakley Generating Station, etc.) that would allow the monitoring to be performed at a location other than the sensitive receptor with the CPM's approval. The specific sections of Condition of Certification **NOISE-4** that SERC, LLC requests be modified are presented below.

After commissioning and installation of the noise attention measures and ~~W~~***w***hen the project first achieves a sustained output of 85 percent or greater of its rated capacity, the project owner shall conduct a 25-hour community noise survey at monitoring locations LT1 and LT2 ***or at a closer location acceptable to the CPM*** and include Leq and L90 readings. This survey shall also include measurement of one-third octave band sound pressure levels to ensure that no new pure-tone noise components have been caused by the project.

The measurement of power plant noise for the purposes of demonstrating compliance with this condition of certification may alternatively be made at a location, acceptable to the CPM, closer to the plant (e.g., 400 feet from the plant boundary) and this measured level then mathematically extrapolated to determine the plant noise contribution at the affected residence. The character of the plant noise shall be evaluated at the affected receptor locations to determine the presence of pure tones or other dominant sources of plant noise.

Verification: The above noise survey shall take place within 30 days of the project first achieving a sustained output of 85 percent or greater of its rated capacity ***and after commissioning and installation of the noise attenuation measures.***

Page 4.7-19, Condition of Certification **NOISE-5**

Similar to the modification proposed to Condition of Certification **NOISE-4**, above, SERC, LLC requests the modification to the following sections of Condition of Certification **NOISE-5** to clarify the timing of the testing required to demonstrate compliance.

NOISE-5 Following ***commissioning and installation of the noise attention measures and*** the project's attainment of a sustained output of 85 percent or greater of its rated capacity, the project owner shall conduct an occupational noise survey to identify any noise hazardous areas within the power plant.

Page 4.7-20, Condition of Certification **NOISE-7**

SERC, LLC requests Condition of Certification **NOISE-7** be modified to clarify that the condition would apply only to impact pile driving methods and would not apply to screw-

driven pile installation, which is being considered for certain components of the SERC facility and does not generate the high levels noise and vibration of impact pile driving.

NOISE-7 The project owner shall perform ***impact*** pile driving in a manner to reduce the potential for any project-related noise and vibration complaints. The project owner shall notify the residents in the vicinity of ***impact*** pile driving prior to start of ***impact*** pile driving activities.

Verification: At least 15 days prior to first ***impact*** pile driving, the project owner shall submit to the CPM a description of the ***impact*** pile driving technique to be employed, including calculations showing its projected noise impacts at monitoring location LT1.

At least 10 days prior to first ***impact*** pile driving, the project owner shall notify the residents within one mile of the ***impact*** pile driving. In this notification, the project owner shall state that it will perform this activity in a manner to reduce the potential for any project-related noise and vibration complaints as much as practicable. The project owner shall submit a copy of this notification to the CPM prior to the start of ***impact*** pile driving.

SOIL AND WATER RESOURCES

Page 4.10-29, Verification to Condition of Certification **SOIL&WATER-2**

Condition of Certification **SOIL&WATER-2** requires SERC, LLC to prepare and submit a Water Quality Management Plan (WQMP) to the Orange County Public Works Department (OCPW) for review at least 180 days prior to site mobilization. SERC, LLC requests the verification timeline be reduced to 120 days before site grading. Therefore, SERC, LLC request the FSA include the following modifications to the Verification to Condition of Certification **SOIL&WATER-2**.

Verification: At least 1~~8~~***2***0 days prior to site ~~mobilization~~ ***grading***, the project owner shall provide a WQMP for post-construction storm water BMPs to the CPM and to the Orange County Public Works Department. Thirty days prior to Stanton ~~construction~~ ***grading*** activities, the project owner shall submit to the CPM verification of the county's completed review of the WQMP. Within ten (10) days of its mailing or receipt, the project owner shall submit to the CPM all copies of any relevant correspondence between the project owner and the county regarding storm water management.

Pages 4.10-30 and 31, Condition of Certification **SOIL&WATER-8**

SERC, LLC requests that the timeline for obtaining an encroachment permit for the construction of the vehicle and utility bridges be tied to the construction of those bridges and not site mobilization. This would allow the project to engage in activities that do not require the bridge encroachment permits but would ensure construction of the bridges could not be undertaken without the issuance of the encroachment permit by Orange County Public Works Department. SERC, LLC requests the following modifications.

SOIL&WATER-8 The project owner shall obtain an encroachment permit for the construction of the vehicle and utility bridges from the Orange County Public Works Department in accordance with Orange County Code – Title 9, Division 2, Article 2, Sections 9-2-40 and 9-2-50. The project owner shall pay all necessary fees to Orange County Public Works Department for compliance with the permit review and approval process. The project owner shall submit the encroachment permit application package to Orange County Public Works Department and the CPM for review and approval prior to ***bridge*** construction. The project owner shall also provide a copy of the approved permit to the CPM.

Verification: At least ninety (90) days prior to ~~site mobilization~~ ***bridge construction***, the project owner shall provide a copy of the application package for the encroachment permit and any comments from Orange County Public Works Department to the CPM for review and approval. At least 30 days prior to ~~site mobilization~~ ***bridge construction***, the project owner shall submit a copy of the final approved permit from Orange County Public Works Department to the CPM for review and approval.

TRAFFIC AND TRANSPORTATION

Pages 4.11-27 and 28, Condition of Certification **TRANS-2**

Condition of Certification **TRANS-2** requires the Traffic Control Plan to include flaggers to assist construction workers to cross the railroad. SERC, LLC requests this requirement be deleted because it is not required by an applicable law, ordinance, regulation or standard (LORS) nor is necessary to mitigate any significant impact. First, the train is very

infrequent with approximately four train-trips per week on UPRR's Stanton Industrial Lead, with trains limited to 10 miles per hour with observed arrival and departure times during the day not coinciding with construction arrival and departure times. Second, the crossing is equipped with automated crossing signals. Given these circumstances, adult construction workers do not need a flagger to ensure they cross the railroad safely. Therefore, SERC, LLC request the last bullet in Condition of Certification **TRANS-2** be deleted.

Page 4.11-29, Condition of Certification **TRANS-6**

For the reasons discussed above relating Condition of Certification **TRANS-2**, SERC, LLC requests that the requirement for a flagger contained in Condition of Certification **TRANS-6** be deleted as follows.

> **TRANS-6 RAIL CROSSING SAFETY PLAN**
> Prior to any construction-related ground disturbance, the project owner shall develop and implement a rail crossing safety plan for construction that addresses construction-related pedestrian activity (including workers walking between the parking area and the site or working at the site), construction vehicles, and heavy/oversize loads. ~~The rail crossing safety plan must include plans for a flagger at the railroad tracks during worker arrival and departure times to ensure safe worker crossing.~~

WASTE MANAGEMENT

Page 4.14-22, New Proposed Condition of Certification **WASTE-10**

As described in the discussion of soil export and disposal in the Project Description section of these comments, SERC, LLC has proposed new Condition of Certification **WASTE-10** to ensure that the SERC, LLC has the appropriate approval from the Orange County Waste and Recycling to dispose of the excess soils at the Olinda Alpha Landfill.

> ***WASTE-10*** ***Prior to transportation of soils for disposal to the Olinda Alpha Landfill, the project owner shall obtain the approval to dispose soils at the Olinda Alpha Landfill from Orange County Waste and Recycling.***
>
> ***Verification:*** ***At least 30 days prior to transportation of soils for disposal to the Olinda Alpha Landfill, the project owner shall submit a Soils Information Form to Orange County Waste and Recycling and the CPM.***

At least 5 days prior to transportation of soils for disposal to the Olinda Alpha Landfill, the project owner shall submit to the CPM Orange County Waste and Recycling's correspondence documenting its ability to accept the soils for disposal.

WORKER SAFETY AND FIRE PROTECTION

Page 4.15-19, Condition of Certification **WORKER SAFETY-8**

Condition of Certification **WORKER SAFETY-8** includes the requirement that the battery energy storage system obtain UL 9540 Certification. SERC, LLC requests that the language be modified to also accept the Residential Engineer's certification that the battery energy storage system meets the requirements of UL 9540 as an alternate form of compliance with the safety requirements. The reason SERC, LLC requests the modification is that, as the battery energy storage systems are evolving rapidly, it may be that the time it takes to obtain Certification from UL Corporation (UL) may be dependent on the system vendor's and/or UL's ability to issue a certification and not the system's ability to meet 9540 requirements. To allow the SERC to proceed with construction and installation of the most effective battery energy storage system design while ensuring it will meet the substantive requirements of UL 9540, SERC, LLC requests the following modifications to Condition of Certification **WORKER SAFETY-8**. Additionally, we request the timing for demonstration compliance be tied to the actual construction of the battery energy storage system and not overall site construction.

WORKER SAFETY-8 The project owner shall ensure that the lithium ion battery energy storage system has UL Standard for Safety for Energy Storage Systems and Equipment, UL 9540 certification ***or obtains certification from the Residential Engineer that it meets the requirements of UL 9540***. The project owner shall submit the certification along with the fire protection drawings and specifications for the ESS to the Orange County Fire Authority for review and comment and to the CPM for review and approval. The project owner shall also collaborate with the Orange County Fire Authority to assist the development of standard operating procedures for first responders to implement when confronting a fire occurring within the lithium ion ESS located on site.

Verification: At least 60 days prior to the start of construction ***of the battery energy storage system***, the project owner shall provide ***either*** UL 9540 certification ***or certification from the Residential Engineer that the battery energy storage system meets the requirements of UL 9540*** along with the fire protection drawings and specifications for the ESS to the Orange County Fire Authority for review and comment and to the CPM for review and approval. At least 60 days prior to commissioning, the project owner shall provide a copy of a letter sent from the project owner to the OCFA offering collaboration and assistance in developing standard operating procedures for first responders to deal with any lithium ion battery fires occurring at the project site.

TRANSMISSION SYSTEM ENGINEERING

Pages 5.5-10 through 5.5-12, Condition of Certification **TSE-3**

Condition of Certification **TSE-3** is a standard condition of certification and includes requirements that are not applicable to the SERC. For example, the SERC facility will not have a reliability criteria violation and does not trigger any network upgrades. Therefore, the condition should simply require compliance with the requirements of the Generator Interconnection Agreement. SERC, LLC requests that condition language section f) (ii) and verification language item e be deleted.

Dated: April 11, 2018

Respectfully Submitted,

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Scott A. Galati
Counsel to SERC, LLC

Attachment A

TECHNICAL MEMORANDUM

Stanton Energy Reliability Center Supplemental Traffic Analysis

PREPARED FOR: Stanton Energy Reliability Center, LLC

PREPARED BY: Lisa Valdez, CH2M

DATE: March 27, 2018

The Stanton Energy Reliability Center (SERC) is a proposed simple-cycle natural gas-fired combustion turbine peaking power plant integrated with battery technology. The project is located on west side of Dale Avenue, north of Katella Avenue and south of West Cerritos Avenue, in the City of Stanton, Orange County, California. Primary access to the site is from Beach Boulevard (State Route 39) from either the north or south, to West Cerritos Avenue or Katella Avenue, and to Dale Avenue.

An Application for Certification (AFC) was filed with the California Energy Commission in October 2016, and evaluated the potential effects of the SERC on traffic and transportation. This technical memorandum was prepared to address the potential transportation effects of newly proposed dirt and asphalt export activities that were not included in the original analysis. The project is proposing to export excess soils and remove and export asphalt concrete waste to the Olinda Alpha Landfill in Brea, California.

Based on the analysis described below, the additional dirt and asphalt export activities would not create any new significant impacts to traffic and transportation that were not previously identified and considered in the AFC. Due to anticipated hours of export and duration of construction phases, the addition of the newly identified export activities does not result in more hourly or daily construction trips than the maximum number of trips that were evaluated in the AFC. There would be no change in the findings contained in AFC Section 5.12, Traffic and Transportation.

Export Activities

The project proposes to export excess soils and asphalt concrete waste to the Olinda Alpha Landfill located at 1942 North Valencia Avenue in Brea. The soil exporting activities will require a maximum of 36 truckloads per day (or six truckloads per hour) for a total of approximately five weeks. The asphalt concrete removal will require an average of four truckloads per day for approximately seven days. The truck trips would be evenly distributed from approximately 9:30 a.m. to 3:30 p.m. These export activities will likely occur in several phases, but will not overlap with each other or with the peak construction activities that were evaluated in the AFC. A large portion of the excess soils will be exported before starting the other main construction activities. Therefore, during the peak export activities there would be a maximum of 36 truckloads per day, associated with the dirt fill removal. Consistent with the Highway Capacity Manual 2010 guidelines, the truck trips are converted to passenger car equivalent (PCE) trips at a ratio of 1.5 passenger cars for each truck, resulting in 54 PCEs per day.

Export Traffic Distribution

As a conservative estimate, it is assumed that all the export-related truck trips (54 PCEs) will travel to the Olinda Alpha Landfill via State Route (SR) 39 (Beach Boulevard), SR 91 and SR 57. However, the project is in a highly urbanized area with direct access to numerous freeways, highways, and major

arterials. Many routes could be used to access the site and the landfill, and the trucks could be more broadly distributed over the regional road network.

AFC Findings

The AFC examined the potential effects on roadway and intersection level of service (LOS) expected during the peak construction period. Based on the construction data, including the number of delivery vehicles, haul vehicles, and workers, the project was estimated to generate a maximum of 207 average daily trips, with 78 trips occurring during each peak hour. The construction-related project trips were assumed to travel through the intersections along Beach Boulevard between I-405 to the south and I-5 to the north. Highway routes would include I-5, SR 91, I-405, and SR 22. Even with a slightly different distribution pattern, the project-added construction trips on the study roadways and through the study intersections would be higher than the export-related truck trips. Therefore, the analysis in the AFC is a more conservative analysis of the potential project-related traffic impacts than needed for the export activities.

The analysis found that the study intersections are currently operating at LOS D or better during both peak hours; only one intersection is operating at LOS D during the morning peak hour, and the rest of the intersections are operating at LOS C or better during both peak hours. The project peak-hour trips through the intersections represent a less than 0.2 percent increase in existing volumes, which is not enough to change the intersection from LOS D to LOS F. The study intersections will continue to operate at acceptable LOS with the construction traffic during both peak hours. In addition, the project trips represent a minimal increase in freeway traffic, and no impacts to the freeway operating conditions are anticipated.

The project will also include a Construction and Demolition Transportation Management Plan to address the movement of workers, vehicles, and materials, including arrival and departure schedules and designated workforce and delivery routes. The project owner will consult with all applicable local jurisdictions, including but not limited to California Department of Transportation (Caltrans) and the City of Stanton in the preparation and implementation of the Transportation Management Plan. The Transportation Management Plan will be implemented during the export activities.

The construction-related project traffic, including the traffic generated during the additional export activities, would not result in a significant impact to the surrounding roadways or intersections.

APPENDIX 5.1E

Construction Emissions and Impact Analysis

Construction Phases

Construction of SERC is expected to last approximately 12 months. Actual construction activities will occur during months 1 through 12, while commissioning, testing, and startup will occur in months 13 to 14. Construction will occur 5 days per week, between the hours of 8 am and 5 pm. The peak construction workforce is expected to be on site during months 7 and 8. Offsite linears will be constructed during months 4 through 6.

The construction will occur in the following four main phases:

- Mobilization and site preparation;
- Foundation work;
- Construction/installation of major structures and equipment; and,
- Commissioning, testing, and startup

The main site consists of two parcels (east parcel at 1.764 acres, and the west parcel at 2.214 acres) for a total of approximately 3.978 acres (only 3.173 acres will be disturbed during construction). The site is essentially flat. A laydown yard will be located on the main site. The proposed facility power block and support systems will be constructed on the east parcel. The proposed battery building will be constructed on the west parcel, and will consist of a battery storage building and infrastructure to support the battery (power storage) systems. The site is currently vacant. The site is currently level, and as such, the site will require only minimum grading and leveling prior to construction of the power block and support systems. Site preparation includes finish grading, excavation of footings and foundations, and backfilling operations. After site preparation is finished, the construction of the foundations and structures is expected to begin. Once the foundations and structures are finished, installation and assembly of the mechanical and electrical equipment are scheduled to commence. The proposed offsite linears (gas line, underground transmission line, water line, and sewer line) are anticipated to create a disturbance area equal to 4.59 acres.

Fugitive dust emissions from the construction of SERC will result from:

- Dust entrained during site preparation and finish grading/excavation at the construction site;
- Dust entrained during onsite travel on paved and unpaved surfaces;
- Dust entrained during aggregate and soil loading and unloading operations; and
- Wind erosion of areas disturbed during construction activities.

Combustion emissions during construction will result from:

- Exhaust from the Diesel construction equipment used for site preparation, grading, excavation, and construction of onsite structures;

- Exhaust from water trucks used to control construction dust emissions;
- Exhaust from Diesel-powered welding machines, electric generators, air compressors, and water pumps;
- Exhaust from pickup trucks and Diesel trucks used to transport workers and materials around the construction site;
- Exhaust from Diesel trucks used to deliver concrete, fuel, and construction supplies to the construction site; and,
- Exhaust from automobiles used by workers to commute to the construction site.

To determine the potential daily construction impacts, exhaust and dust emission rates have been evaluated for each source of emissions. Daily fugitive dust emissions are expected to be most prominent during months 1-5 of construction when site preparation occurs, i.e., grading, cut and fill operations, and foundation excavations. Exhaust emissions are expected to be most prominent in months 6 through 11 during the installation of the major mechanical equipment. Annual emissions are based on the total equipment mix during the 12-month construction period.

Available Mitigation Measures

The following mitigation measures are proposed to control fugitive dust and exhaust emissions from the diesel heavy equipment used during construction of SERC:

- The applicant will have an on-site construction mitigation manager who will be responsible for the implementation and compliance of the construction mitigation program. The documentation of the ongoing implementation and compliance with the proposed construction mitigations will be provided on a periodic basis.
- All unpaved roads and disturbed areas in the project and laydown construction sites will be watered as frequently as necessary to control fugitive dust. The frequency of watering will be on a minimum schedule of three (3) times during the daily construction activity period. Watering may be reduced or eliminated during periods of precipitation.
- Onsite vehicle speeds will be limited to 5 miles per hour on unpaved areas within the project construction site.
- The construction site entrance(s) will be posted with visible speed limit signs.
- All construction equipment vehicle tires will be inspected and cleaned as necessary to be free of dirt prior to leaving the construction site via paved roadways.
- Gravel ramps will be provided at the tire cleaning area.
- All unpaved exits from the construction site will be graveled or treated to reduce track-out to public roadways.

- All construction vehicles will enter the construction site through the treated entrance roadways, unless an alternative route has been provided.

- Construction areas adjacent to any paved roadway will be provided with sandbags or other similar measures as specified in the construction Storm Water Pollution Prevention Plan (SWPPP) to prevent runoff to roadways.

- All paved roads within the construction site will be cleaned on a periodic basis (or less during periods of precipitation), to prevent the accumulation of dirt and debris.

- The first 500 feet of any public roadway exiting the construction site will be cleaned on a periodic basis (or less during periods of precipitation), using wet sweepers or air filtered dry vacuum sweepers, when construction activity occurs or on any day when dirt or runoff from the construction site is visible on the public roadways.

- Any soil storage piles and/or disturbed areas that remain inactive for longer than 10 days will be covered, or shall be treated with appropriate dust suppressant compounds.

- All vehicles that are used to transport solid bulk material on public roadways and that have the potential to cause visible emissions will be covered, or the materials shall be sufficiently wetted and loaded onto the trucks in a manner to minimize fugitive dust emissions. A minimum freeboard height of two (2) feet will be required on all bulk materials transport.

- Wind erosion control techniques (such as windbreaks, water, chemical dust suppressants, and/or vegetation) will be used on all construction areas that may be disturbed. Any windbreaks installed to comply with this condition will remain in place until the soil is stabilized or permanently covered with vegetation.

- Disturbed areas will be re-vegetated as soon as practical.

To mitigate exhaust emissions from construction equipment, the applicant is proposing the following:

- The applicant will work with the construction contractor to utilize to the extent feasible, EPA-ARB Tier 2/Tier 3 engine compliant equipment for equipment over 100 horsepower.

- Insure periodic maintenance and inspections per the manufacturers specifications.

- Reduce idling time through equipment and construction scheduling.

- Use California low sulfur diesel fuels (<=15 ppmw S).

Estimation of Emissions with Mitigation Measures

Tables 5.1E-1 and 5.1E-2 show the estimated mitigated period, monthly, and daily heavy equipment exhaust and fugitive dust emissions for the onsite and offsite construction periods. Detailed emission calculations and support data are included in Tables 5.1E-4 through 5.1E-7, including estimates of CO2e.

Table 5.1E-1 On-Site Construction Emissions Summary						
Activity Category	**Tons/Period**					
	VOC	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Equipment Exhaust	0.65	3.61	4.684	0.008	0.297	0.294
Fugitive Dust	0	0	0	0	0.2654	0.056
Unpaved Road Dust	0	0	0	0	0.44328	0.0443
Paved Road Dust	0	0	0	0	0.004	0.001
Wind Blown Dust	0	0	0	0	0.0002	0.0001
	On-Site Emissions Tabulations					
	VOC	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Total Tons/Period	0.650	3.610	4.684	0.008	1.010.994	0.3964
Total Tons/Year	0.650	3.610	4.684	0.008	1.010.994	0.3964
Lbs/Month	108.3	601.7	780.6	1.41	168.305.66	65.9365
Lbs/Day	4.92	27.35	35.48	0.06	7.6553	3.02.98

Table 5.1E-2 Off-Site Construction Emissions Summary						
Activity Category	**Tons/Period**					
	VOC	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Equipment Exhaust	0.163	0.915	1.175	0.002	0.079	0.078
Fugitive Dust	0	0	0	0	0.013	0.003
Delivery/Hauling Exhaust	0.414389	1.90788	4.795513	0.012	0.24127	0.19684
Site Support Vehicle Exhaust	0.054	0.478	0.045	0.001	0.009	0.006
Worker Commute Exhaust	0.217	1.912	0.180	0.004	0.036	0.024
Unpaved Road Dust	0	0	0	0	0	0
Paved Road Dust	0	0	0	0	2.19957	0.5430
Track Out Dust	0	0	0	0	0.0021	0.0002
	Off-Site Emissions Tabulations					
	VOC	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**
Total Tons/Period	0.84824	5.204093	6.1965.914	0.019	2.57923	0.84725
Total Tons/Year	0.84824	5.204093	6.1965.914	0.019	2.57923	0.84725
Lbs/Month	141.437.4	867.448.8	1032.6985.6	3.2311	429.90.6	141.137.5
Lbs/Day	6.4324	39.438.58	46.944.80	0.154	19.5412	6.4125

Total CO2e emissions are as follows:

On-site construction CO2e = 764 tons/yr (construction period).

Off-site construction CO2e = ~~1941~~2019 tons/yr (construction period).

Analysis of Ambient Impacts from Facility Construction

Ambient air quality impacts from emissions during the construction of SERC were estimated using an air quality dispersion modeling analysis. The modeling analysis considers the construction site location, the surrounding topography, and the sources of emissions during construction, including vehicle and equipment exhaust emissions and fugitive dust.

Existing Ambient Levels

As with the modeling analysis of project operating impacts (Section 5.1), monitoring stations delineated in Section 5.1 were used to establish the ambient background levels for the construction impact modeling analysis. Appendix 5.1B, Table 5.1B-4 shows the maximum concentrations of NO_x, SO_2, CO, PM2.5, and PM10 recorded for 2013 through 2015 at those monitoring stations, as well as the modeled impact concentrations for the construction emissions.

Dispersion Model

As in the analysis of project operating impacts, the USEPA-approved model AERMOD (version15181) was used to estimate ambient impacts from onsite construction activities. A detailed discussion of the AERMOD dispersion model and the associated processing programs AERSURFACE, AERMET, and AERMAP is included in Section 5.1. As with the operational impact analysis, the Anaheim and Costa Mesa air quality monitoring site meteorology was processed in accordance with USEPA guidance.

The emission sources for the construction site were grouped into two categories: exhaust emissions and dust emissions. Combustion equipment exhaust emissions were modeled as eighteen (18) 3.048 meter high point sources (exhaust parameters of 750 Kelvins, 64.681 m/s exit velocity, and 0.1524 meter stack diameter) placed at regular 150-foot intervals around the construction area. Construction fugitive dust emissions were modeled as an area source covering the construction area with an effective plume height of 0.5 meters. Combustion and fugitive emissions were assumed to occur for 8 hours/day (8 AM to 5 PM, accounting for labor force downtime for meals and mandatory break periods) consistent with the expected period of onsite construction activities generating both exhaust emissions and fugitive dust. The construction impacts modeling analysis generally used the same receptor locations and meteorological data as used for the project operating impact analysis. Exceptions were that only the 10-meter fenceline and 20-meter downwash receptor grids were modeled since maximum impacts will occur in the immediate project vicinity and the FASTALL option was utilized to minimize runtimes for the area source and the larger number of point sources modeled. A detailed discussion of the receptor locations and meteorological data is included in Section 5.1. To determine the construction impacts on short-term ambient standards (24 hours and less), the daily onsite construction emission

levels shown in Table 5.1E-1 were used. For pollutants with annual average ambient standards, the annual emission levels as shown in Table 5.1E-1 were used.

Modeling Results

Based on the emission rates of NO_x, SO_2, CO, PM2.5, and PM10, the modeling options, receptor grids, and meteorological data, AERMOD calculates short-term and annual ambient impacts for each pollutant. As mentioned above, the modeled 1-hour, 3-hour 8-hour, and 24-hour ambient impacts are based on the daily emission rates of NO_x, SO_2, CO, PM2.5, and PM10 spread over the estimated daily hours of operation. The annual impacts are based on the annual emission rates of these pollutants.

The annual average concentrations of NO_2 were computed following the revised USEPA guidance for computing these concentrations (August 9, 1995 Federal Register, 60 FR 40465). The annual average was calculated using the ambient ratio method (ARM) with the national default value of 0.75 for the annual average NO_2/NO_x ratio. The 1-hour NO2 impacts were modeled using the ozone limiting method (OLM) as described in the Section 5.1.6 for the commissioning impacts.

The modeling analysis results are summarized in Table 5.1E-3. In general, the impacts are shown as the maximum impact for the five-year period for the Federal as well as the state standards. This is conservative in that the short-term Federal standards are usually based on a lesser modeled value, like the highest value of the second-highs for each year (e.g., 1-hour and 8-hour CO and 3-hour and 24-hour SO_2) or the five-year average of the annual 98th percentile daily maximum values (e.g., 1-hour NO_2 and 24-hour PM2.5). Also included in the table are the maximum background levels that have occurred in the last three years and the resulting total ambient impacts (modeled construction impacts plus background concentrations). Like the modeled impacts, these background concentrations are generally the maximum measured concentration over the three-year period, which are conservative with respect to the Federal standards as discussed above. The two exceptions shown in the table below are for the Federal standards for 1-hour NO_2 background (average of the 98th percentile daily 1-hour maxima from each of the three years) and 24-hour PM2.5 background (average of the 98th percentile from each of the three years. As shown in Table 5.1E-3, modeled construction impacts due to facility emissions alone for all pollutants are below the most stringent state and Federal standards.

TABLE 5.1E-3 MODELED MAXIMUM CONSTRUCTION IMPACTS

Pollutant	Averaging Time	Maximum Construction Impacts ($\mu g/m^3$)	Background ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)	State Standards ($\mu g/m^3$)	Federal Standards ($\mu g/m^3$)
NO_2[a]	1-hour Annual	29.4 1.01	152.6/116.6 50.9	182.0/146.0 51.9	339 57	188 100
SO_2	1-hour 3-hour 24-hour Annual	0.07 0.03 0.01 0.002	23.1 23.1 3.7 0.8	23.2 23.1 3.7 0.8	655 - 105 0	196 1300 - 80
CO	1-hour 8-hour	28.43 13.7	3910 2889	3938 2903	23,000 10,000	40,000 10,000

PM10	24-hour Annual[b]	27.4 7.6	84 26.7	111 34.3	50 20	150 -
PM2.5	24-hour Annual	3.9 1.15	27.7 10.5	31.6 11.7	- 12	35 12.0

Notes:
[a] ARM applied for annual average, using national default 0.75 ratio, and OLM for 1-hour averages.
[b] Annual Arithmetic Mean.

Maximum modeled construction impacts, when added to background concentrations only exceed the state PM10 standards, and only because the background concentrations already exceed the state standards. All of the other maximum modeled construction impacts, when added to representative worst-case background concentrations, are less than the applicable state or Federal standards. Modeled SERC construction particulate impacts shown are not unusual in comparison to the modeling results for most construction projects; actual impacts for construction sites that use good dust suppression techniques and low-emitting vehicles typically would not be expected to cause exceedances of air quality particulate standards. The input and output modeling files are being provided electronically to the appropriate agencies.

Attachments - Detailed Emission Calculations and Support Data

Table 5.1E-4 Construction Schedule

Table 5.1E-5 Construction Manpower Schedule

Table 5.1E-6 Construction Equipment Schedules (2 Pages)

Table 5.1E-7 Construction Support Data and Emissions Calculations (24 Pages)

Table 5.1E-7 Part 1
Assumptions for Exhaust Emissions and Fugitive Dust Emissions Estimates and Other Offsite Emissions Estimates

Onsite Fugitive Dust from Construction Activities
(1) MRI Report, South Coast AQMD Project No. 95040, March 1996, Level 2 Analysis Procedure.
MRI Report uncontrolled factor of 0.11 tons/acre/month is based on 168 hours per month of const activity.
For an activity rate of ~176 hrs/month, the adjusted EF would be ~0.12 tons/acre/month (uncontrolled).
(2) Soil Handling (Cut and Fill), EPA, AP-42, Section 13.2.4., 11/06. For SERC, cut and fill, and trenching, is balanced on site.
(3) URBEMIS, Version 9.2.4, User's Manual Appendix A, page A-6.
(4) CARB Area Source Methodology, Section 7.7, 9/02.
(5) WRAP Fugitive Dust Handbook, 9/06.
(6) USEPA, AP-42, Section 13.2.3, 2/10.
(7) Estimating PM Emissions from Construction Operations, USEPA, MRI, 9/99.
(8) Wind speed data for Anaheim met station. Annual avg wind speed = 4.2 mph, % time wind speeds > 12 mph = 2%
(9) Soil Moisture; 10.7% per the Applicant
(10) typical value is 10% of total acreage, for SERC the daily disturbance values are conservatively high based on the applicant supplied data
(11) SCAQMD CEQA Handbook 1993.
(12) SCAQMD, Sample Construction Scenarios for Projects Less than Five Acres, Fugitive Dust Mitigations, February 2005.

Delivery-Site Support-Worker Commute Emissions
Emissions Factors: SCAQMD 2018 EFs: http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook
EFs for 2018 used for entirety of construction period into 2019, conservative assumption.
CARB-CEIDARS, Updated Fractions for PM Profiles: PM2.5 = 0.991 of PM10 for Diesel Exhaust, and 0.998 for Gasoline Vehicles.
All hauling and delivery is assumed to be done by HDDTs (worst case assumption due to some hauling expected by MDGTs)
All site support vehicles are assumed to be LDTs-gasoline engines (light duty trucks).
All worker commute vehicles are asssumed to the LDAs/LDTs-gasoline engines.
Worker vehicles will be parked offsite on a paved or gravelled area.

Trackout Emissions
PM2.5 fraction of PM10 assumed to be 0.169 (CARB CEIDARS updated fraction values) for paved roads.
Trackout on paved roads from site is usually evaluated for the first 0.1 miles.
# of controlled ingress/egress points planned for site construction = 2
EPA, AP-42, Section 13.2.1, January 2011.
Site soil silt content = 15.5% per the Applicant geotech report

Wind Blown Dust from Soil Storage Piles
MDAQMD, Emissions Inventory Guidance, Mineral Handling and Processing Industries, April 2000.
USEPA, AP-42, Section 13.2.2, Unpaved Roads, Figure 13.2.2-1, Thornethwaite Precipitation Data,
or Precipitation day data from CalEEMod technical appendix.
Soil storage areas only, open cut and fill areas are not soil storage areas.
*Best estimate from site prep contractor and/or grading plan engineer

Unpaved Road Fugitive Emissions
Ref: USEPA, AP-42, Section 13.2.2, Nov 2006
See AP-42 Section 13.2.2 for all equations, data ranges, data explanations, etc.
Assumed road type: Industrial Unpaved Surfaces
Roads will be paved by the end of month 9.

Paved Road Fugitive Emissions
Ref: USEPA, AP-42, Section 13.2.1, Jan 2011.
See AP-42 Section 13.2.1 for all equations, data ranges, data explanations, etc.
Roads will be paved starting in month 10.
Construction Equipment Exhaust Emissions
1. Fuel Consumption Rates
Rice Solar AFC, Construction Appendix, October 2009.
Tables 5.1A-28, 29, 39, 72.
Avg diesel BSFC value is 0.032 gal/Hp-Hr. Factor increased by 20% to account for variability: Use 0.039 gal/Hp-Hr.
For gasoline const equipment: SCAQMD PR-XXI, March 1995, Staff Report, Att B: 0.11 gal/Hp-Hr

2. Construction equipment exhaust emissions will be calculated on an annual basis using the site specific equipment list, HP ratings, hours of use, days of use, etc. Annual emissions will be apportioned to monhtly and daily values based on the estimated construction schedule.

3. The equipment list derived from the South Coast AQMD Offroad database will be used to establish the various equipment categories. Composite avg HP values were derived from CalEEMod Technical Appendices.
Emissions Factors are the composite factors per the SCAQMD Offroad database for the construction start year.
Emissions factors for the start year will be used for all subsequent years if the project is less than 5 years in length.
CalEEMod uses the statewide construction equipment mix and emissions factors.
There is no data that indicates that the use of the SCAQMD composite factors will introduce a significant error as as compared to the CalEEMod equipment list or emissions factors.
CalEEMod (App D) EFs will be used for years after 2025.

4. CARB-CEIDARS, Updated Size Fractions for PM Profiles: PM2.5 = 0.991 of PM10 : Diesel Vehicle Exhaust

5. Trench construction times per: Southern Regional Water Pipeline Alliance, 3/08.
Optimum trench construction progress rate is 80m (260ft) per day.
Non-optimum trench construction progress rate is 30m (100 ft) per day.
An average progress of 180 ft/day is used where applicable, or the applicant supplied timeframe.

6. Paving speeds can range from 3 to 15 m/min depending on asphalt delivery rates and required compaction thickness.
A minium paving speed of 3 m/min (10 ft/min or 600 ft/hr) was used where applicable.
The minimum speed is based upon a 3" compacted layer, 12 ft lane width, with an asphalt delivery rate of ~ 140 tons/hr.
Ref: Asphalt Paving Speed, Pavement Worktip No. 31, AAPA, 11/2001.

7. GWP values: CH4=25, N2O=298, ref: 40 CFR 98 Subpart A, Table A-1.
40 CFR 98 Subpart A, Table A-1
40 CFR 98 Subpart C, Tables C-1 and C-2
CARB, Mandatory GHG Reporting Program, Table 4, Appendix A, 2007

8. Gasoline EFs: EPA OMS-AMD Report NR-009A, 2-13-98, and SCAQMD EMFAC 2007 CEQA Tables, 2016.

9. Fugitive Dust Mitigation Values were derived from the SCAQMD Mitigation Measures and Control Efficiency tables, Rev 4/2007.
Calculation methodology for combining two or more control techniques derived from SCAQMD CEQA Handbook, 1993, Section A-9, Examples 1 and 2. Control techniques are cumulative in the multiplicative sense.

10. Other site specific data: linear data
a. Gas pipeline, 2.75 miles long, 10ft wide ROW, 2.5 X 6 ft trench: 3.33 acres, 8067 yd3
b. 66 Kv underground trans line, 0.25 mile long, 40 ft wide ROW, 8ft X 12 ft trench: 1.21 acres, 4693 yd3
c. water lines (2), 130 ft long total, 10 ft wide ROW, 2 ft X 5ft trench: 0.03 acres, 48 yd3
d. sewer line, 70 ft long, 10 ft wide ROW, 2 ft X 7 ft trench: 0.02 acres, 36 yd3

Table 5.1E-7 Part 2 On and Off-Site Construction Emissions Calculations

Part 2 of Table 5.1E-7 contains the emissions calculations for SERC construction.

There are a total of 22 pages in Part 2.

CONSTRUCTION EQUIPMENT EXHAUST EMISSIONS

Project: SERC Phase ID: **Main Site Construction**

Assumptions:

Composite fuel consumption rates for const equipment: diesel 0.039 gal/hp-hr; gasoline 0.11 gal/hp-hr

Construction Schedule:	12	months	Construction Totals	1.00	period, yrs.
	22	days/month		264	work days
	8.00	hours/day		2112	work hours

Anticipated Construction Start Year: 2018

Equipment types and use rates supplied by the Applicant.

Diesel Equipment Category	Weighted Average HP	# of Units Used for Project	Avg Use Rate Hrs/day	# of Days On Site (each)	Total Hrs/Day	Total Hrs per Const Period	Total HP-Hrs Period
Aerial Lifts	63	1	8	22	8	176	11088
Air Compressors	78	0	0	0	0	0	0
Bore-Drill Rigs	206	0	0	0	0	0	0
Cement Mixers	9	0	0	0	0	0	0
Concrete/Industrial Saws	81	9	4	22	36	792	64152
Cranes	226	7	6	22	42	924	208824
Crawler Tractors/Dozers	208	2	4	22	8	176	36608
Crushing/Processing Eq.	85	0	0	0	0	0	0
Dumpers/Tenders/Water Trucks	16	16	4	22	64	1408	22528
Excavators	163	4	8	22	32	704	114752
Forklifts	89	8	7.6	22	60.8	1337.6	119046.4
Generator Sets	84	18	8	22	144	3168	266112
Graders	175	5	8	22	40	880	154000
Off-Highway Tractors	123	0	0	0	0	0	0
Off-Highway Trucks	400	0	0	0	0	0	0
Other Diesel Construction Eq. (H2O Trk)	172	15	8	22	120	2640	454080
Other General Industrial Eq.	88	0	0	0	0	0	0
Other Material Handling Eq.	167	0	0	0	0	0	0
Pavers	126	1	8	22	8	176	22176
Paving Eq. Other	131	1	8	22	8	176	23056
Plate Compactors	8	8	4.6	22	36.8	809.6	6476.8
Pressure Washers	13	0	0	0	0	0	0
Pumps	84	0	0	0	0	0	0
Roller Compactors	81	10	5.7	22	57	1254	101574
Rough Terrain Forklifts	100	22	4	22	88	1936	193600
Rubber Tired Dozers	255	0	0	0	0	0	0
Rubber Tires Loaders	200	2	4	22	8	176	35200
Scrapers	362	2	6	22	12	264	95568
Signal Boards	6	0	0	0	0	0	0
Skid Steer Loaders	65	10	4	22	40	880	57200
Surfacing Eq.	254	0	0	0	0	0	0
Sweepers/Scrubbers	64	0	0	0	0	0	0
Tractors	98	5	4.3	22	21.5	473	46354
Front End Loaders	98	4	4.3	22	17.2	378.4	37083.2
Backhoes	98	4	4.3	22	17.2	378.4	37083.2
Trenchers	81	6	4	22	24	528	42768
Welders	46	14	4.7	22	65.8	1447.6	66589.6
Gasoline Const Equipment	175	12	4	22	48	1056	184800

CO2e Multipliers:

Diesel Fuel: 1.003471

Gasoline: 1.003583

Const Period Diesel Hp-Hrs = 2215919

Const Period Gasoline Hp-Hrs = 184800

Const Period Diesel Fuel Use = 86421 gals

Const Period Gasoline Fuel Use = 20328 gals

	Emissions Factors					
Diesel Equipment Category	**lbs/hr VOC (ROG)**	**lbs/hr CO**	**lbs/hr NOx**	**lbs/hr SOx**	**lbs/hr PM10**	**lbs/hr CO2**
Aerial Lifts	0.0322	0.1740	0.2152	0.0004	0.0119	34.7
Air Compressors	0.0582	0.3130	0.3935	0.0007	0.0246	63.6
Bore-Drill Rigs	0.0539	0.5011	0.4175	0.0017	0.0099	164.9
Cement Mixers	0.0087	0.0416	0.0538	0.0001	0.0022	7.2
Concrete/Industrial Saws	0.0605	0.3850	0.3959	0.0007	0.0261	58.5
Cranes	0.1012	0.4060	0.7908	0.0014	0.0318	128.6
Crawler Tractors/Dozers	0.1185	0.5387	0.7960	0.0013	0.0457	114.0
Crushing/Processing Eq.	0.1109	0.6328	0.7330	0.0015	0.0412	132.3
Dumpers/Tenders	0.0092	0.0314	0.0584	0.0001	0.0023	7.6
Excavators	0.0848	0.5160	0.5181	0.0013	0.0249	119.6
Forklifts	0.0372	0.2173	0.2186	0.0006	0.0101	54.4
Generator Sets	0.0477	0.2786	0.3759	0.0007	0.0192	61.0
Graders	0.1049	0.5812	0.7217	0.0015	0.0355	132.7
Off-Highway Tractors	0.1631	0.6762	1.2293	0.0017	0.0579	151.4
Off-Highway Trucks	0.1613	0.5634	1.0525	0.0027	0.0360	260.1
Other Diesel Construction Eq.	0.0633	0.3542	0.4478	0.0013	0.0181	122.5
Other General Industrial Eq.	0.1113	0.4591	0.8242	0.0016	0.0336	152.2
Other Material Handling Eq.	0.1050	0.4495	0.8053	0.0015	0.0324	141.2
Pavers	0.1121	0.5017	0.6241	0.0009	0.0419	77.9
Paving Eq. Other	0.0857	0.4136	0.5558	0.0008	0.0374	68.9
Plate Compactors	0.0050	0.0263	0.0314	0.0001	0.0012	4.3
Pressure Washers	0.0101	0.0562	0.0703	0.0001	0.0036	9.4
Pumps	0.0458	0.2722	0.3306	0.0006	0.0189	49.6
Roller Compactors	0.0683	0.3885	0.4485	0.0008	0.0291	67.0
Rough Terrain Forklifts	0.0638	0.4499	0.4219	0.0008	0.0277	70.3
Rubber Tired Dozers	0.2343	0.8819	1.8194	0.0025	0.0737	239.1
Rubber Tires Loaders	0.0861	0.4470	0.5831	0.0012	0.0300	108.6
Scrapers	0.2135	0.8418	1.6042	0.0027	0.0653	262.5
Signal Boards	0.0143	0.0916	0.1029	0.0002	0.0050	16.7
Skid Steer Loaders	0.0253	0.2146	0.1799	0.0004	0.0074	30.3
Surfacing Eq.	0.0923	0.4187	0.8043	0.0017	0.0291	166.0
Sweepers/Scrubbers	0.0681	0.4946	0.4308	0.0009	0.0251	78.5
Tractors	0.0513	0.3647	0.3331	0.0008	0.0189	66.8
Front End Loaders	0.0513	0.3647	0.3331	0.0008	0.0189	66.8
Backhoes	0.0513	0.3647	0.3331	0.0008	0.0189	66.8
Trenchers	0.1061	0.4368	0.5117	0.0007	0.0393	58.7
Welders	0.0388	0.1876	0.1941	0.0003	0.0133	25.6
Gasoline Const Equipment	0.0771	0.3855	1.08	0.00014	0.1542	14.2

	Construction Period Emissions, lbs					
Diesel Equipment Category						
	VOC	**CO**	**NOx**	**SOx**	**PM10**	**CO2**
Aerial Lifts	6	31	38	0	2	6111
Air Compressors	0	0	0	0	0	0
Bore-Drill Rigs	0	0	0	0	0	0
Cement Mixers	0	0	0	0	0	0
Concrete/Industrial Saws	48	305	314	1	21	46303
Cranes	94	375	731	1	29	118852
Crawler Tractors/Dozers	21	95	140	0	8	20067
Crushing/Processing Eq.	0	0	0	0	0	0
Dumpers/Tenders	13	44	82	0	3	10735
Excavators	60	363	365	1	18	84184
Forklifts	50	291	292	1	14	72760
Generator Sets	151	883	1191	2	61	193225
Graders	92	511	635	1	31	116814
Off-Highway Tractors	0	0	0	0	0	0
Off-Highway Trucks	0	0	0	0	0	0
Other Diesel Construction Eq.	167	935	1182	3	48	323454
Other General Industrial Eq.	0	0	0	0	0	0
Other Material Handling Eq.	0	0	0	0	0	0
Pavers	20	88	110	0	7	13716
Paving Eq. Other	15	73	98	0	7	12133
Plate Compactors	4	21	25	0	1	3492
Pressure Washers	0	0	0	0	0	0
Pumps	0	0	0	0	0	0
Roller Compactors	86	487	562	1	36	84073
Rough Terrain Forklifts	123	871	817	2	54	136064
Rubber Tired Dozers	0	0	0	0	0	0
Rubber Tires Loaders	15	79	103	0	5	19116
Scrapers	56	222	424	1	17	69297
Signal Boards	0	0	0	0	0	0
Skid Steer Loaders	22	189	158	0	6	26644
Surfacing Eq.	0	0	0	0	0	0
Sweepers/Scrubbers	0	0	0	0	0	0
Tractors	24	172	158	0	9	31595
Front End Loaders	19	138	126	0	7	25276
Backhoes	19	138	126	0	7	25276
Trenchers	56	231	270	0	21	31001
Welders	56	272	281	0	19	37062
Gasoline Const Equipment	81	407	1140	0	163	14949

Construction Equipment Exhaust Emissions Estimates

Totals	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
Lbs per const. period	1299	7221	9367	17	594	588.98	1522201
Tons per const. period	**0.65**	**3.61**	**4.68**	**0.008**	**0.30**	**0.29**	**761.1**
Monthly, Lbs	**108.3**	**601.7**	**780.6**	**1.411**	**49.53**	**49.08**	**126850.1**
Daily, Lbs	**4.9**	**27.4**	**35.5**	**0.064**	**2.25**	**2.23**	**5765.9**

CO2 from Diesel Fuel Use:	753.6	tons/period	**Total CO2e:**	763.7	tons/period
CO2 from Gasoline Use:	7.5	tons/period			

CONSTRUCTION EQUIPMENT EXHAUST EMISSIONS

Project: SERC Phase ID: **OffSite Linears Construction**

Assumptions:

Composite fuel consumption rates for const equipment: diesel 0.039 gal/hp-hr; gasoline 0.11 gal/hp-hr

Construction Schedule:	3	months	Construction Totals	0.25	period, yrs.
	22	days/month		66	work days
	8.00	hours/day		528	work hours

Anticipated Construction Start Year: 2018

Equipment types and use rates supplied by the Applicant.

Diesel Equipment Category	Weighted Average HP	# of Units Used for Project	Avg Use Rate Hrs/day	# of Days On Site (each)	Total Hrs/Day	Total Hrs per Const Period	Total HP-Hrs Period
Aerial Lifts	63	0	0	0	0	0	0
Air Compressors	78	0	0	0	0	0	0
Bore-Drill Rigs	206	0	0	0	0	0	0
Cement Mixers	9	0	0	0	0	0	0
Concrete/Industrial Saws	81	6	4	22	24	528	42768
Cranes	226	2	6	22	12	264	59664
Crawler Tractors/Dozers	208	0	0	0	0	0	0
Crushing/Processing Eq.	85	0	0	0	0	0	0
Dumpers/Tenders/Water Trucks	16	8	4	22	32	704	11264
Excavators	163	0	0	0	0	0	0
Forklifts	89	0	0	0	0	0	0
Generator Sets	84	8	8	22	64	1408	118272
Graders	175	0	0	0	0	0	0
Off-Highway Tractors	123	0	0	0	0	0	0
Off-Highway Trucks	400	0	0	0	0	0	0
Other Diesel Construction Eq.	172	0	0	0	0	0	0
Other General Industrial Eq.	88	0	0	0	0	0	0
Other Material Handling Eq.	167	0	0	0	0	0	0
Pavers	126	1	8	22	8	176	22176
Paving Eq. Other	131	1	8	22	8	176	23056
Plate Compactors	8	2	4	22	8	176	1408
Pressure Washers	13	0	0	0	0	0	0
Pumps	84	0	0	0	0	0	0
Roller Compactors	81	7	4	22	28	616	49896
Rough Terrain Forklifts	100	0	0	0	0	0	0
Rubber Tired Dozers	255	0	0	0	0	0	0
Rubber Tires Loaders	200	0	0	0	0	0	0
Scrapers	362	0	0	0	0	0	0
Signal Boards	6	7	8	22	56	1232	7392
Skid Steer Loaders	65	0	0	0	0	0	0
Surfacing Eq.	254	0	0	0	0	0	0
Sweepers/Scrubbers	64	0	0	0	0	0	0
Tractors	98	3	6	22	18	396	38808
Front End Loaders	98	2	6	22	12	264	25872
Backhoes	98	2	6	22	12	264	25872
Trenchers	81	0	0	0	0	0	0
Welders	46	6	6	22	36	792	36432
Gasoline Const Equipment	175	3	4	22	12	264	46200

CO2e Multipliers:

Diesel Fuel: 1.003471

Gasoline: 1.003583

Const Period Diesel Hp-Hrs = 462880

Const Period Gasoline Hp-Hrs = 46200

Const Period Diesel Fuel Use = 18052 gals

Const Period Gasoline Fuel Use = 5082 gals

	Emissions Factors					
Diesel Equipment Category	**lbs/hr VOC (ROG)**	**lbs/hr CO**	**lbs/hr NOx**	**lbs/hr SOx**	**lbs/hr PM10**	**lbs/hr CO2**
Aerial Lifts	0.0322	0.1740	0.2152	0.0004	0.0119	34.7
Air Compressors	0.0582	0.3130	0.3935	0.0007	0.0246	63.6
Bore-Drill Rigs	0.0539	0.5011	0.4175	0.0017	0.0099	164.9
Cement Mixers	0.0087	0.0416	0.0538	0.0001	0.0022	7.2
Concrete/Industrial Saws	0.0605	0.3850	0.3959	0.0007	0.0261	58.5
Cranes	0.1012	0.4060	0.7908	0.0014	0.0318	128.6
Crawler Tractors/Dozers	0.1185	0.5387	0.7960	0.0013	0.0457	114.0
Crushing/Processing Eq.	0.1109	0.6328	0.7330	0.0015	0.0412	132.3
Dumpers/Tenders	0.0092	0.0314	0.0584	0.0001	0.0023	7.6
Excavators	0.0848	0.5160	0.5181	0.0013	0.0249	119.6
Forklifts	0.0372	0.2173	0.2186	0.0006	0.0101	54.4
Generator Sets	0.0477	0.2786	0.3759	0.0007	0.0192	61.0
Graders	0.1049	0.5812	0.7217	0.0015	0.0355	132.7
Off-Highway Tractors	0.1631	0.6762	1.2293	0.0017	0.0579	151.4
Off-Highway Trucks	0.1613	0.5634	1.0525	0.0027	0.0360	260.1
Other Diesel Construction Eq.	0.0633	0.3542	0.4478	0.0013	0.0181	122.5
Other General Industrial Eq.	0.1113	0.4591	0.8242	0.0016	0.0336	152.2
Other Material Handling Eq.	0.1050	0.4495	0.8053	0.0015	0.0324	141.2
Pavers	0.1121	0.5017	0.6241	0.0009	0.0419	77.9
Paving Eq. Other	0.0857	0.4136	0.5558	0.0008	0.0374	68.9
Plate Compactors	0.0050	0.0263	0.0314	0.0001	0.0012	4.3
Pressure Washers	0.0101	0.0562	0.0703	0.0001	0.0036	9.4
Pumps	0.0458	0.2722	0.3306	0.0006	0.0189	49.6
Roller Compactors	0.0683	0.3885	0.4485	0.0008	0.0291	67.0
Rough Terrain Forklifts	0.0638	0.4499	0.4219	0.0008	0.0277	70.3
Rubber Tired Dozers	0.2343	0.8819	1.8194	0.0025	0.0737	239.1
Rubber Tires Loaders	0.0861	0.4470	0.5831	0.0012	0.0300	108.6
Scrapers	0.2135	0.8418	1.6042	0.0027	0.0653	262.5
Signal Boards	0.0143	0.0916	0.1029	0.0002	0.0050	16.7
Skid Steer Loaders	0.0253	0.2146	0.1799	0.0004	0.0074	30.3
Surfacing Eq.	0.0923	0.4187	0.8043	0.0017	0.0291	166.0
Sweepers/Scrubbers	0.0681	0.4946	0.4308	0.0009	0.0251	78.5
Tractors	0.0513	0.3647	0.3331	0.0008	0.0189	66.8
Front End Loaders	0.0513	0.3647	0.3331	0.0008	0.0189	66.8
Backhoes	0.0513	0.3647	0.3331	0.0008	0.0189	66.8
Trenchers	0.1061	0.4368	0.5117	0.0007	0.0393	58.7
Welders	0.0388	0.1876	0.1941	0.0003	0.0133	25.6
Gasoline Const Equipment	0.0771	0.3855	1.08	0.00014	0.1542	14.2

Diesel Equipment Category	Construction Period Emissions, lbs					
	VOC	**CO**	**NOx**	**SOx**	**PM10**	**CO2**
Aerial Lifts	0	0	0	0	0	0
Air Compressors	0	0	0	0	0	0
Bore-Drill Rigs	0	0	0	0	0	0
Cement Mixers	0	0	0	0	0	0
Concrete/Industrial Saws	32	203	209	0	14	30869
Cranes	27	107	209	0	8	33958
Crawler Tractors/Dozers	0	0	0	0	0	0
Crushing/Processing Eq.	0	0	0	0	0	0
Dumpers/Tenders	6	22	41	0	2	5368
Excavators	0	0	0	0	0	0
Forklifts	0	0	0	0	0	0
Generator Sets	67	392	529	1	27	85878
Graders	0	0	0	0	0	0
Off-Highway Tractors	0	0	0	0	0	0
Off-Highway Trucks	0	0	0	0	0	0
Other Diesel Construction Eq.	0	0	0	0	0	0
Other General Industrial Eq.	0	0	0	0	0	0
Other Material Handling Eq.	0	0	0	0	0	0
Pavers	20	88	110	0	7	13716
Paving Eq. Other	15	73	98	0	7	12133
Plate Compactors	1	5	6	0	0	759
Pressure Washers	0	0	0	0	0	0
Pumps	0	0	0	0	0	0
Roller Compactors	42	239	276	0	18	41299
Rough Terrain Forklifts	0	0	0	0	0	0
Rubber Tired Dozers	0	0	0	0	0	0
Rubber Tires Loaders	0	0	0	0	0	0
Scrapers	0	0	0	0	0	0
Signal Boards	18	113	127	0	6	20572
Skid Steer Loaders	0	0	0	0	0	0
Surfacing Eq.	0	0	0	0	0	0
Sweepers/Scrubbers	0	0	0	0	0	0
Tractors	20	144	132	0	7	26452
Front End Loaders	14	96	88	0	5	17634
Backhoes	14	96	88	0	5	17634
Trenchers	0	0	0	0	0	0
Welders	31	149	154	0	11	20277
Gasoline Const Equipment	20	102	285	0	41	3737

Construction Equipment Exhaust Emissions Estimates

Totals	**VOC**	**CO**	**NOx**	**SOx**	**PM10**	**PM2.5**	**CO2**
Lbs per const. period	326	1830	2351	4	158	156.30	330287
Tons per const. period	**0.16**	**0.91**	**1.18**	**0.002**	**0.08**	**0.08**	**165.1**
Monthly, Lbs	**108.7**	**610.0**	**783.7**	**1.278**	**52.57**	**52.10**	**110095.8**
Daily, Lbs	**4.9**	**27.7**	**35.6**	**0.058**	**2.39**	**2.37**	**5004.4**

CO2 from Diesel Fuel Use:	163.3	tons/period	**Total CO2e:**	165.7	tons/period
CO2 from Gasoline Use:	1.9	tons/period			

CONSTRUCTION ACTIVITIES FUGITIVE DUST ESTIMATES

MRI Level 2 Analysis (Notes 1, 3-7)		**Main Site Area**		
Acres Subject to Construction Disturbance Activites:		3.173		
Max Acres Subject to Construction Disturbance Activites on any day of this phase:		1.000	note (10)	
Emissions Factor for PM10 Uncontrolled, tons/acre/month:		0.12		
PM2.5 fraction of PM10 (per CARB CEIDARS Profiles):		0.21		
Activity Levels: Hrs/Day:		8		
Days/Wk:		5		
Days/Month:	Applicant Data	22		
Phase Const Period, Months:		12	**1.00**	yrs
Phase Const Period, Days:		264		

Wet Season Adjustment: (Per AP-42, Section 13.2.2, Figure 13.2.2-1, 12/03 or CalEEMod, Appendix D, Table 1.1.)

Mean # days/year with rain >= 0.01 inch:	30	
Mean # months/yr with rain >= 0.01 inch:	1.00	
Adjusted Const Period, Months:	11.00	
Adjusted Const Period, Days:	234	

Controls for Fugitive Dust: Proposed watering cycle 3 times per day

3 watering cycles/8-10 hour construction shift yields a 68% reduction, use 68% for non-desert sites. (11)(12)
Speed control of onsite const traffic to <15 mph yields a 40-70% reduction (use 50% control as conservative for site). (11)(12)

Calculated % control based on mitigations proposed:	84	% control
Conservative control % used for emissions estimates:	80	% control
	0.2	release fraction

Emissions:	PM10	PM2.5
tons/month	0.02	0.01
tons/period	0.26	0.06
avg lbs/day	2.18	0.46

Soil Handling Emissions (Cut and Fill): (2)

Total cu.yds of soil handled:		15100	Mean annual wind speed, mph: (8)			4.2
Total tons of soil handled:		78097.2	Avg. Soil moisture, %: (9)			10.7
Total days soil handled:		22	Avg. Soil density, tons/cu.yd:			1.3
Tons soil/day:		3550	k factor for PM10:			0.35
Control Eff, watering/speed control, %		80	Number of Drops per ton:			4
Release Fraction:		0.2	Calc 1	wind		0.797
			Calc 2	moisture		10.464
Emissions: PM10	PM2.5		Calc 3	int		0.076
tons/period 0.001	0.000		Calc 4	PM10	lb/ton	0.0001
tons/month 0.000	0.000		PM2.5 fraction of PM10:			0.210
avg lbs/day 0.006	0.001					

Controlled Emissions Totals:	**PM10**	**PM2.5**
tons/period	**0.265**	**0.056**
tons/month	**0.024**	**0.005**
avg lbs/day	**2.187**	**0.459**

CONSTRUCTION ACTIVITIES FUGITIVE DUST ESTIMATES

MRI Level 2 Analysis (Notes 1, 3-7)			**Offsite Linears**		
Acres Subject to Construction Disturbance Activites:			4.59		
Max Acres Subject to Construction Disturbance Activites on any day of this phase:			0.200	note (10)	
Emissions Factor for PM10 Uncontrolled, tons/acre/month:			0.12		
PM2.5 fraction of PM10 (per CARB CEIDARS Profiles):			0.21		
Activity Levels:	Hrs/Day:		8		
	Days/Wk:		5		
	Days/Month:	Applicant Data	22		
Phase Const Period, Months:			3	**0.25**	yrs
Phase Const Period, Days:			66		

Wet Season Adjustment: (Per AP-42, Section 13.2.2, Figure 13.2.2-1, 12/03 or CalEEMod, Appendix D, Table 1.1.)

Mean # days/year with rain >= 0.01 inch:	30	
Mean # months/yr with rain >= 0.01 inch:	1.00	
Adjusted Const Period, Months:	2.75	
Adjusted Const Period, Days:	59	

Controls for Fugitive Dust: Proposed watering cycle 3 times per day

3 watering cycles/8-10 hour construction shift yields a 68% reduction, use 68% for non-desert sites. (11)(12)
Speed control of onsite const traffic to <15 mph yields a 40-70% reduction (use 50% control as conservative for site). (11)(12)

Calculated % control based on mitigations proposed:	84	% control
Conservative control % used for emissions estimates:	80	% control
	0.2	release fraction

Emissions:	PM10	PM2.5
tons/month	0.00	0.00
tons/period	0.01	0.00
avg lbs/day	0.44	0.09

Soil Handling Emissions (Cut and Fill): (2)

Total cu.yds of soil handled:	12844	Mean annual wind speed, mph: (8)			4.2
Total tons of soil handled:	33214.6	Avg. Soil moisture, %: (9)			10.7
Total days soil handled:	59	Avg. Soil density, tons/cu.yd:			1.3
Tons soil/day:	563	k factor for PM10:			0.35
Control Eff, watering/speed control, %	80	Number of Drops per ton:			2
Release Fraction:	0.2	Calc 1	wind		0.797
		Calc 2	moisture		10.464
		Calc 3	int		0.076
		Calc 4	PM10	lb/ton	0.0001
		PM2.5 fraction of PM10:			0.210

Emissions:	PM10	PM2.5
tons/period	0.000	0.000
tons/month	0.000	0.000
avg lbs/day	0.009	0.002

Controlled Emissions Totals:	**PM10**	**PM2.5**
tons/period	**0.013**	**0.003**
tons/month	**0.005**	**0.001**
avg lbs/day	**0.446**	**0.094**

CONSTRUCTION PHASE - Truck Hauling/Delivery, Site Support, and Worker Commute Vehicle Emissions

Delivery and Hauling (assumed 100% HDDTs)

				Emissions Factors, Lbs/VMT (SCAQMD 2018-for Construction Start Year)						
Phase ID:	Construction			NOx	CO	VOC	SOx	PM10	PM2.5	CO2
Phase Length, months:	12	Applicant data	HDDTs	0.01526414	0.00604721	0.00131697	0.00003934	0.00076808	0.00062383	4.207568
Avg Days/Month:	22	Applicant data	LDTs	0.000473	0.00502881	0.00057178	0.00001071	0.00009494	0.00006234	1.1056264
Avg Deliveries per Day:	34	Applicant data	LDAs	0.000473	0.00502881	0.00057178	0.00001071	0.00009494	0.00006234	1.1056264
Avg Delivery RT distance, mi:	70	Estimate								
VMT/day	2380									
VMT/month	52360		**HDDT Delivery and Hauling Emissions Estimates**							
VMT/period	628320		lbs/day	36.329	14.392	3.134	0.094	1.828	1.485	10014
			lbs/month	799.230	316.632	68.957	2.060	40.217	32.664	220308
			tons/period	4.795	1.900	0.414	0.012	0.241	0.196	1322

Site Support Staff Vehicles (assumed 100% LDTs)

Estimated # of vehicles:	6		**Site Support Vehicle Emissions Estimates**							
Avg VMT/day:	120	Estimate*	lbs/day	0.341	3.621	0.412	0.008	0.068	0.045	796
VMT/day	720		lbs/month	7.492	79.656	9.057	0.170	1.504	0.987	17513
VMT/month	15840		tons/period	0.045	0.478	0.054	0.001	0.009	0.006	105.079
VMT/period	190080									

Worker Commute Vehicles (assumed 50% LDA, 50% LDT)

Avg # of Workers/day:	48	Applicant data	**Worker Commute Vehicle Emissions**							
# Workers per vehicle:	1		lbs/day	1.362	14.483	1.647	0.031	0.273	0.180	3184.20
Vehicles per day:	48		lbs/month	29.969	318.625	36.228	0.679	6.015	3.950	70052.49
Avg commute RT distance, mi.	60	Estimate	tons/period	0.180	1.912	0.217	0.004	0.036	0.024	420.31
VMT/day	2880									
VMT/month	63360									
VMT/period	760320									

RT=round trip
worst case worker assumption is NO carpooling.
* 4 trips at 5 miles/day each per vehicle

Fugitive Dust Emissions From Unpaved Roads

	Onsite	Offsite	
Unpaved Road Technical Data			
Mean vehicle weight, Tons:	14.7	0	See Veh Weight tab
Surface material silt content, %	15.5	0	Best estimate
PM10 "k" value, lb/VMT	1.5	1.5	
PM2.5 "k" value, lb/VMT	0.15	0.15	
PM10 "a" exponent value:	0.9	0.9	
PM2.5 "a" exponent value:	0.9	0.9	
PM10 "b" exponent value:	0.45	0.45	
PM2.5 "b" exponent value:	0.45	0.45	
PM10 Intermediate Calculation 1	1.259	0.000	
PM10 Intermediate Calculation 2	2.045	0.000	
PM10 Emissions Factor, lb/VMT	3.861	0.000	
PM2.5 Intermediate Calculation 1	1.259	0.000	
PM2.5 Intermediate Calculation 2	2.045	0.000	
PM2.5 Emissions Factor, lb/VMT	0.386	0.000	
Unpaved Road Travel Data			
Average Trip Length, miles	0.1	0	Estimate based on site size
Total Trips per day	58	0	Applicant data
Total VMT/day	5.8	0	
Avg Days/month	22	0	Applicant data
Monthly VMT	127.6	0	
Construction Period, months	9	0	Adj Months, see Const Dust tab
Period VMT	1148.4	0	
Describe dust control methods below:			
(watering twice daily and speed control to 5 mph)			
Expected Dust Control Efficiency, %	80	80	SCAQMD Mitigation Tables
Release Fraction:	0.2	0.2	

Controlled Emissions PM10	**Onsite**	**Offsite**
lbs/day	4.48	0.00
lbs/month	98.54	0.00
lbs/period	886.83	0.00
tons/period	0.44	0.00

Controlled Emissions PM2.5	**Onsite**	**Offsite**
lbs/day	0.45	0.00
lbs/month	9.85	0.00
lbs/period	88.68	0.00
tons/period	0.04	0.00

Notes:

1. onsite roads are paved by the end of month 9
2. workers park offsite

Fugitive Dust Emissions from Paved Roads

Paved Road Technical Data	Onsite	Offsite	
Mean Vehicle Weight, tons:	14.7	14.7	See Veh Weight tab
			Table 13.2.1-3, AP-42, Ubiquitous Baseline
Road Surface Silt Loading, gms/sq.m	0.6	0.06	Values based on ADT data (2011)
PM10 "k" factor	0.0022	0.0022	
PM2.5 "k" factor	0.00054	0.00054	
PM10 Intermediate Calculation 1	0.628	0.077	
PM10 Intermediate Calculation 2	15.512	15.512	
PM10 Emissions Factor, lb/VMT	0.021	0.003	
PM2.5 Intermediate Calculation 1	0.628	0.077	
PM2.5 Intermediate Calculation 2	15.512	15.512	
PM2.5 Emissions Factor, lb/VMT	0.0053	0.0006	

Paved Road Travel Data			
Average RT Length, miles	0.1	65	Applicant data (weighted RT distance)
Total RT per day	58	106	Applicant data
Total VMT/day	5.8	6890	
Avg Days/month	22	22	Applicant data
Monthly VMT	127.6	151580	
Construction Period, months	3	11	Adj Months, see Const Dust tab
Period VMT	382.8	1667380	

Controlled Emissions PM10	**Onsite**	**Offsite**
lbs/day	0.12	18.17
lbs/month	2.74	399.80
lbs/period	8.21	4397.83
tons/period	0.00	2.20

Controlled Emissions PM2.5	**Onsite**	**Offsite**
lbs/day	0.03	4.46
lbs/month	0.67	98.13
lbs/period	2.01	1079.47
tons/period	0.00	0.54

CONSTRUCTION PHASE - Trackout Emissions

Paved Road Length (miles):	0.2	0.1 mile each access point				
Daily # of Vehicles:	88		**Controlled Emissions Estimates**			
Avg Vehicle Weight (tons):	14.7		**PM10**	**PM2.5**		
Total Unadjusted VMT/day	17.6		0.077			
Particle Size Multipliers	PM10		15.512			
lb/VMT	0.0022		0.003	0.0004	lb/VMT	
			0.012	**0.0021**	**lbs/day**	
Road Sfc Silt Loading (g/m^2):	0.06		**0.0001**	**0.0000**	**tons/month**	
# of Active Trackout Points:	2		**0.002**	**0.0003**	**tons/period**	
Added Trackout Miles for PM10 Calc						
Added Trackout VMT/day:	12		*Default Silt Load Values for Paved Road Types*			
Final Adjusted VMT/day	30		ADT	sL Value		
Final Adjusted VMT/month	651		<500	0.6	gm/m2	
Final Adjusted VMT/period	7163		500-5000	0.2	gm/m2	
Construction days/month:	22		5000-10000	0.06	gm/m2	
Adj. Construction months/period:	11.00		>10000	0.03	gm/m2	
			>10000	0.015	gm/m2 limited access freeway	

Control Applied to Trackout:	Gravel entrance, metal cleaning grates, water washing, sweeping			
Control Efficiency, %	84	0.84	Release Factor =	0.16

vehicles = 82 (worker 48, delivery 32, site support 6)

Fugitive Dust from Wind Erosion of Soil Storage Piles

Site Preparation and Grading Phases

Avg acres of soil storage piles exposed per day:	0.2	Applicant estimate *	
Soil silt content, %:	33.9	0.339	
Number of days/year with precipitation >0.01 inches:	30		
Annual % of time wind speed greater than 12 mph:	2	0.02	from met data set
Watering control efficiency, %:	80	0.8	
PM10 aerodynamic factor:	0.5		
PM2.5 aerodynamic factor:	0.2		
Avg Const Days/month:	22		
Total construction period exposure time, months:	11	Adj Months, see Const Dust tab	

Controlled Emissions Estimates

	lb/acre-day	lbs/day	lbs/month	lbs/period	tons/period
PM10	**0.019**	**0.0037**	**0.082**	**0.90**	**0.0005**
PM2.5	**0.007**	**0.0015**	**0.033**	**0.36**	**0.0002**

* estimate from grading contractor or derived from grading plan.

Average Vehicle Weight Estimate for Construction Period

Vehicle Type	Avg Weight tons	Avg # Vehicles per day	Frac. of total vehicles	
Passenger LDP/LDT	1.5	50	0.439	Worker and support travel vehicles
HDD Loaded	35	32	0.281	
HDD Unloaded	15	32	0.281	Materials delivery trucks, service
MDGT Loaded	15	0	0.000	trucks, fuel trucks, concrete trucks, etc.
MDGT Unloaded	5	0	0.000	
		114	1.000	
Vehicle Total		82		

Weighted Avg Vehicle Weight, tons : **14.7**

HDDT/MDGT Delivery Vehicle Weight Data

Passenger LDP/LDT	2.5	0	0.000	
HDD Loaded	35	32	0.500	
HDD Unloaded	15	32	0.500	Materials delivery trucks, service
MDGT Loaded	15	0	0.000	trucks, fuel trucks, concrete trucks, etc.
MDGT Unloaded	5	0	0.000	
		64	1.000	
Vehicle Total		32		

Weighted Avg Vehicle Weight, tons : **25.0**

Ref: Mission Rock Energy Center, AFC-Air Quality Analysis, Appendix 5.1E, 10/2015.

Diesel Fuel Consumption Rate Conversions

Source: Rice Solar Project AFC, 10/2009, Construction Appendix
Tables 5.1A-28, 40, 72

Equipment Type	HP	BSFC gal/hr	BSFC gal/hp-hr
Air Compressor	23.5	0.66	0.028
Paver	174	5.86	0.034
Scraper	450	14.62	0.032
Dozer	410	12.1	0.030
Grader	210	6.57	0.031
Water Truck	450	11.51	0.026
Backhoe	97	2.37	0.024
Excavator	325	10.59	0.033
Compactor	410	11.51	0.028
Crane 150 ton	347	8.18	0.024
Crane 20 ton	130	3.67	0.028
Crane 225 ton	340	8.18	0.024
Crane 225 ton	173	3.67	0.021
Loader	216	7.78	0.036
Concrete Truck	350	11.51	0.033
Rock Plant-Screen	191	6.75	0.035
Generator	173	7.3	0.042
Generator	98	4.3	0.044
Generator	173	7.3	0.042
Generator	98	4.3	0.044
Generator	173	7.3	0.042
Generator	25	0.81	0.032
Generator	26	0.81	0.031
Welder	19.5	0.52	0.027
Welder (gasoline)	19.5	0.89	0.046
		avg diesel	0.032
variability factor 20%			0.039

SCAQMD On-Road Emissions Factors for 2018

Scenario Year: **2018**

All model years in the range 1974 to 2018

Passenger Vehicles (pounds/mile)	
CO	0.00502881
NOx	0.00047300
ROG	0.00057178
SOx	0.00001071
PM10	0.00009494
PM2.5	0.00006234
CO2	1.10562643
CH4	0.00005003

Delivery Trucks (pounds/mile)	
CO	0.00923234
NOx	0.00979416
ROG	0.00139856
SOx	0.00002749
PM10	0.00040110
PM2.5	0.00031792
CO2	2.84646835
CH4	0.00006203

Scenario Year: **2018**

All model years in the range 1974 to 2018

HHDT-DSL (pounds/mile)	
CO	0.00604721
NOx	0.01526414
ROG	0.00131697
SOx	0.00003934
PM10	0.00076808
PM2.5	0.00062383
CO2	4.20756838
CH4	0.00006182

HHDT-DSL, Exh (pounds/mile)	
PM10	0.00062758
PM2.5	0.00057700

EMFAC 2007, Ver 2.3

http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook

Conversion of Tons/Period to Normalized Tons/Year and Summation of Emissions

Enter the length (months) of this phase or period. If the value is less than 12 months, then enter 12 months:	12	1	Eq Years
Avg Construction Work Days per Month:	22		

On Site Emissions — **Tons/Period**

	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CO2e
Construction Equipment Exhaust	0.650	3.610	4.684	0.008	0.297	0.294	761.1	763.7
Construction Site Fugitive Dust	0.000	0.000	0.000	0.000	0.265	0.056	0.0	0.0
Unpaved Roads Fugitive Dust	0.000	0.000	0.000	0.000	0.443	0.044	0.0	0.0
Paved Roads Fugitive Dust	0.000	0.000	0.000	0.000	0.004	0.001	0.0	0.0
Storage Pile Wind Blown Dust	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0
Cumulative On Site Emissions Summary								
Total Tons/Period	0.650	3.610	4.684	0.008	1.010	0.396	761.1	763.7
Normalized Tons/Year	**0.650**	**3.610**	**4.684**	**0.008**	**1.010**	**0.396**	**761.1**	**763.7**
Avg Lbs/Month	**108.27**	**601.74**	**780.62**	**1.41**	**168.30**	**65.93**		
Avg Lbs/Day	**4.92**	**27.35**	**35.48**	**0.06**	**7.65**	**3.00**		

Off Site Emissions — **Tons/Period**

	VOC	CO	NOx	SOx	PM10	PM2.5	CO2	CO2e
Construction Equipment Exhaust	0.163	0.915	1.175	0.002	0.079	0.078	165.144	165.717
Construction Site Fugitive Dust	0.000	0.000	0.000	0.000	0.013	0.003	0.000	0.000
Delivery/Hauling Exhaust	0.414	1.900	4.795	0.012	0.241	0.196	1321.8	1326.4
Site Support Vehicle Exhaust	0.054	0.478	0.045	0.001	0.009	0.006	105.1	105.5
Worker Commute Exhaust	0.217	1.912	0.180	0.004	0.036	0.024	420.3	421.8
Unpaved Roads Fugitive Dust	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.0
Paved Roads Fugitive Dust	0.000	0.000	0.000	0.000	2.199	0.540	0.0	0.0
Track Out Fugitive Dust	0.000	0.000	0.000	0.000	0.002	0.000	0.0	0.0
Cumulative Off Site Emissions Summary								
Total Tons/Period	0.848	5.204	6.196	0.019	2.579	0.847	2012.387	2019.431
Normalized Tons/Year	**0.848**	**5.204**	**6.196**	**0.019**	**2.579**	**0.847**	**2012.4**	**2019.4**
Avg Lbs/Month	**141.41**	**867.41**	**1032.61**	**3.23**	**429.86**	**141.10**		
Avg Lbs/Day	**6.43**	**39.43**	**46.94**	**0.15**	**19.54**	**6.41**		

Total CO2e, tons/yr: **2783.2**

SCAB Fleet Average Emission Factors (Diesel)

2016

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0150	0.0479	0.0887	0.0001	0.0043	11.0	0.0014
	50	0.0430	0.1592	0.1637	0.0003	0.0116	19.6	0.0039
	120	0.0413	0.2355	0.3021	0.0004	0.0219	38.1	0.0037
	500	0.0951	0.4103	1.1062	0.0021	0.0331	213	0.0086
	750	0.1771	0.7417	2.0748	0.0039	0.0611	385	0.0160
Aerial Lifts Composite		0.0397	0.1800	0.2482	0.0004	0.0150	34.7	0.0036
Air Compressors	15	0.0104	0.0461	0.0642	0.0001	0.0037	7.2	0.0009
	25	0.0219	0.0665	0.1224	0.0002	0.0066	14.4	0.0020
	50	0.0667	0.2281	0.1982	0.0003	0.0165	22.3	0.0060
	120	0.0624	0.3150	0.3994	0.0006	0.0333	47.0	0.0056
	175	0.0824	0.5006	0.6378	0.0010	0.0346	88.5	0.0074
	250	0.0838	0.2741	0.8308	0.0015	0.0257	131	0.0076
	500	0.1387	0.4734	1.2719	0.0023	0.0422	232	0.0125
	750	0.2164	0.7315	2.0431	0.0036	0.0668	358	0.0195
	1000	0.3315	1.1175	4.1882	0.0049	0.1137	486	0.0299
Air Compressors Composite		0.0704	0.3207	0.4729	0.0007	0.0318	63.6	0.0064
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0220	0.2223	0.2106	0.0004	0.0058	31.0	0.0020
	120	0.0349	0.4671	0.3308	0.0009	0.0125	77.1	0.0031
	175	0.0566	0.7540	0.4376	0.0016	0.0156	141	0.0051
	250	0.0628	0.3425	0.3887	0.0021	0.0114	188	0.0057
	500	0.1033	0.5511	0.6252	0.0031	0.0186	311	0.0093
	750	0.2045	1.0889	1.2440	0.0062	0.0369	615	0.0185
	1000	0.3273	1.6484	4.6465	0.0093	0.1011	928	0.0295
Bore/Drill Rigs Composite		0.0623	0.5016	0.5340	0.0017	0.0160	165	0.0056
Cement and Mor	15	0.0074	0.0386	0.0462	0.0001	0.0019	6.3	0.0007
	25	0.0243	0.0771	0.1432	0.0002	0.0070	17.6	0.0022
Cement and Mortar Mixers Co		0.0088	0.0418	0.0542	0.0001	0.0023	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0703	0.2673	0.2562	0.0004	0.0186	30.2	0.0063
	120	0.0809	0.4724	0.5783	0.0009	0.0436	74.1	0.0073
	175	0.1226	0.8668	1.0454	0.0018	0.0525	160	0.0111
Concrete/Industrial Saws Com		0.0756	0.3936	0.4589	0.0007	0.0336	58.5	0.0068
Cranes	50	0.0779	0.2655	0.2159	0.0003	0.0185	23.2	0.0070
	120	0.0744	0.3533	0.4476	0.0006	0.0378	50.1	0.0067
	175	0.0862	0.4783	0.6099	0.0009	0.0346	80.3	0.0078
	250	0.0875	0.2634	0.7534	0.0013	0.0259	112	0.0079
	500	0.1325	0.4431	1.0723	0.0018	0.0387	180	0.0120
	750	0.2244	0.7448	1.8635	0.0030	0.0663	303	0.0202
	9999	0.8246	2.7017	8.7644	0.0098	0.2555	971	0.0744
Cranes Composite		0.1137	0.4263	0.9387	0.0014	0.0388	129	0.0103
Crawler Tractors	50	0.0944	0.3015	0.2386	0.0003	0.0215	24.9	0.0085
	120	0.1073	0.4739	0.6379	0.0008	0.0533	65.8	0.0097
	175	0.1427	0.7361	1.0097	0.0014	0.0567	121	0.0129
	250	0.1496	0.4452	1.2431	0.0019	0.0468	166	0.0135
	500	0.2183	0.7903	1.7438	0.0025	0.0669	259	0.0197
	750	0.3930	1.4137	3.2045	0.0047	0.1213	465	0.0355
	1000	0.5970	2.2313	6.3308	0.0066	0.1930	658	0.0539
Crawler Tractors Composite		0.1335	0.5549	0.9315	0.0013	0.0546	114	0.0120
Crushing/Proc. E	50	0.1234	0.4493	0.3877	0.0006	0.0310	44.0	0.0111
	120	0.1054	0.5594	0.6775	0.0010	0.0555	83.1	0.0095
	175	0.1513	0.9539	1.1428	0.0019	0.0620	167	0.0136
	250	0.1553	0.5071	1.4547	0.0028	0.0453	245	0.0140
	500	0.2240	0.7541	1.9256	0.0037	0.0648	374	0.0202
	750	0.3524	1.1817	3.1408	0.0059	0.1031	589	0.0318

	9999	0.9152	2.9318	10.8280	0.0131	0.2940	1,308	0.0826
Crushing/Proc. Equipment Co		0.1337	0.6461	0.8965	0.0015	0.0538	132	0.0121
Dumpers/Tender	25	0.0093	0.0314	0.0587	0.0001	0.0024	7.6	0.0008
Dumpers/Tenders Composite		0.0093	0.0314	0.0587	0.0001	0.0024	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0581	0.2621	0.2166	0.0003	0.0147	25.0	0.0052
	120	0.0833	0.5070	0.5292	0.0009	0.0395	73.6	0.0075
	175	0.0972	0.6648	0.6563	0.0013	0.0355	112	0.0088
	250	0.1054	0.3389	0.7862	0.0018	0.0263	159	0.0095
	500	0.1496	0.4851	1.0236	0.0023	0.0366	234	0.0135
	750	0.2493	0.8037	1.7546	0.0039	0.0618	387	0.0225
Excavators Composite		0.0988	0.5213	0.6603	0.0013	0.0332	120	0.0089
Forklifts	50	0.0284	0.1489	0.1276	0.0002	0.0080	14.7	0.0026
	120	0.0313	0.2133	0.2116	0.0004	0.0149	31.2	0.0028
	175	0.0454	0.3320	0.3050	0.0006	0.0167	56.1	0.0041
	250	0.0493	0.1572	0.3531	0.0009	0.0118	77.1	0.0044
	500	0.0693	0.2150	0.4532	0.0011	0.0165	111	0.0062
Forklifts Composite		0.0427	0.2190	0.2816	0.0006	0.0137	54.4	0.0039
Generator Sets	15	0.0130	0.0652	0.0899	0.0002	0.0048	10.2	0.0012
	25	0.0241	0.0811	0.1494	0.0002	0.0076	17.6	0.0022
	50	0.0630	0.2393	0.2532	0.0004	0.0174	30.6	0.0057
	120	0.0814	0.4767	0.6102	0.0009	0.0431	77.9	0.0073
	175	0.1006	0.7336	0.9416	0.0016	0.0432	142	0.0091
	250	0.1003	0.4059	1.2339	0.0024	0.0342	213	0.0091
	500	0.1437	0.6411	1.7299	0.0033	0.0509	337	0.0130
	750	0.2399	1.0349	2.8965	0.0055	0.0840	544	0.0216
	9999	0.6052	2.2398	8.4480	0.0105	0.2114	1,049	0.0546
Generator Sets Composite		0.0581	0.2862	0.4370	0.0007	0.0241	61.0	0.0052
Graders	50	0.0816	0.3003	0.2476	0.0004	0.0196	27.5	0.0074
	120	0.1002	0.5196	0.6220	0.0009	0.0499	75.0	0.0090
	175	0.1215	0.7310	0.8624	0.0014	0.0476	124	0.0110
	250	0.1250	0.3936	1.0444	0.0019	0.0359	172	0.0113
	500	0.1579	0.5525	1.2394	0.0023	0.0446	229	0.0142
	750	0.3362	1.1682	2.7050	0.0049	0.0960	486	0.0303
Graders Composite		0.1197	0.5883	0.8866	0.0015	0.0441	133	0.0108
Off-Highway Trac	120	0.1806	0.6988	1.0550	0.0011	0.0892	93.7	0.0163
	175	0.1782	0.8166	1.2825	0.0015	0.0723	130	0.0161
	250	0.1415	0.4155	1.1803	0.0015	0.0482	130	0.0128
	750	0.5701	2.3586	4.7515	0.0057	0.1903	568	0.0514
	1000	0.8608	3.6939	8.8128	0.0082	0.2875	814	0.0777
Off-Highway Tractors Compos		0.1803	0.7067	1.4108	0.0017	0.0670	151	0.0163
Off-Highway Truc	175	0.1164	0.7552	0.7647	0.0014	0.0417	125	0.0105
	250	0.1179	0.3651	0.8678	0.0019	0.0290	167	0.0106
	500	0.1855	0.5796	1.2524	0.0027	0.0448	272	0.0167
	750	0.3026	0.9397	2.1025	0.0044	0.0741	442	0.0273
	1000	0.4576	1.4117	4.8929	0.0063	0.1360	625	0.0413
Off-Highway Trucks Composit		0.1816	0.5831	1.3322	0.0027	0.0459	260	0.0164
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0530	0.2447	0.2274	0.0004	0.0143	28.0	0.0048
	120	0.0747	0.5170	0.5495	0.0009	0.0384	80.9	0.0067
	175	0.0729	0.5862	0.5856	0.0012	0.0291	107	0.0066
	500	0.1243	0.4868	1.0415	0.0025	0.0350	254	0.0112
Other Construction Equipment		0.0720	0.3602	0.5680	0.0013	0.0234	123	0.0065
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0700	0.2449	0.2003	0.0003	0.0171	21.7	0.0063
	120	0.0895	0.4343	0.5394	0.0007	0.0461	62.0	0.0081
	175	0.0993	0.5671	0.7059	0.0011	0.0398	95.9	0.0090
	250	0.0990	0.2950	0.8757	0.0015	0.0279	136	0.0089
	500	0.1832	0.5599	1.4849	0.0026	0.0511	265	0.0165
	750	0.3043	0.9228	2.5436	0.0044	0.0861	437	0.0275
	1000	0.4283	1.3244	4.9259	0.0056	0.1385	560	0.0386
Other General Industrial Equip		0.1267	0.4731	1.0122	0.0016	0.0425	152	0.0114
Other Material Ha	50	0.0970	0.3384	0.2785	0.0004	0.0237	30.3	0.0088
	120	0.0869	0.4228	0.5267	0.0007	0.0450	60.7	0.0078

	175	0.1251	0.7182	0.8969	0.0014	0.0504	122	0.0113
	250	0.1046	0.3141	0.9355	0.0016	0.0298	145	0.0094
	500	0.1305	0.4029	1.0706	0.0019	0.0367	192	0.0118
	9999	0.5874	1.7492	6.5148	0.0073	0.1827	741	0.0530
Other Material Handling Equip		0.1202	0.4608	0.9913	0.0015	0.0411	141	0.0108
Pavers	25	0.0230	0.0774	0.1448	0.0002	0.0061	18.7	0.0021
	50	0.1117	0.3339	0.2694	0.0004	0.0252	28.0	0.0101
	120	0.1164	0.4930	0.7030	0.0008	0.0591	69.2	0.0105
	175	0.1524	0.7678	1.1274	0.0014	0.0627	128	0.0138
	250	0.1758	0.5369	1.5485	0.0022	0.0587	194	0.0159
	500	0.1956	0.7646	1.6718	0.0023	0.0641	233	0.0177
Pavers Composite		0.1269	0.5135	0.7128	0.0009	0.0489	77.9	0.0114
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0953	0.2829	0.2297	0.0003	0.0216	23.9	0.0086
	120	0.0912	0.3862	0.5522	0.0006	0.0468	54.5	0.0082
	175	0.1188	0.6004	0.8857	0.0011	0.0492	101	0.0107
	250	0.1077	0.3302	0.9703	0.0014	0.0360	122	0.0097
Paving Equipment Composite		0.0965	0.4198	0.6393	0.0008	0.0436	68.9	0.0087
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0062	0.0312	0.0431	0.0001	0.0023	4.9	0.0006
	25	0.0098	0.0329	0.0606	0.0001	0.0031	7.1	0.0009
	50	0.0222	0.0943	0.1139	0.0002	0.0069	14.3	0.0020
	120	0.0217	0.1404	0.1798	0.0003	0.0114	24.1	0.0020
Pressure Washers Composite		0.0121	0.0579	0.0764	0.0001	0.0044	9.4	0.0011
Pumps	15	0.0106	0.0474	0.0660	0.0001	0.0038	7.4	0.0010
	25	0.0296	0.0897	0.1651	0.0002	0.0088	19.5	0.0027
	50	0.0765	0.2823	0.2874	0.0004	0.0206	34.3	0.0069
	120	0.0851	0.4842	0.6196	0.0009	0.0453	77.9	0.0077
	175	0.1044	0.7350	0.9440	0.0016	0.0448	140	0.0094
	250	0.1005	0.3911	1.1887	0.0023	0.0338	201	0.0091
	500	0.1566	0.6672	1.7955	0.0034	0.0542	345	0.0141
	750	0.2663	1.1031	3.0795	0.0057	0.0916	571	0.0240
	9999	0.8096	2.9411	11.0444	0.0136	0.2798	1,355	0.0730
Pumps Composite		0.0562	0.2785	0.3830	0.0006	0.0239	49.6	0.0051
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0039	13.3	0.0015
	50	0.0798	0.2680	0.2323	0.0003	0.0191	26.0	0.0072
	120	0.0795	0.3971	0.5112	0.0007	0.0416	59.0	0.0072
	175	0.1033	0.6152	0.7968	0.0012	0.0431	108	0.0093
	250	0.1042	0.3463	0.9961	0.0017	0.0333	153	0.0094
	500	0.1391	0.5319	1.2666	0.0022	0.0442	219	0.0126
Rollers Composite		0.0792	0.3944	0.5273	0.0008	0.0353	67.0	0.0071
Rough Terrain Fo	50	0.0840	0.3459	0.2954	0.0004	0.0216	33.9	0.0076
	120	0.0729	0.4231	0.4742	0.0007	0.0369	62.4	0.0066
	175	0.1081	0.7236	0.7797	0.0014	0.0423	125	0.0098
	250	0.1107	0.3592	0.9207	0.0019	0.0302	171	0.0100
	500	0.1590	0.5205	1.2089	0.0025	0.0428	257	0.0143
Rough Terrain Forklifts Compo		0.0775	0.4549	0.5104	0.0008	0.0372	70.3	0.0070
Rubber Tired Doz	175	0.1852	0.8280	1.3073	0.0015	0.0740	129	0.0167
	250	0.2099	0.6066	1.7084	0.0021	0.0707	183	0.0189
	500	0.2794	1.1678	2.2384	0.0026	0.0915	265	0.0252
	750	0.4216	1.7523	3.4334	0.0040	0.1388	399	0.0380
	1000	0.6575	2.8291	6.5404	0.0060	0.2169	592	0.0593
Rubber Tired Dozers Compos		0.2591	0.9834	2.0891	0.0025	0.0858	239	0.0234
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0901	0.3349	0.2783	0.0004	0.0218	31.1	0.0081
	120	0.0773	0.4063	0.4828	0.0007	0.0387	58.9	0.0070
	175	0.1022	0.6242	0.7295	0.0012	0.0402	106	0.0092
	250	0.1056	0.3357	0.8897	0.0017	0.0302	149	0.0095
	500	0.1592	0.5594	1.2576	0.0023	0.0449	237	0.0144
	750	0.3283	1.1450	2.6587	0.0049	0.0937	486	0.0296
	1000	0.4397	1.5570	4.9948	0.0060	0.1424	594	0.0397
Rubber Tired Loaders Compos		0.0983	0.4557	0.7114	0.0012	0.0375	109	0.0089
Scrapers	120	0.1566	0.6775	0.9295	0.0011	0.0781	93.9	0.0141
	175	0.1771	0.9000	1.2619	0.0017	0.0709	148	0.0160

	250	0.1911	0.5689	1.6086	0.0024	0.0607	209	0.0172
	500	0.2736	1.0107	2.2183	0.0032	0.0851	321	0.0247
	750	0.4747	1.7423	3.9270	0.0056	0.1488	555	0.0428
Scrapers Composite		0.2383	0.9053	1.9017	0.0027	0.0783	262	0.0215
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0832	0.3134	0.3032	0.0005	0.0219	36.2	0.0075
	120	0.0873	0.5072	0.6231	0.0009	0.0466	80.2	0.0079
	175	0.1169	0.8288	1.0085	0.0017	0.0498	155	0.0106
	250	0.1318	0.4998	1.4477	0.0029	0.0424	255	0.0119
Signal Boards Composite		0.0161	0.0921	0.1172	0.0002	0.0060	16.7	0.0014
Skid Steer Loade	25	0.0184	0.0594	0.1107	0.0002	0.0053	13.8	0.0017
	50	0.0323	0.2089	0.1953	0.0003	0.0094	25.5	0.0029
	120	0.0295	0.2695	0.2411	0.0005	0.0138	42.8	0.0027
Skid Steer Loaders Composite		0.0305	0.2184	0.2044	0.0004	0.0106	30.3	0.0028
Surfacing Equipn	50	0.0376	0.1300	0.1219	0.0002	0.0093	14.1	0.0034
	120	0.0779	0.4123	0.5363	0.0007	0.0403	63.8	0.0070
	175	0.0734	0.4695	0.6130	0.0010	0.0308	85.8	0.0066
	250	0.0833	0.3013	0.8507	0.0015	0.0280	135	0.0075
	500	0.1260	0.5485	1.2555	0.0022	0.0425	221	0.0114
	750	0.2006	0.8594	2.0266	0.0035	0.0677	347	0.0181
Surfacing Equipment Compos		0.1045	0.4506	0.9731	0.0017	0.0353	166	0.0094
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0662	0.3084	0.2720	0.0004	0.0182	31.6	0.0060
	120	0.0774	0.5017	0.5324	0.0009	0.0392	75.0	0.0070
	175	0.1100	0.8005	0.7999	0.0016	0.0429	139	0.0099
	250	0.0979	0.3255	0.7954	0.0018	0.0258	162	0.0088
Sweepers/Scrubbers Compos		0.0810	0.4988	0.5192	0.0009	0.0332	78.5	0.0073
Tractors/Loaders	25	0.0192	0.0653	0.1216	0.0002	0.0048	15.9	0.0017
	50	0.0623	0.2949	0.2536	0.0004	0.0162	30.3	0.0056
	120	0.0524	0.3460	0.3526	0.0006	0.0253	51.7	0.0047
	175	0.0788	0.5850	0.5574	0.0011	0.0293	101	0.0071
	250	0.1025	0.3534	0.7914	0.0019	0.0260	172	0.0092
	500	0.1985	0.6964	1.4092	0.0039	0.0496	345	0.0179
	750	0.2995	1.0443	2.1837	0.0058	0.0758	517	0.0270
Tractors/Loaders/Backhoes C		0.0610	0.3689	0.4070	0.0008	0.0258	66.8	0.0055
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.1305	0.3813	0.3141	0.0004	0.0293	32.9	0.0118
	120	0.1080	0.4563	0.6653	0.0008	0.0551	64.9	0.0097
	175	0.1678	0.8496	1.2809	0.0016	0.0700	144	0.0151
	250	0.1991	0.6260	1.8052	0.0025	0.0691	223	0.0180
	500	0.2560	1.0680	2.2757	0.0031	0.0874	311	0.0231
	750	0.4852	2.0082	4.3873	0.0059	0.1665	587	0.0438
Trenchers Composite		0.1200	0.4479	0.5719	0.0007	0.0453	58.7	0.0108
Welders	15	0.0089	0.0396	0.0551	0.0001	0.0032	6.2	0.0008
	25	0.0171	0.0519	0.0956	0.0001	0.0051	11.3	0.0015
	50	0.0717	0.2483	0.2262	0.0003	0.0181	26.0	0.0065
	120	0.0494	0.2581	0.3291	0.0005	0.0265	39.5	0.0045
	175	0.0852	0.5411	0.6939	0.0011	0.0362	98.2	0.0077
	250	0.0700	0.2427	0.7386	0.0013	0.0223	119	0.0063
	500	0.0912	0.3361	0.9056	0.0016	0.0292	168	0.0082
Welders Composite		0.0482	0.1951	0.2173	0.0003	0.0168	25.6	0.0044

SCAB Fleet Average Emission Factors (Diesel)

2017

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0146	0.0473	0.0873	0.0001	0.0041	11.0	0.0013
	50	0.0382	0.1548	0.1580	0.0003	0.0104	19.6	0.0034
	120	0.0368	0.2336	0.2787	0.0004	0.0194	38.1	0.0033
	500	0.0890	0.3983	0.9891	0.0021	0.0299	213	0.0080
	750	0.1647	0.7200	1.8445	0.0039	0.0549	385	0.0149
Aerial Lifts Composite		0.0358	0.1768	0.2310	0.0004	0.0134	34.7	0.0032
Air Compressors	15	0.0101	0.0458	0.0624	0.0001	0.0035	7.2	0.0009
	25	0.0212	0.0654	0.1205	0.0002	0.0062	14.4	0.0019
	50	0.0591	0.2209	0.1914	0.0003	0.0148	22.3	0.0053
	120	0.0562	0.3122	0.3674	0.0006	0.0294	47.0	0.0051
	175	0.0752	0.4998	0.5700	0.0010	0.0306	88.5	0.0068
	250	0.0791	0.2692	0.7388	0.0015	0.0230	131	0.0071
	500	0.1321	0.4598	1.1363	0.0023	0.0381	232	0.0119
	750	0.2057	0.7106	1.8141	0.0036	0.0600	358	0.0186
	1000	0.3127	1.0739	3.9506	0.0049	0.1048	486	0.0282
Air Compressors Composite		0.0641	0.3165	0.4318	0.0007	0.0282	63.6	0.0058
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0210	0.2215	0.1992	0.0004	0.0044	31.0	0.0019
	120	0.0326	0.4667	0.2962	0.0009	0.0095	77.1	0.0029
	175	0.0519	0.7541	0.3589	0.0016	0.0121	141	0.0047
	250	0.0580	0.3426	0.3124	0.0021	0.0088	188	0.0052
	500	0.0955	0.5511	0.5035	0.0031	0.0145	311	0.0086
	750	0.1891	1.0890	1.0018	0.0062	0.0287	615	0.0171
	1000	0.3016	1.6457	4.3972	0.0093	0.0855	928	0.0272
Bore/Drill Rigs Composite		0.0578	0.5013	0.4692	0.0017	0.0126	165	0.0052
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0237	0.0762	0.1411	0.0002	0.0067	17.6	0.0021
Cement and Mortar Mixers Co		0.0087	0.0417	0.0539	0.0001	0.0022	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0625	0.2602	0.2473	0.0004	0.0167	30.2	0.0056
	120	0.0728	0.4691	0.5331	0.0009	0.0385	74.1	0.0066
	175	0.1116	0.8663	0.9349	0.0018	0.0466	160	0.0101
Concrete/Industrial Saws Com		0.0679	0.3892	0.4267	0.0007	0.0298	58.5	0.0061
Cranes	50	0.0709	0.2588	0.2087	0.0003	0.0168	23.2	0.0064
	120	0.0690	0.3509	0.4155	0.0006	0.0341	50.1	0.0062
	175	0.0807	0.4774	0.5549	0.0009	0.0314	80.3	0.0073
	250	0.0830	0.2572	0.6832	0.0013	0.0235	112	0.0075
	500	0.1262	0.4243	0.9704	0.0018	0.0351	180	0.0114
	750	0.2137	0.7132	1.6890	0.0030	0.0602	303	0.0193
	9999	0.7823	2.5343	8.2827	0.0098	0.2344	971	0.0706
Cranes Composite		0.1073	0.4152	0.8625	0.0014	0.0352	129	0.0097
Crawler Tractors	50	0.0876	0.2947	0.2312	0.0003	0.0197	24.9	0.0079
	120	0.1008	0.4707	0.5971	0.0008	0.0489	65.8	0.0091
	175	0.1347	0.7342	0.9293	0.0014	0.0522	121	0.0122
	250	0.1413	0.4308	1.1399	0.0019	0.0426	166	0.0127
	500	0.2069	0.7531	1.5987	0.0025	0.0609	259	0.0187
	750	0.3726	1.3475	2.9402	0.0047	0.1106	465	0.0336
	1000	0.5672	2.1186	6.0245	0.0066	0.1793	658	0.0512
Crawler Tractors Composite		0.1258	0.5464	0.8617	0.0013	0.0500	114	0.0114
Crushing/Proc. E	50	0.1086	0.4355	0.3739	0.0006	0.0274	44.0	0.0098
	120	0.0948	0.5547	0.6210	0.0010	0.0484	83.1	0.0086
	175	0.1380	0.9527	1.0155	0.0019	0.0545	167	0.0124
	250	0.1466	0.4993	1.2854	0.0028	0.0405	245	0.0132
	500	0.2135	0.7357	1.7109	0.0037	0.0582	374	0.0193
	750	0.3347	1.1549	2.7641	0.0059	0.0920	589	0.0302

	9999	0.8702	2.8310	10.1798	0.0131	0.2693	1,308	0.0785
Crushing/Proc. Equipment Co		0.1219	0.6388	0.8113	0.0015	0.0473	132	0.0110
Dumpers/Tender	25	0.0092	0.0314	0.0585	0.0001	0.0023	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0585	0.0001	0.0023	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0521	0.2568	0.2082	0.0003	0.0128	25.0	0.0047
	120	0.0760	0.5042	0.4840	0.0009	0.0340	73.6	0.0069
	175	0.0896	0.6644	0.5783	0.0013	0.0308	112	0.0081
	250	0.0992	0.3354	0.6878	0.0018	0.0231	159	0.0090
	500	0.1415	0.4762	0.8988	0.0023	0.0323	234	0.0128
	750	0.2356	0.7890	1.5359	0.0039	0.0544	387	0.0213
Excavators Composite		0.0916	0.5184	0.5858	0.0013	0.0289	120	0.0083
Forklifts	50	0.0254	0.1463	0.1228	0.0002	0.0068	14.7	0.0023
	120	0.0287	0.2125	0.1926	0.0004	0.0128	31.2	0.0026
	175	0.0425	0.3322	0.2685	0.0006	0.0146	56.1	0.0038
	250	0.0467	0.1564	0.3057	0.0009	0.0103	77.1	0.0042
	500	0.0659	0.2139	0.3937	0.0011	0.0145	111	0.0059
Forklifts Composite		0.0399	0.2181	0.2493	0.0006	0.0119	54.4	0.0036
Generator Sets	15	0.0126	0.0647	0.0874	0.0002	0.0045	10.2	0.0011
	25	0.0236	0.0799	0.1471	0.0002	0.0073	17.6	0.0021
	50	0.0559	0.2326	0.2443	0.0004	0.0156	30.6	0.0050
	120	0.0725	0.4728	0.5629	0.0009	0.0381	77.9	0.0065
	175	0.0902	0.7328	0.8439	0.0016	0.0383	142	0.0081
	250	0.0926	0.3988	1.1003	0.0024	0.0307	213	0.0084
	500	0.1343	0.6237	1.5464	0.0033	0.0459	337	0.0121
	750	0.2224	1.0068	2.5746	0.0055	0.0754	544	0.0201
	9999	0.5622	2.1570	7.9778	0.0105	0.1939	1,049	0.0507
Generator Sets Composite		0.0527	0.2821	0.4052	0.0007	0.0216	61.0	0.0048
Graders	50	0.0743	0.2932	0.2387	0.0004	0.0176	27.5	0.0067
	120	0.0928	0.5166	0.5753	0.0009	0.0447	75.0	0.0084
	175	0.1135	0.7301	0.7781	0.0014	0.0429	124	0.0102
	250	0.1180	0.3848	0.9383	0.0019	0.0321	172	0.0106
	500	0.1497	0.5344	1.1139	0.0023	0.0400	229	0.0135
	750	0.3187	1.1303	2.4323	0.0049	0.0862	486	0.0288
Graders Composite		0.1121	0.5844	0.8008	0.0015	0.0397	133	0.0101
Off-Highway Trac	120	0.1712	0.6931	0.9973	0.0011	0.0834	93.7	0.0154
	175	0.1697	0.8122	1.1987	0.0015	0.0677	130	0.0153
	250	0.1344	0.4001	1.1003	0.0015	0.0446	130	0.0121
	750	0.5434	2.2170	4.4309	0.0057	0.1765	568	0.0490
	1000	0.8220	3.4738	8.4378	0.0082	0.2696	814	0.0742
Off-Highway Tractors Compos		0.1716	0.6906	1.3177	0.0017	0.0623	151	0.0155
Off-Highway Truc	175	0.1072	0.7547	0.6764	0.0014	0.0363	125	0.0097
	250	0.1109	0.3608	0.7625	0.0019	0.0256	167	0.0100
	500	0.1753	0.5676	1.1034	0.0027	0.0397	272	0.0158
	750	0.2856	0.9204	1.8476	0.0044	0.0655	442	0.0258
	1000	0.4308	1.3660	4.6014	0.0063	0.1229	625	0.0389
Off-Highway Trucks Composit		0.1712	0.5722	1.1851	0.0027	0.0407	260	0.0154
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0468	0.2392	0.2185	0.0004	0.0125	28.0	0.0042
	120	0.0671	0.5141	0.5013	0.0009	0.0329	80.9	0.0061
	175	0.0665	0.5860	0.5133	0.0012	0.0252	107	0.0060
	500	0.1181	0.4796	0.9136	0.0025	0.0311	254	0.0107
Other Construction Equipment		0.0675	0.3568	0.5044	0.0013	0.0206	123	0.0061
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0621	0.2377	0.1935	0.0003	0.0152	21.7	0.0056
	120	0.0811	0.4307	0.4956	0.0007	0.0404	62.0	0.0073
	175	0.0911	0.5665	0.6307	0.0011	0.0351	95.9	0.0082
	250	0.0936	0.2900	0.7778	0.0015	0.0249	136	0.0084
	500	0.1745	0.5443	1.3258	0.0026	0.0459	265	0.0157
	750	0.2894	0.8971	2.2570	0.0044	0.0770	437	0.0261
	1000	0.4068	1.2739	4.6403	0.0056	0.1274	560	0.0367
Other General Industrial Equip		0.1187	0.4650	0.9138	0.0016	0.0379	152	0.0107
Other Material Ha	50	0.0860	0.3282	0.2689	0.0004	0.0211	30.3	0.0078
	120	0.0786	0.4192	0.4839	0.0007	0.0394	60.7	0.0071

	175	0.1146	0.7173	0.8014	0.0014	0.0445	122	0.0103
	250	0.0988	0.3087	0.8309	0.0016	0.0266	145	0.0089
	500	0.1243	0.3915	0.9560	0.0019	0.0330	192	0.0112
	9999	0.5621	1.6821	6.1372	0.0073	0.1681	741	0.0507
Other Material Handling Equip		0.1123	0.4544	0.8948	0.0015	0.0366	141	0.0101
Pavers	25	0.0228	0.0771	0.1440	0.0002	0.0058	18.7	0.0021
	50	0.1040	0.3262	0.2615	0.0004	0.0234	28.0	0.0094
	120	0.1095	0.4895	0.6606	0.0008	0.0548	69.2	0.0099
	175	0.1443	0.7653	1.0437	0.0014	0.0582	128	0.0130
	250	0.1664	0.5174	1.4290	0.0022	0.0537	194	0.0150
	500	0.1858	0.7239	1.5415	0.0023	0.0588	233	0.0168
Pavers Composite		0.1193	0.5073	0.6672	0.0009	0.0453	77.9	0.0108
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0885	0.2760	0.2230	0.0003	0.0200	23.9	0.0080
	120	0.0858	0.3834	0.5187	0.0006	0.0433	54.5	0.0077
	175	0.1124	0.5987	0.8196	0.0011	0.0458	101	0.0101
	250	0.1018	0.3178	0.8949	0.0014	0.0329	122	0.0092
Paving Equipment Composite		0.0910	0.4165	0.5965	0.0008	0.0404	68.9	0.0082
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0060	0.0310	0.0419	0.0001	0.0022	4.9	0.0005
	25	0.0096	0.0324	0.0596	0.0001	0.0030	7.1	0.0009
	50	0.0195	0.0918	0.1098	0.0002	0.0061	14.3	0.0018
	120	0.0191	0.1393	0.1659	0.0003	0.0100	24.1	0.0017
Pressure Washers Composite		0.0111	0.0570	0.0733	0.0001	0.0040	9.4	0.0010
Pumps	15	0.0103	0.0471	0.0641	0.0001	0.0036	7.4	0.0009
	25	0.0286	0.0883	0.1625	0.0002	0.0084	19.5	0.0026
	50	0.0680	0.2744	0.2773	0.0004	0.0184	34.3	0.0061
	120	0.0760	0.4802	0.5715	0.0009	0.0400	77.9	0.0069
	175	0.0940	0.7342	0.8462	0.0016	0.0398	140	0.0085
	250	0.0932	0.3841	1.0601	0.0023	0.0303	201	0.0084
	500	0.1468	0.6478	1.6054	0.0034	0.0489	345	0.0132
	750	0.2481	1.0709	2.7377	0.0057	0.0823	571	0.0224
	9999	0.7548	2.8273	10.4295	0.0136	0.2569	1,355	0.0681
Pumps Composite		0.0508	0.2751	0.3560	0.0006	0.0214	49.6	0.0046
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0729	0.2611	0.2245	0.0003	0.0174	26.0	0.0066
	120	0.0736	0.3944	0.4749	0.0007	0.0378	59.0	0.0066
	175	0.0964	0.6140	0.7248	0.0012	0.0393	108	0.0087
	250	0.0985	0.3375	0.9035	0.0017	0.0302	153	0.0089
	500	0.1323	0.5091	1.1463	0.0022	0.0401	219	0.0119
Rollers Composite		0.0736	0.3913	0.4866	0.0008	0.0322	67.0	0.0066
Rough Terrain Fo	50	0.0743	0.3373	0.2846	0.0004	0.0190	33.9	0.0067
	120	0.0660	0.4203	0.4341	0.0007	0.0319	62.4	0.0060
	175	0.0993	0.7233	0.6899	0.0014	0.0371	125	0.0090
	250	0.1047	0.3544	0.8098	0.0019	0.0269	171	0.0094
	500	0.1514	0.5104	1.0707	0.0025	0.0383	257	0.0137
Rough Terrain Forklifts Compo		0.0704	0.4522	0.4645	0.0008	0.0323	70.3	0.0064
Rubber Tired Doz	175	0.1763	0.8232	1.2239	0.0015	0.0692	129	0.0159
	250	0.1992	0.5845	1.5954	0.0021	0.0654	183	0.0180
	500	0.2660	1.0972	2.0893	0.0026	0.0849	265	0.0240
	750	0.4016	1.6469	3.2071	0.0040	0.1289	399	0.0362
	1000	0.6276	2.6606	6.2665	0.0060	0.2034	592	0.0566
Rubber Tired Dozers Compos		0.2465	0.9300	1.9508	0.0025	0.0796	239	0.0222
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0818	0.3270	0.2684	0.0004	0.0195	31.1	0.0074
	120	0.0714	0.4038	0.4460	0.0007	0.0346	58.9	0.0064
	175	0.0954	0.6234	0.6571	0.0012	0.0362	106	0.0086
	250	0.1000	0.3290	0.7984	0.0017	0.0272	149	0.0090
	500	0.1514	0.5411	1.1288	0.0023	0.0405	237	0.0137
	750	0.3121	1.1077	2.3876	0.0049	0.0844	486	0.0282
	1000	0.4149	1.4822	4.7146	0.0060	0.1302	594	0.0374
Rubber Tired Loaders Compos		0.0920	0.4510	0.6446	0.0012	0.0336	109	0.0083
Scrapers	120	0.1471	0.6728	0.8712	0.0011	0.0719	93.9	0.0133
	175	0.1673	0.8975	1.1638	0.0017	0.0655	148	0.0151

	250	0.1805	0.5495	1.4783	0.0024	0.0552	209	0.0163
	500	0.2594	0.9602	2.0375	0.0032	0.0777	321	0.0234
	750	0.4502	1.6557	3.6101	0.0056	0.1359	555	0.0406
Scrapers Composite		0.2257	0.8713	1.7483	0.0027	0.0716	262	0.0204
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0738	0.3047	0.2923	0.0005	0.0195	36.2	0.0067
	120	0.0781	0.5033	0.5729	0.0009	0.0410	80.2	0.0070
	175	0.1057	0.8280	0.8988	0.0017	0.0440	155	0.0095
	250	0.1230	0.4919	1.2834	0.0029	0.0379	255	0.0111
Signal Boards Composite		0.0151	0.0918	0.1098	0.0002	0.0055	16.7	0.0014
Skid Steer Loade	25	0.0179	0.0588	0.1090	0.0002	0.0050	13.8	0.0016
	50	0.0288	0.2057	0.1865	0.0003	0.0079	25.5	0.0026
	120	0.0268	0.2686	0.2172	0.0005	0.0114	42.8	0.0024
Skid Steer Loaders Composite		0.0274	0.2161	0.1912	0.0004	0.0088	30.3	0.0025
Surfacing Equipm	50	0.0346	0.1270	0.1178	0.0002	0.0085	14.1	0.0031
	120	0.0722	0.4096	0.4995	0.0007	0.0368	63.8	0.0065
	175	0.0685	0.4685	0.5589	0.0010	0.0282	85.8	0.0062
	250	0.0780	0.2927	0.7732	0.0015	0.0253	135	0.0070
	500	0.1186	0.5248	1.1392	0.0022	0.0385	221	0.0107
	750	0.1888	0.8224	1.8408	0.0035	0.0614	347	0.0170
Surfacing Equipment Compos		0.0981	0.4333	0.8855	0.0017	0.0321	166	0.0088
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0581	0.3019	0.2627	0.0004	0.0158	31.6	0.0052
	120	0.0701	0.4996	0.4855	0.0009	0.0336	75.0	0.0063
	175	0.1029	0.8018	0.7099	0.0016	0.0381	139	0.0093
	250	0.0936	0.3232	0.6970	0.0018	0.0230	162	0.0084
Sweepers/Scrubbers Compos		0.0737	0.4962	0.4726	0.0009	0.0288	78.5	0.0067
Tractors/Loaders	25	0.0192	0.0653	0.1213	0.0002	0.0047	15.9	0.0017
	50	0.0555	0.2889	0.2435	0.0004	0.0141	30.3	0.0050
	120	0.0477	0.3442	0.3216	0.0006	0.0217	51.7	0.0043
	175	0.0726	0.5847	0.4886	0.0011	0.0254	101	0.0066
	250	0.0968	0.3506	0.6887	0.0019	0.0229	172	0.0087
	500	0.1886	0.6859	1.2315	0.0039	0.0438	345	0.0170
	750	0.2842	1.0286	1.9040	0.0058	0.0668	517	0.0256
Tractors/Loaders/Backhoes C		0.0559	0.3666	0.3681	0.0008	0.0222	66.8	0.0050
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.1222	0.3728	0.3051	0.0004	0.0274	32.9	0.0110
	120	0.1018	0.4529	0.6266	0.0008	0.0514	64.9	0.0092
	175	0.1590	0.8464	1.1893	0.0016	0.0653	144	0.0143
	250	0.1883	0.6031	1.6715	0.0025	0.0635	223	0.0170
	500	0.2433	1.0086	2.1048	0.0031	0.0805	311	0.0220
	750	0.4610	1.8971	4.0616	0.0059	0.1535	587	0.0416
Trenchers Composite		0.1129	0.4422	0.5410	0.0007	0.0423	58.7	0.0102
Welders	15	0.0086	0.0394	0.0536	0.0001	0.0030	6.2	0.0008
	25	0.0166	0.0511	0.0941	0.0001	0.0049	11.3	0.0015
	50	0.0638	0.2408	0.2183	0.0003	0.0162	26.0	0.0058
	120	0.0444	0.2559	0.3033	0.0005	0.0234	39.5	0.0040
	175	0.0774	0.5404	0.6214	0.0011	0.0322	98.2	0.0070
	250	0.0657	0.2384	0.6582	0.0013	0.0200	119	0.0059
	500	0.0865	0.3263	0.8096	0.0016	0.0264	168	0.0078
Welders Composite		0.0434	0.1912	0.2054	0.0003	0.0150	25.6	0.0039

SCAB Fleet Average Emission Factors (Diesel)

2018

Air Basin	SC

Equipment	MaxHP	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0143	0.0468	0.0865	0.0001	0.0039	11.0	0.0013
	50	0.0336	0.1506	0.1525	0.0003	0.0093	19.6	0.0030
	120	0.0327	0.2319	0.2565	0.0004	0.0170	38.1	0.0029
	500	0.0840	0.3899	0.8852	0.0021	0.0270	213	0.0076
	750	0.1545	0.7049	1.6423	0.0039	0.0494	385	0.0139
Aerial Lifts Composite		0.0322	0.1740	0.2152	0.0004	0.0119	34.7	0.0029
Air Compressors	15	0.0098	0.0456	0.0608	0.0001	0.0033	7.2	0.0009
	25	0.0207	0.0645	0.1187	0.0002	0.0060	14.4	0.0019
	50	0.0518	0.2142	0.1848	0.0003	0.0131	22.3	0.0047
	120	0.0504	0.3097	0.3370	0.0006	0.0255	47.0	0.0045
	175	0.0685	0.4994	0.5069	0.0010	0.0268	88.5	0.0062
	250	0.0747	0.2653	0.6529	0.0015	0.0206	131	0.0067
	500	0.1262	0.4504	1.0161	0.0023	0.0345	232	0.0114
	750	0.1960	0.6961	1.6134	0.0036	0.0540	358	0.0177
	1000	0.2958	1.0416	3.7257	0.0049	0.0965	486	0.0267
Air Compressors Composite		0.0582	0.3130	0.3935	0.0007	0.0246	63.6	0.0052
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0204	0.2211	0.1897	0.0004	0.0034	31.0	0.0018
	120	0.0308	0.4665	0.2710	0.0009	0.0072	77.1	0.0028
	175	0.0475	0.7542	0.2910	0.0016	0.0092	141	0.0043
	250	0.0538	0.3426	0.2499	0.0021	0.0068	188	0.0049
	500	0.0887	0.5512	0.4035	0.0031	0.0112	311	0.0080
	750	0.1755	1.0891	0.8022	0.0062	0.0222	615	0.0158
	1000	0.2789	1.6441	4.2095	0.0093	0.0723	928	0.0252
Bore/Drill Rigs Composite		0.0539	0.5011	0.4175	0.0017	0.0099	165	0.0049
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0232	0.0754	0.1391	0.0002	0.0064	17.6	0.0021
Cement and Mortar Mixers Co		0.0087	0.0416	0.0538	0.0001	0.0022	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0549	0.2534	0.2388	0.0004	0.0148	30.2	0.0050
	120	0.0650	0.4661	0.4898	0.0009	0.0335	74.1	0.0059
	175	0.1012	0.8661	0.8304	0.0018	0.0410	160	0.0091
Concrete/Industrial Saws Com		0.0605	0.3850	0.3959	0.0007	0.0261	58.5	0.0055
Cranes	50	0.0646	0.2527	0.2019	0.0003	0.0151	23.2	0.0058
	120	0.0639	0.3486	0.3857	0.0006	0.0306	50.1	0.0058
	175	0.0752	0.4766	0.5029	0.0009	0.0283	80.3	0.0068
	250	0.0787	0.2521	0.6168	0.0013	0.0212	112	0.0071
	500	0.1202	0.4085	0.8748	0.0018	0.0317	180	0.0108
	750	0.2034	0.6869	1.5239	0.0030	0.0544	303	0.0184
	9999	0.7422	2.3933	7.8338	0.0098	0.2146	971	0.0670
Cranes Composite		0.1012	0.4060	0.7908	0.0014	0.0318	129	0.0091
Crawler Tractors	50	0.0813	0.2884	0.2240	0.0003	0.0181	24.9	0.0073
	120	0.0945	0.4679	0.5589	0.0008	0.0448	65.8	0.0085
	175	0.1270	0.7327	0.8534	0.0014	0.0479	121	0.0115
	250	0.1333	0.4179	1.0430	0.0019	0.0385	166	0.0120
	500	0.1959	0.7202	1.4625	0.0025	0.0554	259	0.0177
	750	0.3529	1.2889	2.6916	0.0047	0.1006	465	0.0318
	1000	0.5380	2.0171	5.7362	0.0066	0.1663	658	0.0485
Crawler Tractors Composite		0.1185	0.5387	0.7960	0.0013	0.0457	114	0.0107

Crushing/Proc. E	50	0.0949	0.4230	0.3607	0.0006	0.0241	44.0	0.0086
	120	0.0849	0.5506	0.5679	0.0010	0.0416	83.1	0.0077
	175	0.1258	0.9520	0.8975	0.0019	0.0475	167	0.0113
	250	0.1386	0.4932	1.1284	0.0028	0.0359	245	0.0125
	500	0.2037	0.7231	1.5205	0.0037	0.0524	374	0.0184
	750	0.3193	1.1368	2.4441	0.0059	0.0824	589	0.0288
	9999	0.8312	2.7569	9.5902	0.0131	0.2467	1,308	0.0750
Crushing/Proc. Equipment Co		0.1109	0.6328	0.7330	0.0015	0.0412	132	0.0100
Dumpers/Tender	25	0.0092	0.0314	0.0584	0.0001	0.0023	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0584	0.0001	0.0023	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0468	0.2521	0.2002	0.0003	0.0111	25.0	0.0042
	120	0.0693	0.5017	0.4425	0.0009	0.0289	73.6	0.0063
	175	0.0824	0.6641	0.5069	0.0013	0.0264	112	0.0074
	250	0.0933	0.3323	0.5984	0.0018	0.0202	159	0.0084
	500	0.1339	0.4689	0.7881	0.0023	0.0284	234	0.0121
	750	0.2224	0.7769	1.3381	0.0039	0.0476	387	0.0201
Excavators Composite		0.0848	0.5160	0.5181	0.0013	0.0249	120	0.0077
Forklifts	50	0.0229	0.1440	0.1180	0.0002	0.0058	14.7	0.0021
	120	0.0265	0.2118	0.1745	0.0004	0.0108	31.2	0.0024
	175	0.0394	0.3322	0.2328	0.0006	0.0125	56.1	0.0036
	250	0.0440	0.1559	0.2594	0.0009	0.0089	77.1	0.0040
	500	0.0623	0.2131	0.3432	0.0011	0.0125	111	0.0056
Forklifts Composite		0.0372	0.2173	0.2186	0.0006	0.0101	54.4	0.0034
Generator Sets	15	0.0123	0.0644	0.0852	0.0002	0.0043	10.2	0.0011
	25	0.0231	0.0788	0.1449	0.0002	0.0070	17.6	0.0021
	50	0.0491	0.2265	0.2357	0.0004	0.0138	30.6	0.0044
	120	0.0642	0.4694	0.5181	0.0009	0.0333	77.9	0.0058
	175	0.0808	0.7324	0.7528	0.0016	0.0337	142	0.0073
	250	0.0857	0.3931	0.9756	0.0024	0.0274	213	0.0077
	500	0.1264	0.6113	1.3836	0.0033	0.0415	337	0.0114
	750	0.2080	0.9868	2.2918	0.0055	0.0679	544	0.0188
	9999	0.5230	2.0948	7.5356	0.0105	0.1778	1,049	0.0472
Generator Sets Composite		0.0477	0.2786	0.3759	0.0007	0.0192	61.0	0.0043
Graders	50	0.0676	0.2868	0.2305	0.0004	0.0157	27.5	0.0061
	120	0.0860	0.5138	0.5323	0.0009	0.0398	75.0	0.0078
	175	0.1059	0.7294	0.7002	0.0014	0.0385	124	0.0096
	250	0.1115	0.3778	0.8409	0.0019	0.0287	172	0.0101
	500	0.1420	0.5194	0.9989	0.0023	0.0359	229	0.0128
	750	0.3024	1.0988	2.1820	0.0049	0.0774	486	0.0273
Graders Composite		0.1049	0.5812	0.7217	0.0015	0.0355	133	0.0095
Off-Highway Trac	120	0.1622	0.6879	0.9427	0.0011	0.0779	93.7	0.0146
	175	0.1614	0.8085	1.1191	0.0015	0.0632	130	0.0146
	250	0.1275	0.3861	1.0244	0.0015	0.0411	130	0.0115
	750	0.5173	2.0914	4.1264	0.0057	0.1633	568	0.0467
	1000	0.7842	3.2770	8.0820	0.0082	0.2526	814	0.0708
Off-Highway Tractors Compos		0.1631	0.6762	1.2293	0.0017	0.0579	151	0.0147
Off-Highway Truc	175	0.0983	0.7542	0.5947	0.0014	0.0314	125	0.0089
	250	0.1042	0.3572	0.6660	0.0019	0.0225	167	0.0094
	500	0.1656	0.5578	0.9706	0.0027	0.0351	272	0.0149
	750	0.2693	0.9044	1.6152	0.0044	0.0577	442	0.0243
	1000	0.4058	1.3339	4.3394	0.0063	0.1110	625	0.0366
Off-Highway Trucks Composit		0.1613	0.5634	1.0525	0.0027	0.0360	260	0.0146
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0412	0.2342	0.2102	0.0004	0.0108	28.0	0.0037
	120	0.0604	0.5116	0.4573	0.0009	0.0279	80.9	0.0054
	175	0.0608	0.5859	0.4478	0.0012	0.0218	107	0.0055
	500	0.1122	0.4743	0.8004	0.0025	0.0275	254	0.0101
Other Construction Equipment		0.0633	0.3542	0.4478	0.0013	0.0181	123	0.0057

Other General Ind	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0548	0.2314	0.1869	0.0003	0.0134	21.7	0.0049
	120	0.0732	0.4277	0.4544	0.0007	0.0350	62.0	0.0066
	175	0.0835	0.5664	0.5608	0.0011	0.0307	95.9	0.0075
	250	0.0884	0.2862	0.6866	0.0015	0.0221	136	0.0080
	500	0.1664	0.5336	1.1846	0.0026	0.0412	265	0.0150
	750	0.2755	0.8795	2.0057	0.0044	0.0689	437	0.0249
	1000	0.3866	1.2370	4.3716	0.0056	0.1169	560	0.0349
Other General Industrial Equip		0.1113	0.4591	0.8242	0.0016	0.0336	152	0.0100
Other Material Ha	50	0.0758	0.3192	0.2598	0.0004	0.0186	30.3	0.0068
	120	0.0709	0.4162	0.4437	0.0007	0.0341	60.7	0.0064
	175	0.1050	0.7171	0.7125	0.0014	0.0389	122	0.0095
	250	0.0934	0.3046	0.7336	0.0016	0.0237	145	0.0084
	500	0.1186	0.3838	0.8543	0.0019	0.0297	192	0.0107
	9999	0.5386	1.6331	5.7822	0.0073	0.1543	741	0.0486
Other Material Handling Equip		0.1050	0.4495	0.8053	0.0015	0.0324	141	0.0095
Pavers	25	0.0226	0.0769	0.1434	0.0002	0.0057	18.7	0.0020
	50	0.0968	0.3188	0.2539	0.0004	0.0217	28.0	0.0087
	120	0.1030	0.4862	0.6205	0.0008	0.0506	69.2	0.0093
	175	0.1365	0.7632	0.9644	0.0014	0.0539	128	0.0123
	250	0.1574	0.5000	1.3162	0.0022	0.0490	194	0.0142
	500	0.1765	0.6885	1.4189	0.0023	0.0539	233	0.0159
Pavers Composite		0.1121	0.5017	0.6241	0.0009	0.0419	77.9	0.0101
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0821	0.2696	0.2165	0.0003	0.0185	23.9	0.0074
	120	0.0805	0.3809	0.4869	0.0006	0.0400	54.5	0.0073
	175	0.1062	0.5971	0.7567	0.0011	0.0424	101	0.0096
	250	0.0962	0.3068	0.8236	0.0014	0.0300	122	0.0087
Paving Equipment Composite		0.0857	0.4136	0.5558	0.0008	0.0374	68.9	0.0077
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0059	0.0308	0.0408	0.0001	0.0021	4.9	0.0005
	25	0.0094	0.0319	0.0587	0.0001	0.0028	7.1	0.0008
	50	0.0170	0.0895	0.1059	0.0002	0.0054	14.3	0.0015
	120	0.0167	0.1383	0.1528	0.0003	0.0087	24.1	0.0015
Pressure Washers Composite		0.0101	0.0562	0.0703	0.0001	0.0036	9.4	0.0009
Pumps	15	0.0101	0.0468	0.0625	0.0001	0.0034	7.4	0.0009
	25	0.0279	0.0871	0.1601	0.0002	0.0080	19.5	0.0025
	50	0.0599	0.2670	0.2677	0.0004	0.0164	34.3	0.0054
	120	0.0676	0.4767	0.5260	0.0009	0.0350	77.9	0.0061
	175	0.0845	0.7338	0.7548	0.0016	0.0350	140	0.0076
	250	0.0866	0.3786	0.9399	0.0023	0.0271	201	0.0078
	500	0.1387	0.6343	1.4367	0.0034	0.0442	345	0.0125
	750	0.2330	1.0487	2.4376	0.0057	0.0741	571	0.0210
	9999	0.7050	2.7434	9.8509	0.0136	0.2358	1,355	0.0636
Pumps Composite		0.0458	0.2722	0.3306	0.0006	0.0189	49.6	0.0041
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0662	0.2547	0.2171	0.0003	0.0158	26.0	0.0060
	120	0.0680	0.3919	0.4411	0.0007	0.0341	59.0	0.0061
	175	0.0897	0.6130	0.6569	0.0012	0.0356	108	0.0081
	250	0.0934	0.3306	0.8164	0.0017	0.0274	153	0.0084
	500	0.1262	0.4902	1.0345	0.0022	0.0365	219	0.0114
Rollers Composite		0.0683	0.3885	0.4485	0.0008	0.0291	67.0	0.0062
Rough Terrain Fo	50	0.0655	0.3294	0.2744	0.0004	0.0166	33.9	0.0059
	120	0.0596	0.4179	0.3967	0.0007	0.0273	62.4	0.0054
	175	0.0911	0.7231	0.6072	0.0014	0.0322	125	0.0082
	250	0.0988	0.3504	0.7075	0.0019	0.0237	171	0.0089
	500	0.1441	0.5029	0.9468	0.0025	0.0341	257	0.0130
Rough Terrain Forklifts Compo		0.0638	0.4499	0.4219	0.0008	0.0277	70.3	0.0058

Rubber Tired Doz	175	0.1676	0.8191	1.1443	0.0015	0.0646	129	0.0151
	250	0.1890	0.5640	1.4879	0.0021	0.0605	183	0.0171
	500	0.2531	1.0338	1.9476	0.0026	0.0787	265	0.0228
	750	0.3821	1.5520	2.9917	0.0040	0.1195	399	0.0345
	1000	0.5986	2.5082	6.0072	0.0060	0.1906	592	0.0540
Rubber Tired Dozers Compos		0.2343	0.8819	1.8194	0.0025	0.0737	239	0.0211
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0742	0.3198	0.2591	0.0004	0.0174	31.1	0.0067
	120	0.0660	0.4016	0.4121	0.0007	0.0307	58.9	0.0060
	175	0.0888	0.6227	0.5902	0.0012	0.0323	106	0.0080
	250	0.0946	0.3237	0.7142	0.0017	0.0244	149	0.0085
	500	0.1440	0.5256	1.0103	0.0023	0.0363	237	0.0130
	750	0.2966	1.0762	2.1374	0.0049	0.0758	486	0.0268
	1000	0.3912	1.4170	4.4558	0.0060	0.1188	594	0.0353
Rubber Tired Loaders Compo		0.0861	0.4470	0.5831	0.0012	0.0300	109	0.0078
Scrapers	120	0.1382	0.6686	0.8165	0.0011	0.0661	93.9	0.0125
	175	0.1579	0.8954	1.0712	0.0017	0.0603	148	0.0142
	250	0.1704	0.5324	1.3558	0.0024	0.0501	209	0.0154
	500	0.2458	0.9165	1.8678	0.0032	0.0707	321	0.0222
	750	0.4267	1.5807	3.3123	0.0056	0.1238	555	0.0385
Scrapers Composite		0.2135	0.8418	1.6042	0.0027	0.0653	262	0.0193
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0649	0.2966	0.2820	0.0005	0.0172	36.2	0.0059
	120	0.0695	0.4999	0.5256	0.0009	0.0356	80.2	0.0063
	175	0.0955	0.8276	0.7968	0.0017	0.0385	155	0.0086
	250	0.1151	0.4857	1.1305	0.0029	0.0337	255	0.0104
Signal Boards Composite		0.0143	0.0916	0.1029	0.0002	0.0050	16.7	0.0013
Skid Steer Loade	25	0.0176	0.0582	0.1081	0.0002	0.0048	13.8	0.0016
	50	0.0263	0.2035	0.1787	0.0003	0.0065	25.5	0.0024
	120	0.0248	0.2680	0.1970	0.0005	0.0095	42.8	0.0022
Skid Steer Loaders Composite		0.0253	0.2146	0.1799	0.0004	0.0074	30.3	0.0023
Surfacing Equipn	50	0.0317	0.1242	0.1139	0.0002	0.0077	14.1	0.0029
	120	0.0668	0.4072	0.4651	0.0007	0.0334	63.8	0.0060
	175	0.0637	0.4677	0.5082	0.0010	0.0257	85.8	0.0058
	250	0.0733	0.2858	0.7013	0.0015	0.0230	135	0.0066
	500	0.1120	0.5047	1.0316	0.0022	0.0350	221	0.0101
	750	0.1782	0.7911	1.6685	0.0035	0.0558	347	0.0161
Surfacing Equipment Compos		0.0923	0.4187	0.8043	0.0017	0.0291	166	0.0083
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0522	0.2974	0.2539	0.0004	0.0137	31.6	0.0047
	120	0.0647	0.4983	0.4442	0.0009	0.0291	75.0	0.0058
	175	0.0966	0.8030	0.6280	0.0016	0.0337	139	0.0087
	250	0.0894	0.3218	0.6073	0.0018	0.0204	162	0.0081
Sweepers/Scrubbers Compos		0.0681	0.4946	0.4308	0.0009	0.0251	78.5	0.0061
Tractors/Loaders	25	0.0191	0.0653	0.1211	0.0002	0.0046	15.9	0.0017
	50	0.0497	0.2839	0.2342	0.0004	0.0121	30.3	0.0045
	120	0.0435	0.3426	0.2937	0.0006	0.0184	51.7	0.0039
	175	0.0669	0.5845	0.4264	0.0011	0.0218	101	0.0060
	250	0.0914	0.3483	0.5964	0.0019	0.0200	172	0.0082
	500	0.1788	0.6771	1.0736	0.0039	0.0385	345	0.0161
	750	0.2691	1.0154	1.6525	0.0058	0.0585	517	0.0243
Tractors/Loaders/Backhoes C		0.0513	0.3647	0.3331	0.0008	0.0189	66.8	0.0046
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.1142	0.3647	0.2965	0.0004	0.0255	32.9	0.0103
	120	0.0959	0.4498	0.5899	0.0008	0.0477	64.9	0.0087
	175	0.1505	0.8436	1.1021	0.0016	0.0607	144	0.0136
	250	0.1783	0.5823	1.5446	0.0025	0.0582	223	0.0161
	500	0.2312	0.9564	1.9434	0.0031	0.0740	311	0.0209
	750	0.4382	1.7994	3.7533	0.0059	0.1413	587	0.0395
Trenchers Composite		0.1061	0.4368	0.5117	0.0007	0.0393	58.7	0.0096

Welders	15	0.0084	0.0392	0.0522	0.0001	0.0028	6.2	0.0008
	25	0.0161	0.0504	0.0927	0.0001	0.0047	11.3	0.0015
	50	0.0563	0.2339	0.2108	0.0003	0.0144	26.0	0.0051
	120	0.0398	0.2540	0.2787	0.0005	0.0205	39.5	0.0036
	175	0.0703	0.5400	0.5536	0.0011	0.0283	98.2	0.0063
	250	0.0617	0.2348	0.5828	0.0013	0.0179	119	0.0056
	500	0.0825	0.3196	0.7244	0.0016	0.0239	168	0.0074
Welders Composite		0.0388	0.1876	0.1941	0.0003	0.0133	25.6	0.0035

SCAB Fleet Average Emission Factors (Diesel)

2019

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0140	0.0463	0.0859	0.0001	0.0037	11.0	0.0013
	50	0.0293	0.1466	0.1471	0.0003	0.0081	19.6	0.0026
	120	0.0288	0.2304	0.2354	0.0004	0.0146	38.1	0.0026
	500	0.0794	0.3843	0.7878	0.0021	0.0243	213	0.0072
	750	0.1455	0.6947	1.4582	0.0039	0.0444	385	0.0131
Aerial Lifts Composite		0.0288	0.1715	0.2002	0.0004	0.0104	34.7	0.0026
Air Compressors	15	0.0096	0.0453	0.0593	0.0001	0.0031	7.2	0.0009
	25	0.0201	0.0638	0.1170	0.0002	0.0057	14.4	0.0018
	50	0.0450	0.2078	0.1784	0.0003	0.0114	22.3	0.0041
	120	0.0450	0.3075	0.3081	0.0006	0.0218	47.0	0.0041
	175	0.0631	0.4991	0.4511	0.0010	0.0237	88.5	0.0057
	250	0.0707	0.2619	0.5761	0.0015	0.0183	131	0.0064
	500	0.1203	0.4440	0.9034	0.0023	0.0310	232	0.0109
	750	0.1867	0.6861	1.4307	0.0036	0.0485	358	0.0168
	1000	0.2796	1.0167	3.5067	0.0049	0.0884	486	0.0252
Air Compressors Composite		0.0526	0.3100	0.3577	0.0007	0.0213	63.6	0.0047
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0045	16.0	0.0017
	50	0.0199	0.2207	0.1818	0.0004	0.0026	31.0	0.0018
	120	0.0293	0.4663	0.2501	0.0009	0.0054	77.1	0.0026
	175	0.0436	0.7542	0.2336	0.0016	0.0068	141	0.0039
	250	0.0502	0.3426	0.2000	0.0021	0.0054	188	0.0045
	500	0.0829	0.5512	0.3237	0.0031	0.0088	311	0.0075
	750	0.1640	1.0891	0.6432	0.0062	0.0174	615	0.0148
	1000	0.2597	1.6436	4.0728	0.0093	0.0615	928	0.0234
Bore/Drill Rigs Composite		0.0506	0.5009	0.3760	0.0017	0.0078	165	0.0046
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0227	0.0747	0.1381	0.0002	0.0061	17.6	0.0021
Cement and Mortar Mixers Co		0.0086	0.0416	0.0537	0.0001	0.0022	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0478	0.2469	0.2306	0.0004	0.0129	30.2	0.0043
	120	0.0579	0.4633	0.4490	0.0009	0.0288	74.1	0.0052
	175	0.0931	0.8661	0.7382	0.0018	0.0363	160	0.0084
Concrete/Industrial Saws Com		0.0536	0.3812	0.3669	0.0007	0.0225	58.5	0.0048
Cranes	50	0.0587	0.2472	0.1955	0.0003	0.0136	23.2	0.0053
	120	0.0589	0.3465	0.3579	0.0006	0.0272	50.1	0.0053
	175	0.0699	0.4760	0.4536	0.0009	0.0252	80.3	0.0063
	250	0.0745	0.2478	0.5539	0.0013	0.0190	112	0.0067
	500	0.1143	0.3951	0.7861	0.0018	0.0286	180	0.0103
	750	0.1934	0.6644	1.3678	0.0030	0.0490	303	0.0174
	9999	0.7049	2.2802	7.4207	0.0098	0.1963	971	0.0636
Cranes Composite		0.0954	0.3982	0.7236	0.0014	0.0286	129	0.0086
Crawler Tractors	50	0.0754	0.2825	0.2172	0.0003	0.0165	24.9	0.0068
	120	0.0887	0.4652	0.5230	0.0008	0.0408	65.8	0.0080
	175	0.1194	0.7313	0.7820	0.0014	0.0437	121	0.0108
	250	0.1258	0.4065	0.9524	0.0019	0.0349	166	0.0114
	500	0.1856	0.6914	1.3353	0.0025	0.0502	259	0.0167
	750	0.3343	1.2378	2.4593	0.0047	0.0913	465	0.0302
	1000	0.5101	1.9264	5.4669	0.0066	0.1540	658	0.0460
Crawler Tractors Composite		0.1115	0.5319	0.7346	0.0013	0.0416	114	0.0101
Crushing/Proc. E	50	0.0825	0.4118	0.3482	0.0006	0.0209	44.0	0.0074
	120	0.0760	0.5471	0.5185	0.0010	0.0353	83.1	0.0069
	175	0.1161	0.9518	0.7948	0.0019	0.0417	167	0.0105
	250	0.1312	0.4883	0.9900	0.0028	0.0319	245	0.0118
	500	0.1943	0.7148	1.3454	0.0037	0.0468	374	0.0175
	750	0.3049	1.1248	2.1610	0.0059	0.0737	589	0.0275

	9999	0.7943	2.7001	9.0361	0.0131	0.2254	1,308	0.0717
Crushing/Proc. Equipment Co		0.1011	0.6280	0.6619	0.0015	0.0356	132	0.0091
Dumpers/Tender	25	0.0092	0.0314	0.0583	0.0001	0.0022	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0583	0.0001	0.0022	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0422	0.2480	0.1928	0.0003	0.0094	25.0	0.0038
	120	0.0633	0.4996	0.4050	0.0009	0.0244	73.6	0.0057
	175	0.0759	0.6638	0.4429	0.0013	0.0227	112	0.0068
	250	0.0878	0.3298	0.5187	0.0018	0.0176	159	0.0079
	500	0.1266	0.4632	0.6900	0.0023	0.0250	234	0.0114
	750	0.2100	0.7674	1.1653	0.0039	0.0417	387	0.0189
Excavators Composite		0.0787	0.5140	0.4575	0.0013	0.0214	120	0.0071
Forklifts	50	0.0207	0.1418	0.1131	0.0002	0.0047	14.7	0.0019
	120	0.0243	0.2109	0.1572	0.0004	0.0089	31.2	0.0022
	175	0.0364	0.3319	0.2037	0.0006	0.0105	56.1	0.0033
	250	0.0412	0.1556	0.2222	0.0009	0.0075	77.1	0.0037
	500	0.0586	0.2128	0.2968	0.0011	0.0106	111	0.0053
Forklifts Composite		0.0345	0.2166	0.1924	0.0006	0.0085	54.4	0.0031
Generator Sets	15	0.0119	0.0641	0.0832	0.0002	0.0041	10.2	0.0011
	25	0.0228	0.0778	0.1428	0.0002	0.0067	17.6	0.0021
	50	0.0428	0.2206	0.2274	0.0004	0.0121	30.6	0.0039
	120	0.0564	0.4663	0.4757	0.0009	0.0287	77.9	0.0051
	175	0.0734	0.7323	0.6719	0.0016	0.0299	142	0.0066
	250	0.0798	0.3883	0.8633	0.0024	0.0245	213	0.0072
	500	0.1192	0.6027	1.2312	0.0033	0.0373	337	0.0108
	750	0.1955	0.9730	2.0345	0.0055	0.0609	544	0.0176
	9999	0.4857	2.0464	7.1075	0.0105	0.1624	1,049	0.0438
Generator Sets Composite		0.0431	0.2755	0.3483	0.0007	0.0169	61.0	0.0039
Graders	50	0.0617	0.2812	0.2228	0.0004	0.0140	27.5	0.0056
	120	0.0796	0.5112	0.4929	0.0009	0.0353	75.0	0.0072
	175	0.0987	0.7288	0.6283	0.0014	0.0343	124	0.0089
	250	0.1055	0.3726	0.7518	0.0019	0.0257	172	0.0095
	500	0.1350	0.5072	0.8940	0.0023	0.0322	229	0.0122
	750	0.2873	1.0731	1.9527	0.0049	0.0694	486	0.0259
Graders Composite		0.0982	0.5787	0.6490	0.0015	0.0316	133	0.0089
Off-Highway Trac	120	0.1537	0.6832	0.8910	0.0011	0.0726	93.7	0.0139
	175	0.1533	0.8053	1.0433	0.0015	0.0588	130	0.0138
	250	0.1210	0.3732	0.9525	0.0015	0.0379	130	0.0109
	750	0.4923	1.9813	3.8379	0.0057	0.1508	568	0.0444
	1000	0.7478	3.1026	7.7459	0.0082	0.2366	814	0.0675
Off-Highway Tractors Compos		0.1549	0.6634	1.1454	0.0017	0.0537	151	0.0140
Off-Highway Truc	175	0.0904	0.7539	0.5208	0.0014	0.0270	125	0.0082
	250	0.0981	0.3540	0.5797	0.0019	0.0198	167	0.0089
	500	0.1568	0.5502	0.8530	0.0027	0.0310	272	0.0142
	750	0.2547	0.8921	1.4118	0.0044	0.0507	442	0.0230
	1000	0.3824	1.3098	4.1038	0.0063	0.1001	625	0.0345
Off-Highway Trucks Composit		0.1524	0.5565	0.9348	0.0027	0.0318	260	0.0137
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0363	0.2299	0.2025	0.0004	0.0092	28.0	0.0033
	120	0.0545	0.5095	0.4176	0.0009	0.0235	80.9	0.0049
	175	0.0562	0.5859	0.3912	0.0012	0.0189	107	0.0051
	500	0.1066	0.4705	0.6985	0.0025	0.0243	254	0.0096
Other Construction Equipment		0.0596	0.3522	0.3972	0.0013	0.0159	123	0.0054
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0481	0.2255	0.1804	0.0003	0.0117	21.7	0.0043
	120	0.0658	0.4250	0.4154	0.0007	0.0298	62.0	0.0059
	175	0.0772	0.5666	0.4991	0.0011	0.0269	95.9	0.0070
	250	0.0836	0.2830	0.6051	0.0015	0.0196	136	0.0075
	500	0.1584	0.5265	1.0524	0.0026	0.0368	265	0.0143
	750	0.2620	0.8678	1.7772	0.0044	0.0614	437	0.0236
	1000	0.3666	1.2089	4.1118	0.0056	0.1068	560	0.0331
Other General Industrial Equip		0.1044	0.4549	0.7419	0.0016	0.0297	152	0.0094
Other Material Ha	50	0.0664	0.3109	0.2508	0.0004	0.0162	30.3	0.0060
	120	0.0637	0.4135	0.4056	0.0007	0.0291	60.7	0.0058

	175	0.0972	0.7172	0.6342	0.0014	0.0342	122	0.0088
	250	0.0883	0.3011	0.6467	0.0016	0.0209	145	0.0080
	500	0.1130	0.3786	0.7591	0.0019	0.0265	192	0.0102
	9999	0.5150	1.5956	5.4382	0.0073	0.1409	741	0.0465
Other Material Handling Equip		0.0983	0.4458	0.7239	0.0015	0.0286	141	0.0089
Pavers	25	0.0226	0.0768	0.1430	0.0002	0.0056	18.7	0.0020
	50	0.0899	0.3119	0.2467	0.0004	0.0200	28.0	0.0081
	120	0.0969	0.4833	0.5827	0.0008	0.0466	69.2	0.0087
	175	0.1290	0.7615	0.8894	0.0014	0.0498	128	0.0116
	250	0.1490	0.4846	1.2101	0.0022	0.0447	194	0.0134
	500	0.1677	0.6576	1.3038	0.0023	0.0493	233	0.0151
Pavers Composite		0.1053	0.4966	0.5833	0.0009	0.0386	77.9	0.0095
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0760	0.2634	0.2103	0.0003	0.0171	23.9	0.0069
	120	0.0756	0.3785	0.4566	0.0006	0.0368	54.5	0.0068
	175	0.1002	0.5958	0.6969	0.0011	0.0391	101	0.0090
	250	0.0911	0.2974	0.7562	0.0014	0.0273	122	0.0082
Paving Equipment Composite		0.0806	0.4109	0.5172	0.0008	0.0344	68.9	0.0073
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0057	0.0307	0.0399	0.0001	0.0019	4.9	0.0005
	25	0.0092	0.0315	0.0579	0.0001	0.0027	7.1	0.0008
	50	0.0146	0.0873	0.1021	0.0002	0.0047	14.3	0.0013
	120	0.0145	0.1374	0.1404	0.0003	0.0075	24.1	0.0013
Pressure Washers Composite		0.0092	0.0554	0.0675	0.0001	0.0033	9.4	0.0008
Pumps	15	0.0098	0.0466	0.0609	0.0001	0.0032	7.4	0.0009
	25	0.0271	0.0860	0.1579	0.0002	0.0077	19.5	0.0024
	50	0.0523	0.2600	0.2583	0.0004	0.0144	34.3	0.0047
	120	0.0596	0.4736	0.4827	0.0009	0.0302	77.9	0.0054
	175	0.0771	0.7336	0.6737	0.0016	0.0311	140	0.0070
	250	0.0809	0.3738	0.8318	0.0023	0.0242	201	0.0073
	500	0.1312	0.6252	1.2788	0.0034	0.0398	345	0.0118
	750	0.2196	1.0336	2.1645	0.0057	0.0666	571	0.0198
	9999	0.6578	2.6790	9.2901	0.0136	0.2156	1,355	0.0593
Pumps Composite		0.0412	0.2695	0.3068	0.0006	0.0166	49.6	0.0037
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0600	0.2489	0.2103	0.0003	0.0143	26.0	0.0054
	120	0.0626	0.3895	0.4094	0.0007	0.0305	59.0	0.0057
	175	0.0834	0.6121	0.5929	0.0012	0.0320	108	0.0075
	250	0.0886	0.3249	0.7347	0.0017	0.0248	153	0.0080
	500	0.1205	0.4743	0.9309	0.0022	0.0331	219	0.0109
Rollers Composite		0.0632	0.3859	0.4127	0.0008	0.0261	67.0	0.0057
Rough Terrain Fo	50	0.0577	0.3224	0.2646	0.0004	0.0143	33.9	0.0052
	120	0.0539	0.4158	0.3625	0.0007	0.0231	62.4	0.0049
	175	0.0844	0.7230	0.5350	0.0014	0.0281	125	0.0076
	250	0.0933	0.3470	0.6177	0.0019	0.0208	171	0.0084
	500	0.1368	0.4976	0.8334	0.0025	0.0302	257	0.0123
Rough Terrain Forklifts Compo		0.0579	0.4479	0.3832	0.0008	0.0235	70.3	0.0052
Rubber Tired Doz	175	0.1591	0.8155	1.0684	0.0015	0.0602	129	0.0144
	250	0.1792	0.5451	1.3860	0.0021	0.0559	183	0.0162
	500	0.2407	0.9773	1.8134	0.0026	0.0728	265	0.0217
	750	0.3635	1.4676	2.7876	0.0040	0.1107	399	0.0328
	1000	0.5706	2.3715	5.7623	0.0060	0.1786	592	0.0515
Rubber Tired Dozers Compos		0.2227	0.8388	1.6948	0.0025	0.0682	239	0.0201
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0675	0.3135	0.2504	0.0004	0.0155	31.1	0.0061
	120	0.0609	0.3995	0.3812	0.0007	0.0271	58.9	0.0055
	175	0.0825	0.6221	0.5283	0.0012	0.0287	106	0.0074
	250	0.0896	0.3194	0.6366	0.0017	0.0218	149	0.0081
	500	0.1369	0.5126	0.9018	0.0023	0.0326	237	0.0124
	750	0.2819	1.0497	1.9070	0.0049	0.0679	486	0.0254
	1000	0.3690	1.3618	4.2187	0.0060	0.1081	594	0.0333
Rubber Tired Loaders Compos		0.0805	0.4436	0.5265	0.0012	0.0266	109	0.0073
Scrapers	120	0.1298	0.6648	0.7651	0.0011	0.0604	93.9	0.0117
	175	0.1488	0.8936	0.9840	0.0017	0.0552	148	0.0134

	250	0.1610	0.5173	1.2413	0.0024	0.0455	209	0.0145
	500	0.2330	0.8785	1.7092	0.0032	0.0643	321	0.0210
	750	0.4045	1.5154	3.0335	0.0056	0.1126	555	0.0365
Scrapers Composite		0.2021	0.8161	1.4693	0.0027	0.0594	262	0.0182
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0565	0.2890	0.2721	0.0005	0.0150	36.2	0.0051
	120	0.0617	0.4968	0.4813	0.0009	0.0305	80.2	0.0056
	175	0.0875	0.8275	0.7074	0.0017	0.0340	155	0.0079
	250	0.1082	0.4806	0.9949	0.0029	0.0300	255	0.0098
Signal Boards Composite		0.0135	0.0913	0.0967	0.0002	0.0046	16.7	0.0012
Skid Steer Loade	25	0.0173	0.0578	0.1075	0.0002	0.0046	13.8	0.0016
	50	0.0245	0.2019	0.1717	0.0003	0.0053	25.5	0.0022
	120	0.0232	0.2676	0.1796	0.0005	0.0079	42.8	0.0021
Skid Steer Loaders Composite		0.0236	0.2134	0.1700	0.0004	0.0061	30.3	0.0021
Surfacing Equipn	50	0.0290	0.1215	0.1103	0.0002	0.0070	14.1	0.0026
	120	0.0617	0.4049	0.4331	0.0007	0.0302	63.8	0.0056
	175	0.0592	0.4670	0.4609	0.0010	0.0233	85.8	0.0053
	250	0.0691	0.2801	0.6343	0.0015	0.0208	135	0.0062
	500	0.1061	0.4875	0.9319	0.0022	0.0317	221	0.0096
	750	0.1686	0.7643	1.5081	0.0035	0.0507	347	0.0152
Surfacing Equipment Compos		0.0871	0.4061	0.7289	0.0017	0.0264	166	0.0079
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0474	0.2937	0.2454	0.0004	0.0117	31.6	0.0043
	120	0.0600	0.4973	0.4064	0.0009	0.0250	75.0	0.0054
	175	0.0904	0.8041	0.5513	0.0016	0.0295	139	0.0082
	250	0.0850	0.3207	0.5231	0.0018	0.0178	162	0.0077
Sweepers/Scrubbers Compos		0.0632	0.4933	0.3919	0.0009	0.0217	78.5	0.0057
Tractors/Loaders	25	0.0191	0.0653	0.1210	0.0002	0.0046	15.9	0.0017
	50	0.0448	0.2796	0.2257	0.0004	0.0103	30.3	0.0040
	120	0.0398	0.3413	0.2687	0.0006	0.0154	51.7	0.0036
	175	0.0617	0.5843	0.3708	0.0011	0.0187	101	0.0056
	250	0.0861	0.3462	0.5143	0.0019	0.0174	172	0.0078
	500	0.1694	0.6700	0.9349	0.0039	0.0337	345	0.0153
	750	0.2545	1.0047	1.4302	0.0058	0.0510	517	0.0230
Tractors/Loaders/Backhoes C		0.0472	0.3630	0.3019	0.0008	0.0160	66.8	0.0043
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.1064	0.3569	0.2883	0.0004	0.0236	32.9	0.0096
	120	0.0903	0.4470	0.5551	0.0008	0.0442	64.9	0.0081
	175	0.1424	0.8413	1.0194	0.0016	0.0563	144	0.0128
	250	0.1688	0.5637	1.4248	0.0025	0.0533	223	0.0152
	500	0.2199	0.9107	1.7915	0.0031	0.0680	311	0.0198
	750	0.4166	1.7139	3.4627	0.0059	0.1298	587	0.0376
Trenchers Composite		0.0995	0.4317	0.4838	0.0007	0.0364	58.7	0.0090
Welders	15	0.0082	0.0390	0.0509	0.0001	0.0027	6.2	0.0007
	25	0.0157	0.0498	0.0914	0.0001	0.0044	11.3	0.0014
	50	0.0490	0.2271	0.2035	0.0003	0.0126	26.0	0.0044
	120	0.0354	0.2522	0.2552	0.0005	0.0176	39.5	0.0032
	175	0.0646	0.5398	0.4934	0.0011	0.0251	98.2	0.0058
	250	0.0582	0.2319	0.5150	0.0013	0.0159	119	0.0053
	500	0.0786	0.3149	0.6445	0.0016	0.0215	168	0.0071
Welders Composite		0.0344	0.1843	0.1832	0.0003	0.0117	25.6	0.0031

SCAB Fleet Average Emission Factors (Diesel)

2020

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0138	0.0459	0.0854	0.0001	0.0035	11.0	0.0012
	50	0.0261	0.1436	0.1422	0.0003	0.0071	19.6	0.0024
	120	0.0259	0.2292	0.2166	0.0004	0.0127	38.1	0.0023
	500	0.0751	0.3804	0.6959	0.0021	0.0217	213	0.0068
	750	0.1373	0.6877	1.2876	0.0039	0.0396	385	0.0124
Aerial Lifts Composite		0.0261	0.1696	0.1866	0.0004	0.0092	34.7	0.0024
Air Compressors	15	0.0093	0.0451	0.0579	0.0001	0.0029	7.2	0.0008
	25	0.0196	0.0630	0.1155	0.0002	0.0054	14.4	0.0018
	50	0.0398	0.2030	0.1725	0.0003	0.0099	22.3	0.0036
	120	0.0408	0.3058	0.2826	0.0006	0.0188	47.0	0.0037
	175	0.0587	0.4989	0.4013	0.0010	0.0210	88.5	0.0053
	250	0.0669	0.2592	0.5067	0.0015	0.0163	131	0.0060
	500	0.1146	0.4395	0.7970	0.0023	0.0276	232	0.0103
	750	0.1777	0.6792	1.2615	0.0036	0.0432	358	0.0160
	1000	0.2641	0.9959	3.2946	0.0049	0.0804	486	0.0238
Air Compressors Composite		0.0483	0.3077	0.3255	0.0007	0.0185	63.6	0.0044
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0196	0.2205	0.1756	0.0004	0.0020	31.0	0.0018
	120	0.0280	0.4662	0.2329	0.0009	0.0040	77.1	0.0025
	175	0.0402	0.7542	0.1862	0.0016	0.0051	141	0.0036
	250	0.0474	0.3426	0.1617	0.0021	0.0044	188	0.0043
	500	0.0784	0.5512	0.2622	0.0031	0.0072	311	0.0071
	750	0.1549	1.0891	0.5202	0.0062	0.0143	615	0.0140
	1000	0.2442	1.6437	3.9853	0.0093	0.0530	928	0.0220
Bore/Drill Rigs Composite		0.0480	0.5008	0.3439	0.0017	0.0062	165	0.0043
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0223	0.0741	0.1372	0.0002	0.0058	17.6	0.0020
Cement and Mortar Mixers Co		0.0086	0.0415	0.0536	0.0001	0.0021	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0424	0.2420	0.2231	0.0004	0.0113	30.2	0.0038
	120	0.0524	0.4613	0.4128	0.0009	0.0249	74.1	0.0047
	175	0.0865	0.8662	0.6554	0.0018	0.0323	160	0.0078
Concrete/Industrial Saws Com		0.0484	0.3783	0.3410	0.0007	0.0196	58.5	0.0044
Cranes	50	0.0532	0.2423	0.1894	0.0003	0.0121	23.2	0.0048
	120	0.0542	0.3446	0.3317	0.0006	0.0240	50.1	0.0049
	175	0.0648	0.4754	0.4071	0.0009	0.0223	80.3	0.0058
	250	0.0704	0.2440	0.4949	0.0013	0.0170	112	0.0064
	500	0.1087	0.3839	0.7047	0.0018	0.0257	180	0.0098
	750	0.1837	0.6455	1.2225	0.0030	0.0439	303	0.0166
	9999	0.6702	2.1934	7.0436	0.0098	0.1797	971	0.0605
Cranes Composite		0.0898	0.3917	0.6610	0.0014	0.0256	129	0.0081
Crawler Tractors	50	0.0699	0.2771	0.2107	0.0003	0.0150	24.9	0.0063
	120	0.0831	0.4628	0.4896	0.0008	0.0371	65.8	0.0075
	175	0.1123	0.7302	0.7150	0.0014	0.0398	121	0.0101
	250	0.1188	0.3966	0.8681	0.0019	0.0315	166	0.0107
	500	0.1759	0.6665	1.2170	0.0025	0.0455	259	0.0159
	750	0.3168	1.1935	2.2429	0.0047	0.0828	465	0.0286
	1000	0.4836	1.8458	5.2162	0.0066	0.1425	658	0.0436
Crawler Tractors Composite		0.1049	0.5260	0.6772	0.0013	0.0378	114	0.0095
Crushing/Proc. E	50	0.0734	0.4036	0.3367	0.0006	0.0181	44.0	0.0066
	120	0.0692	0.5446	0.4754	0.0010	0.0302	83.1	0.0062
	175	0.1083	0.9519	0.7042	0.0019	0.0368	167	0.0098
	250	0.1245	0.4844	0.8670	0.0028	0.0282	245	0.0112
	500	0.1852	0.7092	1.1829	0.0037	0.0416	374	0.0167
	750	0.2912	1.1167	1.9026	0.0059	0.0655	589	0.0263

	9999	0.7584	2.6528	8.5119	0.0131	0.2049	1,308	0.0684
Crushing/Proc. Equipment Co		0.0934	0.6247	0.5983	0.0015	0.0310	132	0.0084
Dumpers/Tender	25	0.0092	0.0314	0.0582	0.0001	0.0022	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0582	0.0001	0.0022	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0384	0.2446	0.1862	0.0003	0.0080	25.0	0.0035
	120	0.0583	0.4979	0.3717	0.0009	0.0206	73.6	0.0053
	175	0.0703	0.6637	0.3868	0.0013	0.0195	112	0.0063
	250	0.0828	0.3276	0.4493	0.0018	0.0154	159	0.0075
	500	0.1198	0.4591	0.6028	0.0023	0.0219	234	0.0108
	750	0.1987	0.7606	1.0153	0.0039	0.0365	387	0.0179
Excavators Composite		0.0733	0.5124	0.4042	0.0013	0.0184	120	0.0066
Forklifts	50	0.0191	0.1400	0.1084	0.0002	0.0039	14.7	0.0017
	120	0.0225	0.2102	0.1443	0.0004	0.0074	31.2	0.0020
	175	0.0336	0.3315	0.1772	0.0006	0.0087	56.1	0.0030
	250	0.0385	0.1554	0.1887	0.0009	0.0062	77.1	0.0035
	500	0.0548	0.2126	0.2528	0.0011	0.0088	111	0.0049
Forklifts Composite		0.0320	0.2160	0.1691	0.0006	0.0070	54.4	0.0029
Generator Sets	15	0.0116	0.0638	0.0814	0.0002	0.0038	10.2	0.0011
	25	0.0224	0.0769	0.1410	0.0002	0.0064	17.6	0.0020
	50	0.0379	0.2161	0.2199	0.0004	0.0106	30.6	0.0034
	120	0.0506	0.4641	0.4378	0.0009	0.0250	77.9	0.0046
	175	0.0676	0.7323	0.5990	0.0016	0.0266	142	0.0061
	250	0.0747	0.3844	0.7614	0.0024	0.0218	213	0.0067
	500	0.1125	0.5968	1.0874	0.0033	0.0333	337	0.0102
	750	0.1842	0.9634	1.7962	0.0055	0.0544	544	0.0166
	9999	0.4502	2.0059	6.6947	0.0105	0.1476	1,049	0.0406
Generator Sets Composite		0.0395	0.2732	0.3232	0.0007	0.0150	61.0	0.0036
Graders	50	0.0563	0.2762	0.2156	0.0004	0.0124	27.5	0.0051
	120	0.0738	0.5090	0.4568	0.0009	0.0311	75.0	0.0067
	175	0.0918	0.7282	0.5622	0.0014	0.0303	124	0.0083
	250	0.0999	0.3683	0.6701	0.0019	0.0230	172	0.0090
	500	0.1284	0.4966	0.7982	0.0023	0.0288	229	0.0116
	750	0.2731	1.0508	1.7425	0.0049	0.0621	486	0.0246
Graders Composite		0.0919	0.5765	0.5823	0.0015	0.0280	133	0.0083
Off-Highway Trac	120	0.1455	0.6789	0.8421	0.0011	0.0674	93.7	0.0131
	175	0.1455	0.8025	0.9712	0.0015	0.0547	130	0.0131
	250	0.1147	0.3614	0.8843	0.0015	0.0348	130	0.0103
	750	0.4683	1.8825	3.5643	0.0057	0.1391	568	0.0423
	1000	0.7129	2.9445	7.4279	0.0082	0.2214	814	0.0643
Off-Highway Tractors Compos		0.1470	0.6517	1.0657	0.0017	0.0497	151	0.0133
Off-Highway Truc	175	0.0837	0.7538	0.4564	0.0014	0.0234	125	0.0076
	250	0.0927	0.3514	0.5042	0.0019	0.0173	167	0.0084
	500	0.1488	0.5446	0.7481	0.0027	0.0273	272	0.0134
	750	0.2416	0.8831	1.2347	0.0044	0.0446	442	0.0218
	1000	0.3613	1.2913	3.8920	0.0063	0.0903	625	0.0326
Off-Highway Trucks Composit		0.1443	0.5514	0.8306	0.0027	0.0280	260	0.0130
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0328	0.2267	0.1956	0.0004	0.0078	28.0	0.0030
	120	0.0501	0.5080	0.3835	0.0009	0.0199	80.9	0.0045
	175	0.0524	0.5859	0.3414	0.0012	0.0164	107	0.0047
	500	0.1012	0.4676	0.6065	0.0025	0.0212	254	0.0091
Other Construction Equipment		0.0563	0.3508	0.3519	0.0013	0.0139	122	0.0051
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0431	0.2211	0.1744	0.0003	0.0101	21.7	0.0039
	120	0.0602	0.4232	0.3810	0.0007	0.0256	62.0	0.0054
	175	0.0721	0.5668	0.4439	0.0011	0.0237	95.9	0.0065
	250	0.0791	0.2804	0.5318	0.0015	0.0173	136	0.0071
	500	0.1506	0.5217	0.9276	0.0026	0.0326	265	0.0136
	750	0.2490	0.8599	1.5657	0.0044	0.0543	437	0.0225
	1000	0.3467	1.1855	3.8628	0.0056	0.0969	560	0.0313
Other General Industrial Equip		0.0983	0.4517	0.6661	0.0016	0.0262	152	0.0089
Other Material Ha	50	0.0595	0.3049	0.2425	0.0004	0.0141	30.3	0.0054
	120	0.0583	0.4117	0.3720	0.0007	0.0250	60.7	0.0053

	175	0.0907	0.7176	0.5642	0.0014	0.0301	122	0.0082
	250	0.0836	0.2984	0.5684	0.0016	0.0185	145	0.0075
	500	0.1074	0.3752	0.6692	0.0019	0.0235	192	0.0097
	9999	0.4910	1.5647	5.1082	0.0073	0.1280	741	0.0443
Other Material Handling Equip		0.0924	0.4429	0.6500	0.0015	0.0252	141	0.0083
Pavers	25	0.0225	0.0768	0.1427	0.0002	0.0055	18.7	0.0020
	50	0.0834	0.3055	0.2398	0.0004	0.0184	28.0	0.0075
	120	0.0910	0.4805	0.5471	0.0008	0.0428	69.2	0.0082
	175	0.1217	0.7599	0.8187	0.0014	0.0459	128	0.0110
	250	0.1411	0.4713	1.1106	0.0022	0.0407	194	0.0127
	500	0.1595	0.6305	1.1959	0.0023	0.0450	233	0.0144
Pavers Composite		0.0989	0.4920	0.5450	0.0009	0.0355	77.9	0.0089
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0702	0.2577	0.2043	0.0003	0.0157	23.9	0.0063
	120	0.0708	0.3762	0.4280	0.0006	0.0337	54.5	0.0064
	175	0.0944	0.5945	0.6403	0.0011	0.0360	101	0.0085
	250	0.0864	0.2894	0.6928	0.0014	0.0249	122	0.0078
Paving Equipment Composite		0.0757	0.4084	0.4807	0.0008	0.0315	68.9	0.0068
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0056	0.0305	0.0390	0.0001	0.0018	4.9	0.0005
	25	0.0091	0.0312	0.0572	0.0001	0.0026	7.1	0.0008
	50	0.0128	0.0856	0.0986	0.0002	0.0041	14.3	0.0012
	120	0.0128	0.1367	0.1293	0.0003	0.0065	24.1	0.0012
Pressure Washers Composite		0.0085	0.0549	0.0650	0.0001	0.0030	9.4	0.0008
Pumps	15	0.0096	0.0464	0.0595	0.0001	0.0030	7.4	0.0009
	25	0.0265	0.0850	0.1558	0.0002	0.0073	19.5	0.0024
	50	0.0465	0.2546	0.2497	0.0004	0.0126	34.3	0.0042
	120	0.0537	0.4713	0.4442	0.0009	0.0263	77.9	0.0048
	175	0.0712	0.7336	0.6007	0.0016	0.0277	140	0.0064
	250	0.0760	0.3700	0.7338	0.0023	0.0215	201	0.0069
	500	0.1241	0.6189	1.1297	0.0034	0.0355	345	0.0112
	750	0.2075	1.0232	1.9114	0.0057	0.0594	571	0.0187
	9999	0.6127	2.6255	8.7489	0.0136	0.1961	1,355	0.0553
Pumps Composite		0.0376	0.2674	0.2854	0.0006	0.0147	49.6	0.0034
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0543	0.2436	0.2039	0.0003	0.0128	26.0	0.0049
	120	0.0576	0.3873	0.3799	0.0007	0.0270	59.0	0.0052
	175	0.0774	0.6114	0.5331	0.0012	0.0286	108	0.0070
	250	0.0842	0.3201	0.6581	0.0017	0.0223	153	0.0076
	500	0.1151	0.4607	0.8354	0.0022	0.0299	219	0.0104
Rollers Composite		0.0584	0.3837	0.3793	0.0008	0.0232	67.0	0.0053
Rough Terrain Fo	50	0.0520	0.3171	0.2556	0.0004	0.0122	33.9	0.0047
	120	0.0495	0.4142	0.3326	0.0007	0.0197	62.4	0.0045
	175	0.0788	0.7229	0.4710	0.0014	0.0245	125	0.0071
	250	0.0881	0.3442	0.5378	0.0019	0.0182	171	0.0079
	500	0.1296	0.4936	0.7287	0.0025	0.0265	257	0.0117
Rough Terrain Forklifts Compo		0.0533	0.4464	0.3494	0.0008	0.0201	70.3	0.0048
Rubber Tired Doz	175	0.1509	0.8124	0.9962	0.0015	0.0561	129	0.0136
	250	0.1701	0.5279	1.2898	0.0021	0.0516	183	0.0153
	500	0.2291	0.9276	1.6868	0.0026	0.0673	265	0.0207
	750	0.3461	1.3934	2.5948	0.0040	0.1024	399	0.0312
	1000	0.5438	2.2500	5.5311	0.0060	0.1672	592	0.0491
Rubber Tired Dozers Compos		0.2118	0.8006	1.5773	0.0025	0.0630	239	0.0191
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0615	0.3080	0.2424	0.0004	0.0137	31.1	0.0055
	120	0.0563	0.3977	0.3529	0.0007	0.0237	58.9	0.0051
	175	0.0767	0.6215	0.4713	0.0012	0.0253	106	0.0069
	250	0.0848	0.3159	0.5655	0.0017	0.0194	149	0.0077
	500	0.1302	0.5016	0.8032	0.0023	0.0291	237	0.0118
	750	0.2680	1.0271	1.6958	0.0049	0.0606	486	0.0242
	1000	0.3484	1.3166	4.0040	0.0060	0.0983	594	0.0314
Rubber Tired Loaders Compos		0.0753	0.4406	0.4747	0.0012	0.0235	109	0.0068
Scrapers	120	0.1218	0.6612	0.7170	0.0011	0.0551	93.9	0.0110
	175	0.1400	0.8921	0.9020	0.0017	0.0505	148	0.0126

	250	0.1522	0.5044	1.1344	0.0024	0.0412	209	0.0137
	500	0.2211	0.8455	1.5615	0.0032	0.0584	321	0.0200
	750	0.3839	1.4588	2.7734	0.0056	0.1024	555	0.0346
Scrapers Composite		0.1914	0.7938	1.3434	0.0027	0.0541	262	0.0173
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0502	0.2833	0.2631	0.0005	0.0131	36.2	0.0045
	120	0.0558	0.4946	0.4424	0.0009	0.0264	80.2	0.0050
	175	0.0811	0.8276	0.6279	0.0017	0.0302	155	0.0073
	250	0.1022	0.4765	0.8737	0.0029	0.0266	255	0.0092
Signal Boards Composite		0.0129	0.0912	0.0912	0.0002	0.0042	16.7	0.0012
Skid Steer Loade	25	0.0171	0.0575	0.1070	0.0002	0.0044	13.8	0.0015
	50	0.0230	0.2006	0.1655	0.0003	0.0043	25.5	0.0021
	120	0.0218	0.2673	0.1647	0.0005	0.0064	42.8	0.0020
Skid Steer Loaders Composite		0.0222	0.2125	0.1614	0.0004	0.0050	30.3	0.0020
Surfacing Equipn	50	0.0265	0.1191	0.1069	0.0002	0.0063	14.1	0.0024
	120	0.0570	0.4028	0.4035	0.0007	0.0271	63.8	0.0051
	175	0.0550	0.4663	0.4168	0.0010	0.0210	85.8	0.0050
	250	0.0652	0.2754	0.5719	0.0015	0.0188	135	0.0059
	500	0.1008	0.4728	0.8400	0.0022	0.0288	221	0.0091
	750	0.1599	0.7413	1.3593	0.0035	0.0459	347	0.0144
Surfacing Equipment Compos		0.0823	0.3953	0.6593	0.0017	0.0239	166	0.0074
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0430	0.2898	0.2365	0.0004	0.0098	31.6	0.0039
	120	0.0555	0.4959	0.3694	0.0009	0.0210	75.0	0.0050
	175	0.0845	0.8043	0.4869	0.0016	0.0253	139	0.0076
	250	0.0803	0.3198	0.4530	0.0018	0.0152	162	0.0072
Sweepers/Scrubbers Compos		0.0584	0.4916	0.3563	0.0009	0.0183	78.5	0.0053
Tractors/Loaders	25	0.0191	0.0653	0.1209	0.0002	0.0046	15.9	0.0017
	50	0.0407	0.2760	0.2179	0.0004	0.0087	30.3	0.0037
	120	0.0366	0.3402	0.2466	0.0006	0.0129	51.7	0.0033
	175	0.0571	0.5841	0.3220	0.0011	0.0159	101	0.0052
	250	0.0813	0.3445	0.4427	0.0019	0.0151	172	0.0073
	500	0.1606	0.6642	0.8132	0.0039	0.0294	345	0.0145
	750	0.2409	0.9959	1.2387	0.0058	0.0443	517	0.0217
Tractors/Loaders/Backhoes C		0.0436	0.3616	0.2744	0.0008	0.0134	66.8	0.0039
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.0990	0.3495	0.2804	0.0004	0.0218	32.9	0.0089
	120	0.0849	0.4443	0.5223	0.0008	0.0408	64.9	0.0077
	175	0.1346	0.8393	0.9412	0.0016	0.0521	144	0.0121
	250	0.1600	0.5472	1.3120	0.0025	0.0487	223	0.0144
	500	0.2092	0.8710	1.6487	0.0031	0.0623	311	0.0189
	750	0.3964	1.6395	3.1894	0.0059	0.1191	587	0.0358
Trenchers Composite		0.0933	0.4270	0.4575	0.0007	0.0336	58.7	0.0084
Welders	15	0.0080	0.0388	0.0498	0.0001	0.0025	6.2	0.0007
	25	0.0153	0.0492	0.0903	0.0001	0.0042	11.3	0.0014
	50	0.0435	0.2219	0.1968	0.0003	0.0110	26.0	0.0039
	120	0.0321	0.2508	0.2344	0.0005	0.0153	39.5	0.0029
	175	0.0600	0.5396	0.4393	0.0011	0.0223	98.2	0.0054
	250	0.0551	0.2294	0.4536	0.0013	0.0142	119	0.0050
	500	0.0748	0.3117	0.5690	0.0016	0.0192	168	0.0067
Welders Composite		0.0310	0.1816	0.1735	0.0003	0.0102	25.6	0.0028

SCAB Fleet Average Emission Factors (Diesel)

2021

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0136	0.0456	0.0849	0.0001	0.0034	11.0	0.0012
	50	0.0233	0.1405	0.1369	0.0003	0.0061	19.6	0.0021
	120	0.0234	0.2280	0.1978	0.0004	0.0110	38.1	0.0021
	500	0.0703	0.3769	0.6021	0.0021	0.0189	213	0.0063
	750	0.1283	0.6813	1.1121	0.0039	0.0346	385	0.0116
Aerial Lifts Composite		0.0238	0.1677	0.1726	0.0004	0.0080	34.7	0.0021
Air Compressors	15	0.0092	0.0449	0.0569	0.0001	0.0027	7.2	0.0008
	25	0.0192	0.0623	0.1145	0.0002	0.0052	14.4	0.0017
	50	0.0355	0.1979	0.1659	0.0003	0.0085	22.3	0.0032
	120	0.0371	0.3037	0.2570	0.0006	0.0160	47.0	0.0033
	175	0.0541	0.4975	0.3498	0.0010	0.0183	88.5	0.0049
	250	0.0626	0.2564	0.4359	0.0015	0.0141	131	0.0056
	500	0.1075	0.4350	0.6881	0.0023	0.0240	232	0.0097
	750	0.1667	0.6723	1.0871	0.0036	0.0376	358	0.0150
	1000	0.2459	0.9751	3.0739	0.0049	0.0717	486	0.0222
Air Compressors Composite		0.0442	0.3051	0.2928	0.0007	0.0158	63.6	0.0040
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0193	0.2202	0.1710	0.0004	0.0015	31.0	0.0017
	120	0.0269	0.4661	0.2191	0.0009	0.0030	77.1	0.0024
	175	0.0373	0.7542	0.1473	0.0016	0.0039	141	0.0034
	250	0.0456	0.3426	0.1364	0.0021	0.0041	188	0.0041
	500	0.0753	0.5512	0.2223	0.0031	0.0068	311	0.0068
	750	0.1488	1.0889	0.4398	0.0062	0.0134	615	0.0134
	1000	0.2329	1.6434	3.9539	0.0093	0.0472	928	0.0210
Bore/Drill Rigs Composite		0.0460	0.5007	0.3219	0.0017	0.0053	165	0.0042
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0220	0.0736	0.1365	0.0002	0.0056	17.6	0.0020
Cement and Mortar Mixers Co		0.0086	0.0415	0.0535	0.0001	0.0021	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0384	0.2382	0.2160	0.0004	0.0098	30.2	0.0035
	120	0.0483	0.4598	0.3802	0.0009	0.0217	74.1	0.0044
	175	0.0808	0.8662	0.5793	0.0018	0.0286	160	0.0073
Concrete/Industrial Saws Com		0.0444	0.3761	0.3176	0.0007	0.0171	58.5	0.0040
Cranes	50	0.0483	0.2377	0.1837	0.0003	0.0107	23.2	0.0044
	120	0.0499	0.3428	0.3072	0.0006	0.0210	50.1	0.0045
	175	0.0601	0.4750	0.3641	0.0009	0.0197	80.3	0.0054
	250	0.0667	0.2407	0.4404	0.0013	0.0152	112	0.0060
	500	0.1035	0.3747	0.6303	0.0018	0.0231	180	0.0093
	750	0.1746	0.6301	1.0891	0.0030	0.0393	303	0.0158
	9999	0.6375	2.1272	6.6964	0.0098	0.1645	971	0.0575
Cranes Composite		0.0846	0.3865	0.6033	0.0014	0.0229	129	0.0076
Crawler Tractors	50	0.0649	0.2722	0.2046	0.0003	0.0136	24.9	0.0059
	120	0.0780	0.4606	0.4585	0.0008	0.0336	65.8	0.0070
	175	0.1054	0.7292	0.6524	0.0014	0.0362	121	0.0095
	250	0.1123	0.3881	0.7899	0.0019	0.0285	166	0.0101
	500	0.1669	0.6452	1.1075	0.0025	0.0412	259	0.0151
	750	0.3006	1.1555	2.0421	0.0047	0.0750	465	0.0271
	1000	0.4584	1.7742	4.9834	0.0066	0.1317	658	0.0414
Crawler Tractors Composite		0.0988	0.5208	0.6239	0.0013	0.0343	114	0.0089
Crushing/Proc. E	50	0.0668	0.3978	0.3262	0.0006	0.0156	44.0	0.0060
	120	0.0641	0.5430	0.4374	0.0010	0.0261	83.1	0.0058
	175	0.1015	0.9522	0.6223	0.0019	0.0324	167	0.0092
	250	0.1182	0.4815	0.7556	0.0028	0.0248	245	0.0107
	500	0.1765	0.7050	1.0353	0.0037	0.0366	374	0.0159
	750	0.2779	1.1108	1.6653	0.0059	0.0578	589	0.0251

	9999	0.7241	2.6136	8.0264	0.0131	0.1854	1,308	0.0653
Crushing/Proc. Equipment Co		0.0872	0.6224	0.5412	0.0015	0.0270	132	0.0079
Dumpers/Tender	25	0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0356	0.2421	0.1802	0.0003	0.0068	25.0	0.0032
	120	0.0543	0.4967	0.3429	0.0009	0.0174	73.6	0.0049
	175	0.0655	0.6637	0.3377	0.0013	0.0168	112	0.0059
	250	0.0783	0.3258	0.3891	0.0018	0.0134	159	0.0071
	500	0.1137	0.4561	0.5254	0.0023	0.0191	234	0.0103
	750	0.1885	0.7559	0.8840	0.0039	0.0319	387	0.0170
Excavators Composite		0.0687	0.5113	0.3577	0.0013	0.0158	120	0.0062
Forklifts	50	0.0175	0.1376	0.1034	0.0002	0.0032	14.7	0.0016
	120	0.0207	0.2091	0.1321	0.0004	0.0059	31.2	0.0019
	175	0.0305	0.3303	0.1503	0.0006	0.0069	56.1	0.0027
	250	0.0354	0.1548	0.1554	0.0009	0.0050	77.1	0.0032
	500	0.0506	0.2120	0.2091	0.0011	0.0070	111	0.0046
Forklifts Composite		0.0294	0.2148	0.1459	0.0006	0.0056	54.4	0.0027
Generator Sets	15	0.0114	0.0635	0.0800	0.0002	0.0036	10.2	0.0010
	25	0.0221	0.0761	0.1397	0.0002	0.0061	17.6	0.0020
	50	0.0338	0.2115	0.2116	0.0004	0.0091	30.6	0.0030
	120	0.0456	0.4617	0.3996	0.0009	0.0215	77.9	0.0041
	175	0.0617	0.7313	0.5233	0.0016	0.0233	142	0.0056
	250	0.0694	0.3807	0.6568	0.0024	0.0190	213	0.0063
	500	0.1052	0.5913	0.9401	0.0033	0.0291	337	0.0095
	750	0.1717	0.9545	1.5502	0.0055	0.0475	544	0.0155
	9999	0.4120	1.9665	6.2664	0.0105	0.1316	1,049	0.0372
Generator Sets Composite		0.0363	0.2708	0.2978	0.0007	0.0131	61.0	0.0033
Graders	50	0.0516	0.2718	0.2089	0.0004	0.0109	27.5	0.0047
	120	0.0684	0.5069	0.4241	0.0009	0.0272	75.0	0.0062
	175	0.0854	0.7277	0.5015	0.0014	0.0267	124	0.0077
	250	0.0947	0.3647	0.5955	0.0019	0.0205	172	0.0085
	500	0.1222	0.4875	0.7112	0.0023	0.0258	229	0.0110
	750	0.2598	1.0314	1.5507	0.0049	0.0555	486	0.0234
Graders Composite		0.0861	0.5747	0.5213	0.0015	0.0247	133	0.0078
Off-Highway Trac	120	0.1378	0.6749	0.7959	0.0011	0.0626	93.7	0.0124
	175	0.1379	0.8000	0.9027	0.0015	0.0507	130	0.0124
	250	0.1087	0.3507	0.8198	0.0015	0.0320	130	0.0098
	750	0.4454	1.7945	3.3054	0.0057	0.1282	568	0.0402
	1000	0.6794	2.8019	7.1274	0.0082	0.2070	814	0.0613
Off-Highway Tractors Compos		0.1394	0.6413	0.9902	0.0017	0.0459	151	0.0126
Off-Highway Truc	175	0.0782	0.7537	0.4000	0.0014	0.0203	125	0.0071
	250	0.0879	0.3493	0.4383	0.0019	0.0151	167	0.0079
	500	0.1415	0.5407	0.6543	0.0027	0.0240	272	0.0128
	750	0.2297	0.8769	1.0788	0.0044	0.0391	442	0.0207
	1000	0.3421	1.2771	3.7016	0.0063	0.0814	625	0.0309
Off-Highway Trucks Composit		0.1370	0.5476	0.7382	0.0027	0.0246	260	0.0124
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0303	0.2243	0.1893	0.0004	0.0067	28.0	0.0027
	120	0.0468	0.5069	0.3537	0.0009	0.0169	80.9	0.0042
	175	0.0491	0.5858	0.2972	0.0012	0.0142	107	0.0044
	500	0.0961	0.4654	0.5253	0.0025	0.0185	254	0.0087
Other Construction Equipment		0.0534	0.3497	0.3120	0.0013	0.0121	122	0.0048
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0388	0.2161	0.1676	0.0003	0.0086	21.7	0.0035
	120	0.0551	0.4205	0.3467	0.0007	0.0218	62.0	0.0050
	175	0.0664	0.5654	0.3871	0.0011	0.0205	95.9	0.0060
	250	0.0739	0.2775	0.4574	0.0015	0.0149	136	0.0067
	500	0.1411	0.5167	0.8006	0.0026	0.0282	265	0.0127
	750	0.2333	0.8515	1.3488	0.0044	0.0470	437	0.0210
	1000	0.3231	1.1617	3.6053	0.0056	0.0863	560	0.0292
Other General Industrial Equip		0.0915	0.4479	0.5887	0.0016	0.0227	152	0.0083
Other Material Ha	50	0.0535	0.2980	0.2331	0.0004	0.0120	30.3	0.0048
	120	0.0533	0.4091	0.3386	0.0007	0.0213	60.7	0.0048

	175	0.0837	0.7158	0.4921	0.0014	0.0261	122	0.0075
	250	0.0781	0.2953	0.4889	0.0016	0.0159	145	0.0070
	500	0.1007	0.3715	0.5777	0.0019	0.0203	192	0.0091
	9999	0.4606	1.5333	4.7673	0.0073	0.1140	741	0.0416
Other Material Handling Equip		0.0860	0.4392	0.5748	0.0015	0.0218	141	0.0078
Pavers	25	0.0225	0.0768	0.1425	0.0002	0.0055	18.7	0.0020
	50	0.0774	0.2996	0.2332	0.0004	0.0168	28.0	0.0070
	120	0.0855	0.4780	0.5137	0.0008	0.0391	69.2	0.0077
	175	0.1148	0.7586	0.7520	0.0014	0.0421	128	0.0104
	250	0.1338	0.4598	1.0174	0.0022	0.0371	194	0.0121
	500	0.1518	0.6069	1.0951	0.0023	0.0410	233	0.0137
Pavers Composite		0.0928	0.4878	0.5089	0.0009	0.0325	77.9	0.0084
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0648	0.2524	0.1987	0.0003	0.0143	23.9	0.0058
	120	0.0662	0.3741	0.4010	0.0006	0.0307	54.5	0.0060
	175	0.0888	0.5934	0.5867	0.0011	0.0329	101	0.0080
	250	0.0820	0.2827	0.6331	0.0014	0.0227	122	0.0074
Paving Equipment Composite		0.0710	0.4062	0.4462	0.0008	0.0288	68.9	0.0064
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0055	0.0304	0.0383	0.0001	0.0017	4.9	0.0005
	25	0.0090	0.0308	0.0566	0.0001	0.0025	7.1	0.0008
	50	0.0113	0.0841	0.0949	0.0002	0.0035	14.3	0.0010
	120	0.0114	0.1362	0.1182	0.0003	0.0056	24.1	0.0010
Pressure Washers Composite		0.0079	0.0543	0.0625	0.0001	0.0027	9.4	0.0007
Pumps	15	0.0094	0.0462	0.0585	0.0001	0.0028	7.4	0.0008
	25	0.0259	0.0841	0.1544	0.0002	0.0070	19.5	0.0023
	50	0.0415	0.2490	0.2404	0.0004	0.0108	34.3	0.0037
	120	0.0484	0.4687	0.4054	0.0009	0.0227	77.9	0.0044
	175	0.0652	0.7325	0.5249	0.0016	0.0242	140	0.0059
	250	0.0707	0.3662	0.6331	0.0023	0.0187	201	0.0064
	500	0.1162	0.6131	0.9769	0.0034	0.0310	345	0.0105
	750	0.1939	1.0135	1.6500	0.0057	0.0519	571	0.0175
	9999	0.5635	2.5731	8.1862	0.0136	0.1751	1,355	0.0508
Pumps Composite		0.0344	0.2652	0.2637	0.0006	0.0128	49.6	0.0031
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0491	0.2389	0.1979	0.0003	0.0114	26.0	0.0044
	120	0.0529	0.3854	0.3524	0.0007	0.0238	59.0	0.0048
	175	0.0719	0.6108	0.4775	0.0012	0.0254	108	0.0065
	250	0.0800	0.3158	0.5870	0.0017	0.0201	153	0.0072
	500	0.1100	0.4490	0.7481	0.0022	0.0270	219	0.0099
Rollers Composite		0.0540	0.3816	0.3483	0.0008	0.0206	67.0	0.0049
Rough Terrain Fo	50	0.0479	0.3133	0.2472	0.0004	0.0105	33.9	0.0043
	120	0.0461	0.4131	0.3062	0.0007	0.0168	62.4	0.0042
	175	0.0736	0.7229	0.4132	0.0014	0.0213	125	0.0066
	250	0.0832	0.3419	0.4658	0.0019	0.0158	171	0.0075
	500	0.1228	0.4904	0.6343	0.0025	0.0231	257	0.0111
Rough Terrain Forklifts Compo		0.0497	0.4454	0.3193	0.0008	0.0172	70.3	0.0045
Rubber Tired Doz	175	0.1432	0.8097	0.9278	0.0015	0.0522	129	0.0129
	250	0.1616	0.5121	1.1988	0.0021	0.0475	183	0.0146
	500	0.2182	0.8829	1.5670	0.0026	0.0622	265	0.0197
	750	0.3297	1.3266	2.4124	0.0040	0.0946	399	0.0297
	1000	0.5186	2.1395	5.3122	0.0060	0.1566	592	0.0468
Rubber Tired Dozers Compos		0.2015	0.7661	1.4661	0.0025	0.0582	239	0.0182
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0561	0.3032	0.2349	0.0004	0.0120	31.1	0.0051
	120	0.0520	0.3960	0.3271	0.0007	0.0206	58.9	0.0047
	175	0.0712	0.6211	0.4192	0.0012	0.0222	106	0.0064
	250	0.0804	0.3129	0.5008	0.0017	0.0173	149	0.0073
	500	0.1240	0.4920	0.7143	0.0023	0.0260	237	0.0112
	750	0.2549	1.0075	1.5039	0.0049	0.0540	486	0.0230
	1000	0.3298	1.2808	3.8115	0.0060	0.0894	594	0.0298
Rubber Tired Loaders Compos		0.0705	0.4381	0.4275	0.0012	0.0206	109	0.0064
Scrapers	120	0.1142	0.6580	0.6720	0.0011	0.0501	93.9	0.0103
	175	0.1316	0.8907	0.8250	0.0017	0.0460	148	0.0119

	250	0.1442	0.4935	1.0349	0.0024	0.0374	209	0.0130
	500	0.2102	0.8168	1.4242	0.0032	0.0531	321	0.0190
	750	0.3649	1.4095	2.5312	0.0056	0.0932	555	0.0329
Scrapers Composite		0.1815	0.7745	1.2263	0.0027	0.0492	262	0.0164
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0455	0.2789	0.2549	0.0005	0.0114	36.2	0.0041
	120	0.0513	0.4930	0.4078	0.0009	0.0230	80.2	0.0046
	175	0.0757	0.8277	0.5557	0.0017	0.0267	155	0.0068
	250	0.0968	0.4734	0.7633	0.0029	0.0235	255	0.0087
Signal Boards Composite		0.0125	0.0911	0.0863	0.0002	0.0039	16.7	0.0011
Skid Steer Loade	25	0.0169	0.0572	0.1065	0.0002	0.0042	13.8	0.0015
	50	0.0220	0.1998	0.1600	0.0003	0.0036	25.5	0.0020
	120	0.0207	0.2671	0.1538	0.0005	0.0053	42.8	0.0019
Skid Steer Loaders Composite		0.0212	0.2119	0.1544	0.0004	0.0042	30.3	0.0019
Surfacing Equipm	50	0.0242	0.1170	0.1037	0.0002	0.0057	14.1	0.0022
	120	0.0525	0.4008	0.3760	0.0007	0.0242	63.8	0.0047
	175	0.0511	0.4658	0.3757	0.0010	0.0189	85.8	0.0046
	250	0.0617	0.2715	0.5141	0.0015	0.0170	135	0.0056
	500	0.0959	0.4602	0.7556	0.0022	0.0261	221	0.0087
	750	0.1520	0.7215	1.2216	0.0035	0.0416	347	0.0137
Surfacing Equipment Compos		0.0779	0.3860	0.5953	0.0017	0.0216	166	0.0070
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0391	0.2844	0.2261	0.0004	0.0081	31.6	0.0035
	120	0.0510	0.4931	0.3380	0.0009	0.0173	75.0	0.0046
	175	0.0774	0.8017	0.4205	0.0016	0.0208	139	0.0070
	250	0.0744	0.3184	0.3827	0.0018	0.0125	162	0.0067
Sweepers/Scrubbers Compos		0.0536	0.4882	0.3225	0.0009	0.0151	78.5	0.0048
Tractors/Loaders	25	0.0191	0.0653	0.1209	0.0002	0.0045	15.9	0.0017
	50	0.0376	0.2733	0.2108	0.0004	0.0073	30.3	0.0034
	120	0.0340	0.3394	0.2275	0.0006	0.0108	51.7	0.0031
	175	0.0533	0.5841	0.2798	0.0011	0.0135	101	0.0048
	250	0.0769	0.3430	0.3814	0.0019	0.0131	172	0.0069
	500	0.1523	0.6596	0.7068	0.0039	0.0255	345	0.0137
	750	0.2284	0.9891	1.0736	0.0058	0.0385	517	0.0206
Tractors/Loaders/Backhoes C		0.0407	0.3606	0.2506	0.0008	0.0113	66.8	0.0037
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.0921	0.3425	0.2729	0.0004	0.0201	32.9	0.0083
	120	0.0799	0.4419	0.4914	0.0008	0.0375	64.9	0.0072
	175	0.1272	0.8376	0.8675	0.0016	0.0481	144	0.0115
	250	0.1517	0.5327	1.2061	0.0025	0.0445	223	0.0137
	500	0.1992	0.8364	1.5150	0.0031	0.0571	311	0.0180
	750	0.3775	1.5747	2.9328	0.0059	0.1091	587	0.0341
Trenchers Composite		0.0874	0.4226	0.4327	0.0007	0.0309	58.7	0.0079
Welders	15	0.0079	0.0386	0.0489	0.0001	0.0024	6.2	0.0007
	25	0.0150	0.0487	0.0894	0.0001	0.0040	11.3	0.0014
	50	0.0387	0.2163	0.1893	0.0003	0.0094	26.0	0.0035
	120	0.0291	0.2492	0.2134	0.0005	0.0131	39.5	0.0026
	175	0.0552	0.5383	0.3833	0.0011	0.0194	98.2	0.0050
	250	0.0515	0.2269	0.3907	0.0013	0.0123	119	0.0046
	500	0.0703	0.3086	0.4915	0.0016	0.0167	168	0.0063
Welders Composite		0.0280	0.1788	0.1635	0.0003	0.0088	25.6	0.0025

SCAB Fleet Average Emission Factors (Diesel)

2022

Air Basin	SC

Equipment	MaxHP	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0134	0.0454	0.0845	0.0001	0.0033	11.0	0.0012
	50	0.0213	0.1388	0.1328	0.0003	0.0053	19.6	0.0019
	120	0.0216	0.2275	0.1829	0.0004	0.0096	38.1	0.0020
	500	0.0668	0.3746	0.5339	0.0021	0.0167	213	0.0060
	750	0.1217	0.6772	0.9849	0.0039	0.0305	385	0.0110
Aerial Lifts Composite		0.0222	0.1667	0.1619	0.0004	0.0071	34.7	0.0020
Air Compressors	15	0.0090	0.0448	0.0562	0.0001	0.0026	7.2	0.0008
	25	0.0189	0.0618	0.1138	0.0002	0.0049	14.4	0.0017
	50	0.0326	0.1954	0.1609	0.0003	0.0073	22.3	0.0029
	120	0.0346	0.3031	0.2371	0.0006	0.0139	47.0	0.0031
	175	0.0508	0.4979	0.3093	0.0010	0.0161	88.5	0.0046
	250	0.0595	0.2550	0.3794	0.0015	0.0124	131	0.0054
	500	0.1026	0.4326	0.6095	0.0023	0.0211	232	0.0093
	750	0.1590	0.6685	0.9614	0.0036	0.0330	358	0.0143
	1000	0.2330	0.9602	2.9122	0.0049	0.0651	486	0.0210
Air Compressors Composite		0.0414	0.3041	0.2677	0.0007	0.0138	63.6	0.0037
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0192	0.2200	0.1680	0.0004	0.0011	31.0	0.0017
	120	0.0262	0.4660	0.2091	0.0009	0.0025	77.1	0.0024
	175	0.0353	0.7541	0.1179	0.0016	0.0035	141	0.0032
	250	0.0442	0.3426	0.1180	0.0021	0.0039	188	0.0040
	500	0.0731	0.5511	0.1932	0.0031	0.0065	311	0.0066
	750	0.1444	1.0889	0.3821	0.0062	0.0128	615	0.0130
	1000	0.2241	1.6434	3.9312	0.0093	0.0428	928	0.0202
Bore/Drill Rigs Composite		0.0446	0.5007	0.3059	0.0017	0.0048	165	0.0040
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0218	0.0731	0.1359	0.0002	0.0054	17.6	0.0020
Cement and Mortar Mixers Co		0.0085	0.0414	0.0535	0.0001	0.0021	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0351	0.2351	0.2093	0.0004	0.0084	30.2	0.0032
	120	0.0448	0.4586	0.3505	0.0009	0.0188	74.1	0.0040
	175	0.0755	0.8662	0.5091	0.0018	0.0251	160	0.0068
Concrete/Industrial Saws Com		0.0411	0.3743	0.2962	0.0007	0.0148	58.5	0.0037
Cranes	50	0.0439	0.2338	0.1783	0.0003	0.0094	23.2	0.0040
	120	0.0459	0.3413	0.2846	0.0006	0.0182	50.1	0.0041
	175	0.0559	0.4747	0.3248	0.0009	0.0174	80.3	0.0050
	250	0.0632	0.2378	0.3906	0.0013	0.0135	112	0.0057
	500	0.0985	0.3670	0.5626	0.0018	0.0207	180	0.0089
	750	0.1661	0.6173	0.9687	0.0030	0.0352	303	0.0150
	9999	0.6059	2.0738	6.3749	0.0098	0.1504	971	0.0547
Cranes Composite		0.0798	0.3822	0.5505	0.0014	0.0203	129	0.0072
Crawler Tractors	50	0.0603	0.2677	0.1989	0.0003	0.0123	24.9	0.0054
	120	0.0731	0.4586	0.4297	0.0008	0.0304	65.8	0.0066
	175	0.0989	0.7284	0.5941	0.0014	0.0328	121	0.0089
	250	0.1065	0.3809	0.7177	0.0019	0.0258	166	0.0096
	500	0.1588	0.6271	1.0067	0.0025	0.0374	259	0.0143
	750	0.2860	1.1231	1.8570	0.0047	0.0680	465	0.0258
	1000	0.4347	1.7108	4.7678	0.0066	0.1216	658	0.0392
Crawler Tractors Composite		0.0931	0.5163	0.5746	0.0013	0.0310	114	0.0084
Crushing/Proc. E	50	0.0616	0.3936	0.3162	0.0006	0.0134	44.0	0.0056
	120	0.0600	0.5420	0.4035	0.0010	0.0225	83.1	0.0054
	175	0.0952	0.9528	0.5479	0.0019	0.0282	167	0.0086
	250	0.1123	0.4795	0.6546	0.0028	0.0216	245	0.0101
	500	0.1682	0.7020	0.9136	0.0037	0.0319	374	0.0152
	750	0.2652	1.1064	1.4690	0.0059	0.0505	589	0.0239

	9999	0.6919	2.5793	7.6191	0.0131	0.1680	1,308	0.0624
Crushing/Proc. Equipment Co		0.0820	0.6208	0.4911	0.0015	0.0234	132	0.0074
Dumpers/Tender	25	0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0336	0.2402	0.1748	0.0003	0.0058	25.0	0.0030
	120	0.0512	0.4958	0.3181	0.0009	0.0148	73.6	0.0046
	175	0.0614	0.6636	0.2947	0.0013	0.0145	112	0.0055
	250	0.0743	0.3243	0.3366	0.0018	0.0116	159	0.0067
	500	0.1081	0.4540	0.4583	0.0023	0.0166	234	0.0098
	750	0.1793	0.7525	0.7705	0.0039	0.0277	387	0.0162
Excavators Composite		0.0648	0.5104	0.3171	0.0013	0.0136	120	0.0059
Forklifts	50	0.0166	0.1368	0.0992	0.0002	0.0026	14.7	0.0015
	120	0.0194	0.2087	0.1222	0.0004	0.0046	31.2	0.0018
	175	0.0281	0.3303	0.1276	0.0006	0.0054	56.1	0.0025
	250	0.0331	0.1548	0.1276	0.0009	0.0039	77.1	0.0030
	500	0.0474	0.2120	0.1726	0.0011	0.0055	111	0.0043
Forklifts Composite		0.0274	0.2146	0.1265	0.0006	0.0044	54.4	0.0025
Generator Sets	15	0.0113	0.0633	0.0791	0.0002	0.0035	10.2	0.0010
	25	0.0220	0.0754	0.1389	0.0002	0.0059	17.6	0.0020
	50	0.0309	0.2089	0.2052	0.0004	0.0079	30.6	0.0028
	120	0.0421	0.4606	0.3697	0.0009	0.0188	77.9	0.0038
	175	0.0574	0.7315	0.4635	0.0016	0.0206	142	0.0052
	250	0.0654	0.3784	0.5732	0.0024	0.0167	213	0.0059
	500	0.0998	0.5878	0.8334	0.0033	0.0256	337	0.0090
	750	0.1627	0.9489	1.3725	0.0055	0.0419	544	0.0147
	9999	0.3853	1.9364	5.9490	0.0105	0.1195	1,049	0.0348
Generator Sets Composite		0.0340	0.2694	0.2783	0.0007	0.0117	61.0	0.0031
Graders	50	0.0474	0.2681	0.2028	0.0004	0.0096	27.5	0.0043
	120	0.0635	0.5051	0.3943	0.0009	0.0237	75.0	0.0057
	175	0.0794	0.7272	0.4462	0.0014	0.0234	124	0.0072
	250	0.0899	0.3617	0.5278	0.0019	0.0183	172	0.0081
	500	0.1165	0.4796	0.6329	0.0023	0.0231	229	0.0105
	750	0.2474	1.0147	1.3769	0.0049	0.0496	486	0.0223
Graders Composite		0.0807	0.5732	0.4657	0.0015	0.0218	133	0.0073
Off-Highway Trac	120	0.1304	0.6712	0.7522	0.0011	0.0580	93.7	0.0118
	175	0.1306	0.7979	0.8376	0.0015	0.0470	130	0.0118
	250	0.1032	0.3410	0.7591	0.0015	0.0294	130	0.0093
	750	0.4240	1.7168	3.0614	0.0057	0.1180	568	0.0383
	1000	0.6473	2.6737	6.8441	0.0082	0.1935	814	0.0584
Off-Highway Tractors Compos		0.1322	0.6320	0.9188	0.0017	0.0424	151	0.0119
Off-Highway Truc	175	0.0734	0.7537	0.3503	0.0014	0.0176	125	0.0066
	250	0.0836	0.3474	0.3804	0.0019	0.0132	167	0.0075
	500	0.1348	0.5379	0.5724	0.0027	0.0209	272	0.0122
	750	0.2189	0.8725	0.9428	0.0044	0.0342	442	0.0198
	1000	0.3246	1.2658	3.5349	0.0063	0.0734	625	0.0293
Off-Highway Trucks Composit		0.1303	0.5447	0.6574	0.0027	0.0216	260	0.0118
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0284	0.2225	0.1835	0.0004	0.0056	28.0	0.0026
	120	0.0440	0.5061	0.3277	0.0009	0.0144	80.9	0.0040
	175	0.0460	0.5858	0.2580	0.0012	0.0122	107	0.0041
	500	0.0913	0.4635	0.4587	0.0025	0.0159	254	0.0082
Other Construction Equipment		0.0507	0.3488	0.2785	0.0013	0.0106	123	0.0046
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0360	0.2140	0.1625	0.0003	0.0074	21.7	0.0032
	120	0.0516	0.4198	0.3199	0.0007	0.0189	62.0	0.0047
	175	0.0623	0.5661	0.3419	0.0011	0.0179	95.9	0.0056
	250	0.0701	0.2762	0.3977	0.0015	0.0130	136	0.0063
	500	0.1344	0.5141	0.7082	0.0026	0.0247	265	0.0121
	750	0.2221	0.8474	1.1914	0.0044	0.0411	437	0.0200
	1000	0.3060	1.1450	3.4169	0.0056	0.0781	560	0.0276
Other General Industrial Equip		0.0867	0.4464	0.5301	0.0016	0.0199	152	0.0078
Other Material Ha	50	0.0496	0.2950	0.2260	0.0004	0.0103	30.3	0.0045
	120	0.0499	0.4085	0.3124	0.0007	0.0185	60.7	0.0045

	175	0.0785	0.7167	0.4349	0.0014	0.0228	122	0.0071
	250	0.0741	0.2939	0.4252	0.0016	0.0139	145	0.0067
	500	0.0959	0.3697	0.5110	0.0019	0.0178	192	0.0087
	9999	0.4384	1.5111	4.5177	0.0073	0.1032	741	0.0396
Other Material Handling Equip		0.0813	0.4378	0.5158	0.0015	0.0191	141	0.0073
Pavers	25	0.0225	0.0768	0.1424	0.0002	0.0054	18.7	0.0020
	50	0.0718	0.2941	0.2269	0.0004	0.0154	28.0	0.0065
	120	0.0802	0.4756	0.4824	0.0008	0.0357	69.2	0.0072
	175	0.1081	0.7573	0.6894	0.0014	0.0385	128	0.0098
	250	0.1271	0.4502	0.9303	0.0022	0.0337	194	0.0115
	500	0.1447	0.5863	1.0011	0.0023	0.0374	233	0.0131
Pavers Composite		0.0870	0.4840	0.4750	0.0009	0.0296	77.9	0.0078
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0598	0.2475	0.1933	0.0003	0.0130	23.9	0.0054
	120	0.0619	0.3722	0.3757	0.0006	0.0279	54.5	0.0056
	175	0.0834	0.5924	0.5361	0.0011	0.0299	101	0.0075
	250	0.0779	0.2771	0.5769	0.0014	0.0206	122	0.0070
Paving Equipment Composite		0.0666	0.4042	0.4137	0.0008	0.0261	68.9	0.0060
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0054	0.0303	0.0379	0.0001	0.0017	4.9	0.0005
	25	0.0089	0.0306	0.0563	0.0001	0.0024	7.1	0.0008
	50	0.0103	0.0831	0.0920	0.0002	0.0030	14.3	0.0009
	120	0.0104	0.1358	0.1094	0.0003	0.0049	24.1	0.0009
Pressure Washers Composite		0.0075	0.0539	0.0606	0.0001	0.0024	9.4	0.0007
Pumps	15	0.0093	0.0460	0.0577	0.0001	0.0027	7.4	0.0008
	25	0.0255	0.0834	0.1535	0.0002	0.0067	19.5	0.0023
	50	0.0380	0.2459	0.2331	0.0004	0.0094	34.3	0.0034
	120	0.0449	0.4676	0.3749	0.0009	0.0199	77.9	0.0040
	175	0.0608	0.7328	0.4650	0.0016	0.0214	140	0.0055
	250	0.0668	0.3640	0.5526	0.0023	0.0165	201	0.0060
	500	0.1105	0.6094	0.8662	0.0034	0.0274	345	0.0100
	750	0.1841	1.0074	1.4611	0.0057	0.0458	571	0.0166
	9999	0.5293	2.5333	7.7698	0.0136	0.1590	1,355	0.0478
Pumps Composite		0.0322	0.2640	0.2467	0.0006	0.0114	49.6	0.0029
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0444	0.2347	0.1923	0.0003	0.0101	26.0	0.0040
	120	0.0486	0.3836	0.3270	0.0007	0.0207	59.0	0.0044
	175	0.0669	0.6103	0.4265	0.0012	0.0225	108	0.0060
	250	0.0760	0.3121	0.5217	0.0017	0.0180	153	0.0069
	500	0.1052	0.4391	0.6689	0.0022	0.0243	219	0.0095
Rollers Composite		0.0500	0.3799	0.3198	0.0008	0.0181	67.0	0.0045
Rough Terrain Fo	50	0.0447	0.3102	0.2394	0.0004	0.0088	33.9	0.0040
	120	0.0433	0.4122	0.2827	0.0007	0.0144	62.4	0.0039
	175	0.0689	0.7228	0.3608	0.0014	0.0184	125	0.0062
	250	0.0786	0.3401	0.4010	0.0019	0.0137	171	0.0071
	500	0.1164	0.4879	0.5561	0.0025	0.0200	257	0.0105
Rough Terrain Forklifts Compo		0.0467	0.4445	0.2924	0.0008	0.0148	70.3	0.0042
Rubber Tired Doz	175	0.1359	0.8073	0.8630	0.0015	0.0485	129	0.0123
	250	0.1536	0.4976	1.1128	0.0021	0.0437	183	0.0139
	500	0.2081	0.8431	1.4541	0.0026	0.0573	265	0.0188
	750	0.3144	1.2669	2.2402	0.0040	0.0873	399	0.0284
	1000	0.4949	2.0395	5.1053	0.0060	0.1466	592	0.0447
Rubber Tired Dozers Compos		0.1919	0.7353	1.3612	0.0025	0.0536	239	0.0173
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0515	0.2990	0.2280	0.0004	0.0105	31.1	0.0046
	120	0.0482	0.3946	0.3036	0.0007	0.0178	58.9	0.0043
	175	0.0662	0.6207	0.3719	0.0012	0.0194	106	0.0060
	250	0.0763	0.3102	0.4423	0.0017	0.0154	149	0.0069
	500	0.1181	0.4837	0.6348	0.0023	0.0232	237	0.0107
	750	0.2426	0.9905	1.3313	0.0049	0.0481	486	0.0219
	1000	0.3127	1.2515	3.6383	0.0060	0.0813	594	0.0282
Rubber Tired Loaders Compos		0.0661	0.4359	0.3849	0.0012	0.0181	109	0.0060
Scrapers	120	0.1071	0.6549	0.6300	0.0011	0.0454	93.9	0.0097
	175	0.1235	0.8895	0.7529	0.0017	0.0417	148	0.0111

	250	0.1369	0.4844	0.9425	0.0024	0.0340	209	0.0123
	500	0.2003	0.7920	1.2973	0.0032	0.0483	321	0.0181
	750	0.3476	1.3669	2.3064	0.0056	0.0848	555	0.0314
Scrapers Composite		0.1724	0.7579	1.1177	0.0027	0.0447	262	0.0156
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0417	0.2755	0.2471	0.0005	0.0098	36.2	0.0038
	120	0.0477	0.4918	0.3767	0.0009	0.0200	80.2	0.0043
	175	0.0707	0.8279	0.4898	0.0017	0.0235	155	0.0064
	250	0.0919	0.4710	0.6627	0.0029	0.0206	255	0.0083
Signal Boards Composite		0.0121	0.0910	0.0818	0.0002	0.0036	16.7	0.0011
Skid Steer Loade	25	0.0168	0.0570	0.1062	0.0002	0.0042	13.8	0.0015
	50	0.0211	0.1991	0.1551	0.0003	0.0029	25.5	0.0019
	120	0.0197	0.2669	0.1446	0.0005	0.0043	42.8	0.0018
Skid Steer Loaders Composite		0.0204	0.2114	0.1485	0.0004	0.0034	30.3	0.0018
Surfacing Equipn	50	0.0221	0.1150	0.1008	0.0002	0.0051	14.1	0.0020
	120	0.0484	0.3991	0.3507	0.0007	0.0215	63.8	0.0044
	175	0.0474	0.4653	0.3377	0.0010	0.0169	85.8	0.0043
	250	0.0585	0.2682	0.4607	0.0015	0.0154	135	0.0053
	500	0.0915	0.4491	0.6786	0.0022	0.0236	221	0.0083
	750	0.1447	0.7042	1.0950	0.0035	0.0376	347	0.0131
Surfacing Equipment Compos		0.0739	0.3778	0.5368	0.0017	0.0195	166	0.0067
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0362	0.2815	0.2173	0.0004	0.0067	31.6	0.0033
	120	0.0475	0.4919	0.3133	0.0009	0.0141	75.0	0.0043
	175	0.0716	0.8013	0.3643	0.0016	0.0169	139	0.0065
	250	0.0696	0.3182	0.3224	0.0018	0.0101	162	0.0063
Sweepers/Scrubbers Compos		0.0498	0.4867	0.2947	0.0009	0.0124	78.5	0.0045
Tractors/Loaders	25	0.0191	0.0653	0.1209	0.0002	0.0045	15.9	0.0017
	50	0.0354	0.2713	0.2045	0.0004	0.0062	30.3	0.0032
	120	0.0320	0.3388	0.2113	0.0006	0.0090	51.7	0.0029
	175	0.0499	0.5840	0.2431	0.0011	0.0116	101	0.0045
	250	0.0728	0.3417	0.3287	0.0019	0.0113	172	0.0066
	500	0.1447	0.6562	0.6144	0.0039	0.0221	345	0.0131
	750	0.2170	0.9841	0.9320	0.0058	0.0334	517	0.0196
Tractors/Loaders/Backhoes C		0.0384	0.3599	0.2302	0.0008	0.0095	66.8	0.0035
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.0856	0.3361	0.2658	0.0004	0.0185	32.9	0.0077
	120	0.0751	0.4397	0.4624	0.0008	0.0344	64.9	0.0068
	175	0.1201	0.8361	0.7981	0.0016	0.0442	144	0.0108
	250	0.1441	0.5202	1.1070	0.0025	0.0407	223	0.0130
	500	0.1899	0.8063	1.3903	0.0031	0.0523	311	0.0171
	750	0.3599	1.5183	2.6930	0.0059	0.0999	587	0.0325
Trenchers Composite		0.0819	0.4186	0.4094	0.0007	0.0284	58.7	0.0074
Welders	15	0.0078	0.0385	0.0483	0.0001	0.0022	6.2	0.0007
	25	0.0147	0.0483	0.0889	0.0001	0.0039	11.3	0.0013
	50	0.0354	0.2134	0.1836	0.0003	0.0082	26.0	0.0032
	120	0.0270	0.2486	0.1970	0.0005	0.0114	39.5	0.0024
	175	0.0517	0.5385	0.3390	0.0011	0.0171	98.2	0.0047
	250	0.0489	0.2256	0.3404	0.0013	0.0108	119	0.0044
	500	0.0671	0.3068	0.4355	0.0016	0.0147	168	0.0061
Welders Composite		0.0260	0.1773	0.1557	0.0003	0.0078	25.6	0.0023

SCAB Fleet Average Emission Factors (Diesel)

2023

Air Basin	SC

Equipment	MaxHP	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0133	0.0452	0.0842	0.0001	0.0033	11.0	0.0012
	50	0.0196	0.1373	0.1289	0.0003	0.0046	19.6	0.0018
	120	0.0201	0.2271	0.1697	0.0004	0.0084	38.1	0.0018
	500	0.0637	0.3732	0.4746	0.0021	0.0146	213	0.0058
	750	0.1160	0.6746	0.8754	0.0039	0.0268	385	0.0105
Aerial Lifts Composite		0.0208	0.1658	0.1525	0.0004	0.0062	34.7	0.0019
Air Compressors	15	0.0089	0.0446	0.0555	0.0001	0.0025	7.2	0.0008
	25	0.0186	0.0613	0.1132	0.0002	0.0048	14.4	0.0017
	50	0.0301	0.1936	0.1563	0.0003	0.0063	22.3	0.0027
	120	0.0325	0.3027	0.2194	0.0006	0.0121	47.0	0.0029
	175	0.0478	0.4985	0.2761	0.0010	0.0141	88.5	0.0043
	250	0.0567	0.2542	0.3336	0.0015	0.0108	131	0.0051
	500	0.0981	0.4312	0.5407	0.0023	0.0184	232	0.0089
	750	0.1520	0.6663	0.8527	0.0036	0.0288	358	0.0137
	1000	0.2215	0.9472	2.7762	0.0049	0.0592	486	0.0200
Air Compressors Composite		0.0390	0.3035	0.2459	0.0007	0.0119	63.6	0.0035
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0191	0.2200	0.1672	0.0004	0.0010	31.0	0.0017
	120	0.0256	0.4660	0.2018	0.0009	0.0023	77.1	0.0023
	175	0.0337	0.7541	0.0966	0.0016	0.0033	141	0.0030
	250	0.0432	0.3426	0.1058	0.0021	0.0038	188	0.0039
	500	0.0716	0.5512	0.1739	0.0031	0.0062	311	0.0065
	750	0.1414	1.0890	0.3438	0.0062	0.0123	615	0.0128
	1000	0.2174	1.6434	3.9139	0.0093	0.0395	928	0.0196
Bore/Drill Rigs Composite		0.0436	0.5007	0.2949	0.0017	0.0045	165	0.0039
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0216	0.0728	0.1354	0.0002	0.0053	17.6	0.0019
Cement and Mortar Mixers Co		0.0085	0.0414	0.0534	0.0001	0.0021	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0322	0.2324	0.2028	0.0004	0.0072	30.2	0.0029
	120	0.0418	0.4576	0.3234	0.0009	0.0162	74.1	0.0038
	175	0.0707	0.8662	0.4509	0.0018	0.0219	160	0.0064
Concrete/Industrial Saws Com		0.0382	0.3728	0.2767	0.0007	0.0127	58.5	0.0034
Cranes	50	0.0402	0.2305	0.1733	0.0003	0.0082	23.2	0.0036
	120	0.0426	0.3401	0.2642	0.0006	0.0158	50.1	0.0038
	175	0.0522	0.4746	0.2894	0.0009	0.0153	80.3	0.0047
	250	0.0600	0.2354	0.3458	0.0013	0.0120	112	0.0054
	500	0.0940	0.3610	0.5013	0.0018	0.0185	180	0.0085
	750	0.1583	0.6073	0.8613	0.0030	0.0314	303	0.0143
	9999	0.5757	2.0307	6.0792	0.0098	0.1373	971	0.0519
Cranes Composite		0.0754	0.3786	0.5028	0.0014	0.0181	129	0.0068
Crawler Tractors	50	0.0560	0.2636	0.1936	0.0003	0.0111	24.9	0.0051
	120	0.0687	0.4568	0.4030	0.0008	0.0274	65.8	0.0062
	175	0.0929	0.7277	0.5402	0.0014	0.0297	121	0.0084
	250	0.1013	0.3749	0.6513	0.0019	0.0233	166	0.0091
	500	0.1515	0.6117	0.9142	0.0025	0.0339	259	0.0137
	750	0.2728	1.0957	1.6867	0.0047	0.0617	465	0.0246
	1000	0.4130	1.6547	4.5686	0.0066	0.1123	658	0.0373
Crawler Tractors Composite		0.0879	0.5125	0.5291	0.0013	0.0280	114	0.0079
Crushing/Proc. E	50	0.0573	0.3903	0.3069	0.0006	0.0114	44.0	0.0052
	120	0.0564	0.5413	0.3734	0.0010	0.0193	83.1	0.0051
	175	0.0897	0.9538	0.4869	0.0019	0.0245	167	0.0081
	250	0.1068	0.4783	0.5727	0.0028	0.0186	245	0.0096
	500	0.1605	0.7002	0.8070	0.0037	0.0276	374	0.0145
	750	0.2534	1.1039	1.2978	0.0059	0.0437	589	0.0229

	9999	0.6617	2.5491	7.2745	0.0131	0.1522	1,308	0.0597
Crushing/Proc. Equipment Co		0.0773	0.6199	0.4479	0.0015	0.0201	132	0.0070
Dumpers/Tender	25	0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0320	0.2387	0.1699	0.0003	0.0049	25.0	0.0029
	120	0.0487	0.4952	0.2967	0.0009	0.0126	73.6	0.0044
	175	0.0578	0.6636	0.2573	0.0013	0.0125	112	0.0052
	250	0.0707	0.3230	0.2915	0.0018	0.0100	159	0.0064
	500	0.1031	0.4522	0.4014	0.0023	0.0144	234	0.0093
	750	0.1710	0.7495	0.6744	0.0039	0.0240	387	0.0154
Excavators Composite		0.0615	0.5097	0.2821	0.0013	0.0117	120	0.0055
Forklifts	50	0.0159	0.1363	0.0954	0.0002	0.0020	14.7	0.0014
	120	0.0183	0.2086	0.1134	0.0004	0.0035	31.2	0.0017
	175	0.0260	0.3305	0.1074	0.0006	0.0040	56.1	0.0023
	250	0.0315	0.1549	0.1069	0.0009	0.0033	77.1	0.0028
	500	0.0451	0.2120	0.1455	0.0011	0.0047	111	0.0041
Forklifts Composite		0.0259	0.2146	0.1108	0.0006	0.0035	54.4	0.0023
Generator Sets	15	0.0111	0.0631	0.0782	0.0002	0.0034	10.2	0.0010
	25	0.0218	0.0748	0.1381	0.0002	0.0057	17.6	0.0020
	50	0.0284	0.2068	0.1992	0.0004	0.0068	30.6	0.0026
	120	0.0390	0.4597	0.3429	0.0009	0.0164	77.9	0.0035
	175	0.0536	0.7319	0.4144	0.0016	0.0181	142	0.0048
	250	0.0620	0.3769	0.5050	0.0024	0.0146	213	0.0056
	500	0.0951	0.5855	0.7401	0.0033	0.0225	337	0.0086
	750	0.1548	0.9452	1.2186	0.0055	0.0367	544	0.0140
	9999	0.3628	1.9093	5.6803	0.0105	0.1086	1,049	0.0327
Generator Sets Composite		0.0321	0.2683	0.2612	0.0007	0.0103	61.0	0.0029
Graders	50	0.0438	0.2649	0.1973	0.0004	0.0083	27.5	0.0040
	120	0.0592	0.5035	0.3674	0.0009	0.0205	75.0	0.0053
	175	0.0740	0.7268	0.3960	0.0014	0.0205	124	0.0067
	250	0.0856	0.3591	0.4670	0.0019	0.0163	172	0.0077
	500	0.1113	0.4726	0.5631	0.0023	0.0207	229	0.0100
	750	0.2361	0.9999	1.2212	0.0049	0.0443	486	0.0213
Graders Composite		0.0758	0.5718	0.4156	0.0015	0.0191	133	0.0068
Off-Highway Trac	120	0.1235	0.6678	0.7110	0.0011	0.0536	93.7	0.0111
	175	0.1237	0.7961	0.7762	0.0015	0.0435	130	0.0112
	250	0.0980	0.3323	0.7020	0.0015	0.0269	130	0.0088
	750	0.4042	1.6484	2.8322	0.0057	0.1085	568	0.0365
	1000	0.6171	2.5586	6.5771	0.0082	0.1808	814	0.0557
Off-Highway Tractors Compos		0.1255	0.6238	0.8516	0.0017	0.0391	151	0.0113
Off-Highway Truc	175	0.0692	0.7536	0.3068	0.0014	0.0152	125	0.0062
	250	0.0796	0.3458	0.3302	0.0019	0.0114	167	0.0072
	500	0.1287	0.5355	0.5023	0.0027	0.0182	272	0.0116
	750	0.2090	0.8685	0.8270	0.0044	0.0297	442	0.0189
	1000	0.3089	1.2561	3.3947	0.0063	0.0663	625	0.0279
Off-Highway Trucks Composit		0.1243	0.5422	0.5881	0.0027	0.0188	260	0.0112
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0267	0.2209	0.1783	0.0004	0.0047	28.0	0.0024
	120	0.0416	0.5054	0.3051	0.0009	0.0122	80.9	0.0038
	175	0.0432	0.5857	0.2259	0.0012	0.0105	107	0.0039
	500	0.0869	0.4622	0.4007	0.0025	0.0137	254	0.0078
Other Construction Equipment		0.0483	0.3482	0.2497	0.0013	0.0092	123	0.0044
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0336	0.2124	0.1578	0.0003	0.0063	21.7	0.0030
	120	0.0486	0.4194	0.2962	0.0007	0.0164	62.0	0.0044
	175	0.0585	0.5669	0.3049	0.0011	0.0156	95.9	0.0053
	250	0.0668	0.2755	0.3496	0.0015	0.0113	136	0.0060
	500	0.1284	0.5127	0.6281	0.0026	0.0215	265	0.0116
	750	0.2122	0.8450	1.0564	0.0044	0.0358	437	0.0191
	1000	0.2905	1.1303	3.2598	0.0056	0.0709	560	0.0262
Other General Industrial Equip		0.0824	0.4454	0.4807	0.0016	0.0174	152	0.0074
Other Material Ha	50	0.0463	0.2927	0.2194	0.0004	0.0088	30.3	0.0042
	120	0.0470	0.4081	0.2892	0.0007	0.0160	60.7	0.0042

	175	0.0738	0.7178	0.3878	0.0014	0.0199	122	0.0067
	250	0.0706	0.2931	0.3737	0.0016	0.0121	145	0.0064
	500	0.0916	0.3687	0.4532	0.0019	0.0155	192	0.0083
	9999	0.4172	1.4917	4.3096	0.0073	0.0937	741	0.0376
Other Material Handling Equip		0.0771	0.4369	0.4671	0.0015	0.0167	141	0.0070
Pavers	25	0.0225	0.0768	0.1423	0.0002	0.0054	18.7	0.0020
	50	0.0666	0.2890	0.2210	0.0004	0.0140	28.0	0.0060
	120	0.0753	0.4735	0.4531	0.0008	0.0323	69.2	0.0068
	175	0.1017	0.7562	0.6305	0.0014	0.0350	128	0.0092
	250	0.1208	0.4419	0.8488	0.0022	0.0307	194	0.0109
	500	0.1380	0.5680	0.9135	0.0023	0.0341	233	0.0125
Pavers Composite		0.0815	0.4805	0.4432	0.0009	0.0269	77.9	0.0074
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0551	0.2431	0.1882	0.0003	0.0118	23.9	0.0050
	120	0.0578	0.3703	0.3520	0.0006	0.0251	54.5	0.0052
	175	0.0782	0.5915	0.4884	0.0011	0.0271	101	0.0071
	250	0.0741	0.2724	0.5241	0.0014	0.0187	122	0.0067
Paving Equipment Composite		0.0624	0.4024	0.3832	0.0008	0.0236	68.9	0.0056
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0053	0.0302	0.0375	0.0001	0.0016	4.9	0.0005
	25	0.0088	0.0303	0.0560	0.0001	0.0023	7.1	0.0008
	50	0.0093	0.0823	0.0893	0.0002	0.0026	14.3	0.0008
	120	0.0096	0.1355	0.1015	0.0003	0.0042	24.1	0.0009
Pressure Washers Composite		0.0072	0.0536	0.0589	0.0001	0.0022	9.4	0.0006
Pumps	15	0.0091	0.0459	0.0571	0.0001	0.0026	7.4	0.0008
	25	0.0251	0.0827	0.1527	0.0002	0.0064	19.5	0.0023
	50	0.0350	0.2434	0.2263	0.0004	0.0081	34.3	0.0032
	120	0.0417	0.4668	0.3476	0.0009	0.0174	77.9	0.0038
	175	0.0569	0.7333	0.4157	0.0016	0.0189	140	0.0051
	250	0.0635	0.3626	0.4870	0.0023	0.0145	201	0.0057
	500	0.1054	0.6070	0.7693	0.0034	0.0240	345	0.0095
	750	0.1755	1.0035	1.2976	0.0057	0.0401	571	0.0158
	9999	0.5003	2.4976	7.4174	0.0136	0.1447	1,355	0.0451
Pumps Composite		0.0302	0.2631	0.2319	0.0006	0.0101	49.6	0.0027
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0404	0.2311	0.1870	0.0003	0.0088	26.0	0.0036
	120	0.0449	0.3822	0.3039	0.0007	0.0180	59.0	0.0041
	175	0.0625	0.6100	0.3806	0.0012	0.0199	108	0.0056
	250	0.0723	0.3089	0.4627	0.0017	0.0161	153	0.0065
	500	0.1005	0.4310	0.5973	0.0022	0.0219	219	0.0091
Rollers Composite		0.0465	0.3784	0.2939	0.0008	0.0159	67.0	0.0042
Rough Terrain Fo	50	0.0420	0.3076	0.2321	0.0004	0.0074	33.9	0.0038
	120	0.0408	0.4115	0.2618	0.0007	0.0122	62.4	0.0037
	175	0.0645	0.7228	0.3175	0.0014	0.0158	125	0.0058
	250	0.0744	0.3388	0.3483	0.0019	0.0117	171	0.0067
	500	0.1103	0.4861	0.4872	0.0025	0.0172	257	0.0100
Rough Terrain Forklifts Compo		0.0439	0.4439	0.2688	0.0008	0.0125	70.3	0.0040
Rubber Tired Doz	175	0.1290	0.8053	0.8018	0.0015	0.0450	129	0.0116
	250	0.1461	0.4845	1.0318	0.0021	0.0402	183	0.0132
	500	0.1986	0.8077	1.3478	0.0026	0.0528	265	0.0179
	750	0.3001	1.2140	2.0778	0.0040	0.0805	399	0.0271
	1000	0.4726	1.9494	4.9100	0.0060	0.1372	592	0.0426
Rubber Tired Dozers Compos		0.1830	0.7078	1.2624	0.0025	0.0494	239	0.0165
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0475	0.2955	0.2217	0.0004	0.0091	31.1	0.0043
	120	0.0449	0.3934	0.2826	0.0007	0.0154	58.9	0.0040
	175	0.0618	0.6203	0.3296	0.0012	0.0169	106	0.0056
	250	0.0725	0.3079	0.3901	0.0017	0.0136	149	0.0065
	500	0.1127	0.4766	0.5638	0.0023	0.0207	237	0.0102
	750	0.2313	0.9758	1.1789	0.0049	0.0428	486	0.0209
	1000	0.2970	1.2278	3.4839	0.0060	0.0740	594	0.0268
Rubber Tired Loaders Compos		0.0622	0.4340	0.3467	0.0012	0.0158	109	0.0056
Scrapers	120	0.1005	0.6522	0.5911	0.0011	0.0410	93.9	0.0091
	175	0.1160	0.8884	0.6857	0.0017	0.0378	148	0.0105

	250	0.1302	0.4766	0.8568	0.0024	0.0308	209	0.0117
	500	0.1912	0.7700	1.1799	0.0032	0.0440	321	0.0173
	750	0.3318	1.3291	2.0977	0.0056	0.0772	555	0.0299
Scrapers Composite		0.1641	0.7432	1.0171	0.0027	0.0406	262	0.0148
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0384	0.2727	0.2399	0.0005	0.0084	36.2	0.0035
	120	0.0445	0.4910	0.3489	0.0009	0.0173	80.2	0.0040
	175	0.0664	0.8282	0.4356	0.0017	0.0205	155	0.0060
	250	0.0875	0.4696	0.5809	0.0029	0.0179	255	0.0079
Signal Boards Composite		0.0117	0.0909	0.0780	0.0002	0.0033	16.7	0.0011
Skid Steer Loade	25	0.0167	0.0569	0.1059	0.0002	0.0041	13.8	0.0015
	50	0.0204	0.1985	0.1509	0.0003	0.0024	25.5	0.0018
	120	0.0188	0.2667	0.1364	0.0005	0.0034	42.8	0.0017
Skid Steer Loaders Composite		0.0196	0.2110	0.1433	0.0004	0.0028	30.3	0.0018
Surfacing Equipm	50	0.0202	0.1133	0.0981	0.0002	0.0045	14.1	0.0018
	120	0.0447	0.3975	0.3274	0.0007	0.0190	63.8	0.0040
	175	0.0441	0.4649	0.3028	0.0010	0.0150	85.8	0.0040
	250	0.0556	0.2653	0.4118	0.0015	0.0138	135	0.0050
	500	0.0874	0.4395	0.6089	0.0022	0.0214	221	0.0079
	750	0.1379	0.6891	0.9797	0.0035	0.0339	347	0.0124
Surfacing Equipment Compos		0.0703	0.3707	0.4836	0.0017	0.0176	166	0.0063
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0340	0.2791	0.2089	0.0004	0.0055	31.6	0.0031
	120	0.0444	0.4909	0.2906	0.0009	0.0112	75.0	0.0040
	175	0.0660	0.8008	0.3115	0.0016	0.0134	139	0.0060
	250	0.0650	0.3180	0.2671	0.0018	0.0080	162	0.0059
Sweepers/Scrubbers Compos		0.0464	0.4855	0.2689	0.0009	0.0099	78.5	0.0042
Tractors/Loaders	25	0.0191	0.0653	0.1209	0.0002	0.0045	15.9	0.0017
	50	0.0338	0.2698	0.1988	0.0004	0.0052	30.3	0.0030
	120	0.0304	0.3384	0.1974	0.0006	0.0076	51.7	0.0027
	175	0.0469	0.5840	0.2114	0.0011	0.0099	101	0.0042
	250	0.0693	0.3406	0.2840	0.0019	0.0098	172	0.0062
	500	0.1378	0.6538	0.5358	0.0039	0.0192	345	0.0124
	750	0.2067	0.9806	0.8121	0.0058	0.0289	517	0.0186
Tractors/Loaders/Backhoes C		0.0365	0.3593	0.2127	0.0008	0.0081	66.8	0.0033
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.0795	0.3301	0.2590	0.0004	0.0169	32.9	0.0072
	120	0.0706	0.4377	0.4353	0.0008	0.0314	64.9	0.0064
	175	0.1133	0.8348	0.7330	0.0016	0.0406	144	0.0102
	250	0.1371	0.5094	1.0145	0.0025	0.0371	223	0.0124
	500	0.1814	0.7801	1.2742	0.0031	0.0478	311	0.0164
	750	0.3437	1.4692	2.4692	0.0059	0.0915	587	0.0310
Trenchers Composite		0.0767	0.4150	0.3876	0.0007	0.0260	58.7	0.0069
Welders	15	0.0076	0.0383	0.0477	0.0001	0.0021	6.2	0.0007
	25	0.0145	0.0479	0.0884	0.0001	0.0037	11.3	0.0013
	50	0.0325	0.2111	0.1783	0.0003	0.0070	26.0	0.0029
	120	0.0253	0.2482	0.1823	0.0005	0.0099	39.5	0.0023
	175	0.0486	0.5390	0.3026	0.0011	0.0150	98.2	0.0044
	250	0.0466	0.2248	0.2994	0.0013	0.0095	119	0.0042
	500	0.0641	0.3056	0.3864	0.0016	0.0129	168	0.0058
Welders Composite		0.0242	0.1762	0.1487	0.0003	0.0068	25.6	0.0022

SCAB Fleet Average Emission Factors (Diesel)

2024

Air Basin	SC

		(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)	(lb/hr)
Equipment	**MaxHP**	**ROG**	**CO**	**NOX**	**SOX**	**PM**	**CO2**	**CH4**
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0133	0.0452	0.0840	0.0001	0.0032	11.0	0.0012
	50	0.0181	0.1362	0.1253	0.0003	0.0040	19.6	0.0016
	120	0.0188	0.2268	0.1590	0.0004	0.0073	38.1	0.0017
	500	0.0608	0.3720	0.4189	0.0021	0.0127	213	0.0055
	750	0.1106	0.6724	0.7727	0.0039	0.0232	385	0.0100
Aerial Lifts Composite		0.0195	0.1652	0.1442	0.0004	0.0055	34.7	0.0018
Air Compressors	15	0.0088	0.0445	0.0550	0.0001	0.0024	7.2	0.0008
	25	0.0183	0.0609	0.1126	0.0002	0.0046	14.4	0.0017
	50	0.0280	0.1922	0.1519	0.0003	0.0054	22.3	0.0025
	120	0.0306	0.3025	0.2052	0.0006	0.0104	47.0	0.0028
	175	0.0451	0.4992	0.2467	0.0010	0.0122	88.5	0.0041
	250	0.0540	0.2536	0.2931	0.0015	0.0092	131	0.0049
	500	0.0937	0.4300	0.4761	0.0023	0.0158	232	0.0085
	750	0.1452	0.6646	0.7508	0.0036	0.0248	358	0.0131
	1000	0.2105	0.9360	2.6550	0.0049	0.0536	486	0.0190
Air Compressors Composite		0.0369	0.3031	0.2272	0.0007	0.0103	63.6	0.0033
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0190	0.2200	0.1666	0.0004	0.0009	31.0	0.0017
	120	0.0253	0.4660	0.1970	0.0009	0.0021	77.1	0.0023
	175	0.0327	0.7542	0.0827	0.0016	0.0031	141	0.0030
	250	0.0429	0.3426	0.1014	0.0021	0.0036	188	0.0039
	500	0.0710	0.5512	0.1671	0.0031	0.0060	311	0.0064
	750	0.1404	1.0890	0.3303	0.0062	0.0119	615	0.0127
	1000	0.2130	1.6436	3.9011	0.0093	0.0372	928	0.0192
Bore/Drill Rigs Composite		0.0431	0.5007	0.2892	0.0017	0.0043	165	0.0039
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0214	0.0726	0.1350	0.0002	0.0053	17.6	0.0019
Cement and Mortar Mixers Co		0.0085	0.0414	0.0534	0.0001	0.0021	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0299	0.2302	0.1967	0.0004	0.0062	30.2	0.0027
	120	0.0392	0.4568	0.3021	0.0009	0.0138	74.1	0.0035
	175	0.0664	0.8662	0.3998	0.0018	0.0189	160	0.0060
Concrete/Industrial Saws Com		0.0358	0.3716	0.2608	0.0007	0.0109	58.5	0.0032
Cranes	50	0.0373	0.2278	0.1687	0.0003	0.0072	23.2	0.0034
	120	0.0399	0.3391	0.2459	0.0006	0.0138	50.1	0.0036
	175	0.0490	0.4745	0.2579	0.0009	0.0136	80.3	0.0044
	250	0.0571	0.2333	0.3059	0.0013	0.0107	112	0.0051
	500	0.0897	0.3566	0.4464	0.0018	0.0165	180	0.0081
	750	0.1512	0.5999	0.7661	0.0030	0.0280	303	0.0136
	9999	0.5477	1.9971	5.8122	0.0098	0.1254	971	0.0494
Cranes Composite		0.0715	0.3759	0.4601	0.0014	0.0161	129	0.0065
Crawler Tractors	50	0.0522	0.2599	0.1887	0.0003	0.0100	24.9	0.0047
	120	0.0646	0.4552	0.3786	0.0008	0.0246	65.8	0.0058
	175	0.0874	0.7271	0.4904	0.0014	0.0268	121	0.0079
	250	0.0966	0.3701	0.5904	0.0019	0.0211	166	0.0087
	500	0.1450	0.5986	0.8297	0.0025	0.0308	259	0.0131
	750	0.2611	1.0724	1.5305	0.0047	0.0561	465	0.0236
	1000	0.3931	1.6052	4.3851	0.0066	0.1037	658	0.0355
Crawler Tractors Composite		0.0832	0.5092	0.4874	0.0013	0.0252	114	0.0075
Crushing/Proc. E	50	0.0538	0.3879	0.2983	0.0006	0.0097	44.0	0.0049
	120	0.0533	0.5409	0.3495	0.0010	0.0165	83.1	0.0048
	175	0.0845	0.9548	0.4334	0.0019	0.0210	167	0.0076
	250	0.1016	0.4774	0.5013	0.0028	0.0159	245	0.0092
	500	0.1531	0.6988	0.7082	0.0037	0.0236	374	0.0138
	750	0.2419	1.1018	1.1389	0.0059	0.0374	589	0.0218

	9999	0.6320	2.5232	6.9713	0.0131	0.1376	1,308	0.0570
Crushing/Proc. Equipment Co		0.0731	0.6193	0.4104	0.0015	0.0172	132	0.0066
Dumpers/Tender	25	0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0307	0.2374	0.1655	0.0003	0.0041	25.0	0.0028
	120	0.0466	0.4946	0.2785	0.0009	0.0108	73.6	0.0042
	175	0.0546	0.6636	0.2257	0.0013	0.0107	112	0.0049
	250	0.0675	0.3218	0.2539	0.0018	0.0086	159	0.0061
	500	0.0985	0.4507	0.3521	0.0023	0.0124	234	0.0089
	750	0.1635	0.7470	0.5916	0.0039	0.0207	387	0.0148
Excavators Composite		0.0585	0.5091	0.2524	0.0013	0.0101	120	0.0053
Forklifts	50	0.0154	0.1361	0.0920	0.0002	0.0015	14.7	0.0014
	120	0.0175	0.2086	0.1060	0.0004	0.0027	31.2	0.0016
	175	0.0243	0.3307	0.0892	0.0006	0.0033	56.1	0.0022
	250	0.0301	0.1550	0.0895	0.0009	0.0030	77.1	0.0027
	500	0.0432	0.2122	0.1230	0.0011	0.0042	111	0.0039
Forklifts Composite		0.0246	0.2146	0.0974	0.0006	0.0029	54.4	0.0022
Generator Sets	15	0.0110	0.0629	0.0775	0.0002	0.0033	10.2	0.0010
	25	0.0217	0.0743	0.1375	0.0002	0.0056	17.6	0.0020
	50	0.0262	0.2050	0.1936	0.0004	0.0059	30.6	0.0024
	120	0.0364	0.4591	0.3212	0.0009	0.0142	77.9	0.0033
	175	0.0502	0.7324	0.3708	0.0016	0.0158	142	0.0045
	250	0.0588	0.3756	0.4449	0.0024	0.0127	213	0.0053
	500	0.0905	0.5835	0.6525	0.0033	0.0195	337	0.0082
	750	0.1473	0.9420	1.0745	0.0055	0.0318	544	0.0133
	9999	0.3426	1.8853	5.4399	0.0105	0.0985	1,049	0.0309
Generator Sets Composite		0.0303	0.2674	0.2464	0.0007	0.0092	61.0	0.0027
Graders	50	0.0407	0.2621	0.1922	0.0004	0.0073	27.5	0.0037
	120	0.0554	0.5021	0.3433	0.0009	0.0177	75.0	0.0050
	175	0.0693	0.7264	0.3512	0.0014	0.0179	124	0.0063
	250	0.0816	0.3568	0.4129	0.0019	0.0145	172	0.0074
	500	0.1065	0.4665	0.5014	0.0023	0.0185	229	0.0096
	750	0.2259	0.9869	1.0831	0.0049	0.0395	486	0.0204
Graders Composite		0.0714	0.5706	0.3709	0.0015	0.0168	133	0.0064
Off-Highway Trac	120	0.1169	0.6647	0.6724	0.0011	0.0494	93.7	0.0106
	175	0.1172	0.7945	0.7183	0.0015	0.0402	130	0.0106
	250	0.0933	0.3246	0.6484	0.0015	0.0247	130	0.0084
	750	0.3859	1.5884	2.6171	0.0057	0.0998	568	0.0348
	1000	0.5888	2.4551	6.3258	0.0082	0.1689	814	0.0531
Off-Highway Tractors Compos		0.1192	0.6165	0.7884	0.0017	0.0360	151	0.0108
Off-Highway Truc	175	0.0655	0.7536	0.2698	0.0014	0.0131	125	0.0059
	250	0.0761	0.3445	0.2879	0.0019	0.0098	167	0.0069
	500	0.1232	0.5334	0.4414	0.0027	0.0157	272	0.0111
	750	0.2001	0.8652	0.7266	0.0044	0.0256	442	0.0181
	1000	0.2949	1.2476	3.2774	0.0063	0.0601	625	0.0266
Off-Highway Trucks Composit		0.1189	0.5401	0.5286	0.0027	0.0164	260	0.0107
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0254	0.2197	0.1736	0.0004	0.0040	28.0	0.0023
	120	0.0397	0.5049	0.2876	0.0009	0.0103	80.9	0.0036
	175	0.0407	0.5858	0.1980	0.0012	0.0089	107	0.0037
	500	0.0828	0.4612	0.3489	0.0025	0.0117	254	0.0075
Other Construction Equipment		0.0462	0.3477	0.2244	0.0013	0.0079	123	0.0042
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0316	0.2111	0.1534	0.0003	0.0055	21.7	0.0029
	120	0.0460	0.4192	0.2770	0.0007	0.0141	62.0	0.0041
	175	0.0551	0.5678	0.2723	0.0011	0.0135	95.9	0.0050
	250	0.0637	0.2749	0.3073	0.0015	0.0097	136	0.0058
	500	0.1228	0.5114	0.5533	0.0026	0.0185	265	0.0111
	750	0.2029	0.8429	0.9305	0.0044	0.0309	437	0.0183
	1000	0.2763	1.1172	3.1204	0.0056	0.0642	560	0.0249
Other General Industrial Equip		0.0784	0.4446	0.4363	0.0016	0.0151	152	0.0071
Other Material Ha	50	0.0435	0.2910	0.2133	0.0004	0.0076	30.3	0.0039
	120	0.0444	0.4079	0.2705	0.0007	0.0138	60.7	0.0040

	175	0.0694	0.7189	0.3463	0.0014	0.0172	122	0.0063
	250	0.0673	0.2925	0.3285	0.0016	0.0104	145	0.0061
	500	0.0875	0.3678	0.3992	0.0019	0.0133	192	0.0079
	9999	0.3974	1.4745	4.1250	0.0073	0.0848	741	0.0359
Other Material Handling Equip		0.0733	0.4362	0.4243	0.0015	0.0145	141	0.0066
Pavers	25	0.0225	0.0768	0.1422	0.0002	0.0053	18.7	0.0020
	50	0.0618	0.2844	0.2154	0.0004	0.0127	28.0	0.0056
	120	0.0706	0.4714	0.4258	0.0008	0.0292	69.2	0.0064
	175	0.0956	0.7552	0.5753	0.0014	0.0317	128	0.0086
	250	0.1150	0.4348	0.7727	0.0022	0.0279	194	0.0104
	500	0.1319	0.5518	0.8323	0.0023	0.0311	233	0.0119
Pavers Composite		0.0764	0.4773	0.4135	0.0009	0.0244	77.9	0.0069
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0508	0.2391	0.1834	0.0003	0.0106	23.9	0.0046
	120	0.0539	0.3687	0.3298	0.0006	0.0225	54.5	0.0049
	175	0.0733	0.5907	0.4437	0.0011	0.0244	101	0.0066
	250	0.0705	0.2683	0.4748	0.0014	0.0170	122	0.0064
Paving Equipment Composite		0.0584	0.4007	0.3546	0.0008	0.0212	68.9	0.0053
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0053	0.0301	0.0371	0.0001	0.0016	4.9	0.0005
	25	0.0088	0.0301	0.0557	0.0001	0.0023	7.1	0.0008
	50	0.0086	0.0816	0.0868	0.0002	0.0022	14.3	0.0008
	120	0.0088	0.1353	0.0952	0.0003	0.0037	24.1	0.0008
Pressure Washers Composite		0.0069	0.0534	0.0575	0.0001	0.0020	9.4	0.0006
Pumps	15	0.0090	0.0457	0.0565	0.0001	0.0025	7.4	0.0008
	25	0.0247	0.0821	0.1519	0.0002	0.0062	19.5	0.0022
	50	0.0323	0.2413	0.2200	0.0004	0.0071	34.3	0.0029
	120	0.0390	0.4661	0.3256	0.0009	0.0151	77.9	0.0035
	175	0.0533	0.7338	0.3720	0.0016	0.0165	140	0.0048
	250	0.0603	0.3614	0.4290	0.0023	0.0125	201	0.0054
	500	0.1006	0.6050	0.6783	0.0034	0.0208	345	0.0091
	750	0.1672	1.0001	1.1442	0.0057	0.0348	571	0.0151
	9999	0.4739	2.4659	7.1019	0.0136	0.1313	1,355	0.0428
Pumps Composite		0.0285	0.2624	0.2193	0.0006	0.0089	49.6	0.0026
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0371	0.2282	0.1822	0.0003	0.0077	26.0	0.0033
	120	0.0418	0.3810	0.2832	0.0007	0.0157	59.0	0.0038
	175	0.0587	0.6097	0.3395	0.0012	0.0176	108	0.0053
	250	0.0689	0.3061	0.4099	0.0017	0.0143	153	0.0062
	500	0.0962	0.4242	0.5328	0.0022	0.0195	219	0.0087
Rollers Composite		0.0435	0.3772	0.2707	0.0008	0.0139	67.0	0.0039
Rough Terrain Fo	50	0.0398	0.3057	0.2254	0.0004	0.0063	33.9	0.0036
	120	0.0387	0.4110	0.2454	0.0007	0.0104	62.4	0.0035
	175	0.0605	0.7228	0.2796	0.0014	0.0134	125	0.0055
	250	0.0705	0.3379	0.3029	0.0019	0.0099	171	0.0064
	500	0.1048	0.4847	0.4245	0.0025	0.0146	257	0.0095
Rough Terrain Forklifts Compo		0.0416	0.4433	0.2499	0.0008	0.0106	70.3	0.0038
Rubber Tired Doz	175	0.1225	0.8035	0.7440	0.0015	0.0417	129	0.0111
	250	0.1392	0.4728	0.9557	0.0021	0.0369	183	0.0126
	500	0.1898	0.7765	1.2479	0.0026	0.0487	265	0.0171
	750	0.2869	1.1673	1.9252	0.0040	0.0742	399	0.0259
	1000	0.4517	1.8684	4.7258	0.0060	0.1284	592	0.0408
Rubber Tired Dozers Compos		0.1748	0.6835	1.1695	0.0025	0.0455	239	0.0158
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0443	0.2927	0.2161	0.0004	0.0079	31.1	0.0040
	120	0.0420	0.3924	0.2639	0.0007	0.0132	58.9	0.0038
	175	0.0580	0.6201	0.2922	0.0012	0.0148	106	0.0052
	250	0.0691	0.3059	0.3442	0.0017	0.0121	149	0.0062
	500	0.1078	0.4705	0.5009	0.0023	0.0184	237	0.0097
	750	0.2211	0.9634	1.0446	0.0049	0.0380	486	0.0199
	1000	0.2828	1.2085	3.3471	0.0060	0.0674	594	0.0255
Rubber Tired Loaders Compos		0.0588	0.4324	0.3131	0.0012	0.0138	109	0.0053
Scrapers	120	0.0943	0.6496	0.5551	0.0011	0.0368	93.9	0.0085
	175	0.1090	0.8874	0.6232	0.0017	0.0341	148	0.0098

	250	0.1242	0.4700	0.7773	0.0024	0.0280	209	0.0112
	500	0.1830	0.7505	1.0718	0.0032	0.0400	321	0.0165
	750	0.3175	1.2955	1.9046	0.0056	0.0702	555	0.0286
Scrapers Composite		0.1565	0.7302	0.9241	0.0027	0.0369	262	0.0141
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0357	0.2705	0.2332	0.0005	0.0073	36.2	0.0032
	120	0.0418	0.4904	0.3267	0.0009	0.0149	80.2	0.0038
	175	0.0624	0.8287	0.3881	0.0017	0.0178	155	0.0056
	250	0.0833	0.4684	0.5094	0.0029	0.0155	255	0.0075
Signal Boards Composite		0.0114	0.0909	0.0747	0.0002	0.0031	16.7	0.0010
Skid Steer Loade	25	0.0167	0.0568	0.1056	0.0002	0.0041	13.8	0.0015
	50	0.0198	0.1981	0.1474	0.0003	0.0019	25.5	0.0018
	120	0.0181	0.2666	0.1295	0.0005	0.0027	42.8	0.0016
Skid Steer Loaders Composite		0.0190	0.2107	0.1389	0.0004	0.0023	30.3	0.0017
Surfacing Equipn	50	0.0185	0.1118	0.0956	0.0002	0.0040	14.1	0.0017
	120	0.0414	0.3961	0.3061	0.0007	0.0167	63.8	0.0037
	175	0.0412	0.4645	0.2712	0.0010	0.0133	85.8	0.0037
	250	0.0528	0.2627	0.3674	0.0015	0.0124	135	0.0048
	500	0.0836	0.4310	0.5459	0.0022	0.0193	221	0.0075
	750	0.1317	0.6758	0.8761	0.0035	0.0306	347	0.0119
Surfacing Equipment Compos		0.0669	0.3644	0.4356	0.0017	0.0159	166	0.0060
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0322	0.2774	0.2012	0.0004	0.0043	31.6	0.0029
	120	0.0417	0.4901	0.2701	0.0009	0.0086	75.0	0.0038
	175	0.0608	0.8006	0.2634	0.0016	0.0101	139	0.0055
	250	0.0616	0.3179	0.2252	0.0018	0.0069	162	0.0056
Sweepers/Scrubbers Compos		0.0434	0.4846	0.2457	0.0009	0.0076	78.5	0.0039
Tractors/Loaders	25	0.0191	0.0653	0.1209	0.0002	0.0045	15.9	0.0017
	50	0.0326	0.2687	0.1939	0.0004	0.0043	30.3	0.0029
	120	0.0291	0.3381	0.1857	0.0006	0.0065	51.7	0.0026
	175	0.0442	0.5840	0.1843	0.0011	0.0084	101	0.0040
	250	0.0661	0.3397	0.2465	0.0019	0.0084	172	0.0060
	500	0.1317	0.6521	0.4696	0.0039	0.0166	345	0.0119
	750	0.1976	0.9781	0.7117	0.0058	0.0250	517	0.0178
Tractors/Loaders/Backhoes C		0.0349	0.3589	0.1980	0.0008	0.0069	66.8	0.0031
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.0739	0.3247	0.2527	0.0004	0.0154	32.9	0.0067
	120	0.0664	0.4358	0.4099	0.0008	0.0286	64.9	0.0060
	175	0.1069	0.8337	0.6721	0.0016	0.0371	144	0.0096
	250	0.1307	0.5004	0.9284	0.0025	0.0339	223	0.0118
	500	0.1735	0.7573	1.1664	0.0031	0.0438	311	0.0157
	750	0.3287	1.4264	2.2609	0.0059	0.0838	587	0.0297
Trenchers Composite		0.0719	0.4116	0.3672	0.0007	0.0237	58.7	0.0065
Welders	15	0.0076	0.0382	0.0472	0.0001	0.0021	6.2	0.0007
	25	0.0143	0.0475	0.0880	0.0001	0.0036	11.3	0.0013
	50	0.0301	0.2093	0.1733	0.0003	0.0061	26.0	0.0027
	120	0.0237	0.2479	0.1705	0.0005	0.0085	39.5	0.0021
	175	0.0457	0.5395	0.2704	0.0011	0.0131	98.2	0.0041
	250	0.0444	0.2241	0.2632	0.0013	0.0082	119	0.0040
	500	0.0613	0.3047	0.3404	0.0016	0.0111	168	0.0055
Welders Composite		0.0227	0.1753	0.1428	0.0003	0.0059	25.6	0.0021

SCAB Fleet Average Emission Factors (Diesel)

2025

Air Basin	SC

Equipment	MaxHP	(lb/hr) ROG	(lb/hr) CO	(lb/hr) NOX	(lb/hr) SOX	(lb/hr) PM	(lb/hr) CO2	(lb/hr) CH4
Aerial Lifts	15	0.0101	0.0528	0.0631	0.0001	0.0025	8.7	0.0009
	25	0.0132	0.0451	0.0838	0.0001	0.0032	11.0	0.0012
	50	0.0168	0.1351	0.1218	0.0003	0.0035	19.6	0.0015
	120	0.0176	0.2265	0.1496	0.0004	0.0063	38.1	0.0016
	500	0.0580	0.3710	0.3660	0.0021	0.0109	213	0.0052
	750	0.1054	0.6706	0.6753	0.0039	0.0199	385	0.0095
Aerial Lifts Composite		0.0184	0.1646	0.1366	0.0004	0.0048	34.7	0.0017
Air Compressors	15	0.0087	0.0444	0.0545	0.0001	0.0023	7.2	0.0008
	25	0.0181	0.0605	0.1121	0.0002	0.0045	14.4	0.0016
	50	0.0263	0.1911	0.1476	0.0003	0.0047	22.3	0.0024
	120	0.0289	0.3023	0.1928	0.0006	0.0088	47.0	0.0026
	175	0.0424	0.4998	0.2187	0.0010	0.0104	88.5	0.0038
	250	0.0514	0.2531	0.2553	0.0015	0.0078	131	0.0046
	500	0.0894	0.4292	0.4150	0.0023	0.0134	232	0.0081
	750	0.1385	0.6633	0.6545	0.0036	0.0210	358	0.0125
	1000	0.1999	0.9265	2.5439	0.0049	0.0483	486	0.0180
Air Compressors Composite		0.0349	0.3027	0.2104	0.0007	0.0088	63.6	0.0031
Bore/Drill Rigs	15	0.0120	0.0632	0.0754	0.0002	0.0029	10.3	0.0011
	25	0.0193	0.0658	0.1219	0.0002	0.0046	16.0	0.0017
	50	0.0190	0.2200	0.1662	0.0004	0.0009	31.0	0.0017
	120	0.0252	0.4660	0.1955	0.0009	0.0020	77.1	0.0023
	175	0.0324	0.7542	0.0787	0.0016	0.0030	141	0.0029
	250	0.0427	0.3426	0.0981	0.0021	0.0035	188	0.0039
	500	0.0706	0.5512	0.1622	0.0031	0.0058	311	0.0064
	750	0.1396	1.0891	0.3204	0.0062	0.0115	615	0.0126
	1000	0.2115	1.6437	3.8912	0.0093	0.0364	928	0.0191
Bore/Drill Rigs Composite		0.0428	0.5007	0.2864	0.0017	0.0042	165	0.0039
Cement and Mor	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0213	0.0724	0.1346	0.0002	0.0052	17.6	0.0019
Cement and Mortar Mixers Co		0.0085	0.0414	0.0534	0.0001	0.0021	7.2	0.0008
Concrete/Industri	25	0.0199	0.0678	0.1256	0.0002	0.0047	16.5	0.0018
	50	0.0279	0.2284	0.1910	0.0004	0.0053	30.2	0.0025
	120	0.0370	0.4561	0.2840	0.0009	0.0117	74.1	0.0033
	175	0.0623	0.8663	0.3523	0.0018	0.0160	160	0.0056
Concrete/Industrial Saws Com		0.0337	0.3706	0.2471	0.0007	0.0093	58.5	0.0030
Cranes	50	0.0350	0.2256	0.1644	0.0003	0.0062	23.2	0.0032
	120	0.0376	0.3384	0.2298	0.0006	0.0120	50.1	0.0034
	175	0.0462	0.4744	0.2300	0.0009	0.0120	80.3	0.0042
	250	0.0544	0.2316	0.2705	0.0013	0.0094	112	0.0049
	500	0.0858	0.3535	0.3977	0.0018	0.0146	180	0.0077
	750	0.1446	0.5947	0.6821	0.0030	0.0248	303	0.0130
	9999	0.5219	1.9715	5.5760	0.0098	0.1146	971	0.0471
Cranes Composite		0.0681	0.3738	0.4223	0.0014	0.0143	129	0.0061
Crawler Tractors	50	0.0487	0.2566	0.1842	0.0003	0.0090	24.9	0.0044
	120	0.0609	0.4537	0.3562	0.0008	0.0221	65.8	0.0055
	175	0.0823	0.7265	0.4447	0.0014	0.0241	121	0.0074
	250	0.0924	0.3662	0.5348	0.0019	0.0192	166	0.0083
	500	0.1392	0.5877	0.7527	0.0025	0.0280	259	0.0126
	750	0.2506	1.0528	1.3878	0.0047	0.0510	465	0.0226
	1000	0.3749	1.5618	4.2168	0.0066	0.0958	658	0.0338
Crawler Tractors Composite		0.0789	0.5065	0.4492	0.0013	0.0227	114	0.0071
Crushing/Proc. E	50	0.0508	0.3859	0.2899	0.0006	0.0083	44.0	0.0046
	120	0.0506	0.5406	0.3289	0.0010	0.0140	83.1	0.0046
	175	0.0795	0.9556	0.3830	0.0019	0.0177	167	0.0072
	250	0.0967	0.4768	0.4357	0.0028	0.0134	245	0.0087
	500	0.1459	0.6977	0.6163	0.0037	0.0200	374	0.0132
	750	0.2307	1.1003	0.9907	0.0059	0.0316	589	0.0208

	9999	0.6019	2.5014	6.6977	0.0131	0.1238	1,308	0.0543
Crushing/Proc. Equipment Co		0.0693	0.6187	0.3763	0.0015	0.0146	132	0.0062
Dumpers/Tender	25	0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Dumpers/Tenders Composite		0.0092	0.0314	0.0581	0.0001	0.0022	7.6	0.0008
Excavators	25	0.0198	0.0677	0.1253	0.0002	0.0047	16.4	0.0018
	50	0.0297	0.2365	0.1616	0.0003	0.0035	25.0	0.0027
	120	0.0448	0.4942	0.2638	0.0009	0.0092	73.6	0.0040
	175	0.0518	0.6636	0.1982	0.0013	0.0091	112	0.0047
	250	0.0647	0.3210	0.2222	0.0018	0.0074	159	0.0058
	500	0.0946	0.4495	0.3091	0.0023	0.0107	234	0.0085
	750	0.1569	0.7451	0.5194	0.0039	0.0178	387	0.0142
Excavators Composite		0.0559	0.5086	0.2269	0.0013	0.0086	120	0.0050
Forklifts	50	0.0150	0.1361	0.0904	0.0002	0.0013	14.7	0.0014
	120	0.0168	0.2086	0.0997	0.0004	0.0023	31.2	0.0015
	175	0.0228	0.3310	0.0732	0.0006	0.0029	56.1	0.0021
	250	0.0289	0.1551	0.0746	0.0009	0.0027	77.1	0.0026
	500	0.0416	0.2123	0.1038	0.0011	0.0038	111	0.0038
Forklifts Composite		0.0236	0.2148	0.0860	0.0006	0.0025	54.4	0.0021
Generator Sets	15	0.0109	0.0627	0.0768	0.0002	0.0032	10.2	0.0010
	25	0.0216	0.0738	0.1368	0.0002	0.0055	17.6	0.0019
	50	0.0242	0.2034	0.1881	0.0004	0.0051	30.6	0.0022
	120	0.0340	0.4585	0.3022	0.0009	0.0122	77.9	0.0031
	175	0.0469	0.7328	0.3291	0.0016	0.0136	142	0.0042
	250	0.0558	0.3746	0.3885	0.0024	0.0108	213	0.0050
	500	0.0862	0.5820	0.5697	0.0033	0.0167	337	0.0078
	750	0.1401	0.9395	0.9382	0.0055	0.0272	544	0.0126
	9999	0.3235	1.8648	5.2188	0.0105	0.0888	1,049	0.0292
Generator Sets Composite		0.0288	0.2667	0.2329	0.0007	0.0081	61.0	0.0026
Graders	50	0.0382	0.2599	0.1877	0.0004	0.0063	27.5	0.0034
	120	0.0521	0.5009	0.3219	0.0009	0.0153	75.0	0.0047
	175	0.0652	0.7261	0.3117	0.0014	0.0157	124	0.0059
	250	0.0781	0.3549	0.3652	0.0019	0.0129	172	0.0071
	500	0.1023	0.4610	0.4468	0.0023	0.0165	229	0.0092
	750	0.2167	0.9755	0.9628	0.0049	0.0353	486	0.0196
Graders Composite		0.0676	0.5696	0.3314	0.0015	0.0147	133	0.0061
Off-Highway Trac	120	0.1108	0.6619	0.6362	0.0011	0.0455	93.7	0.0100
	175	0.1110	0.7932	0.6639	0.0015	0.0370	130	0.0100
	250	0.0890	0.3179	0.5983	0.0015	0.0227	130	0.0080
	750	0.3692	1.5358	2.4157	0.0057	0.0918	568	0.0333
	1000	0.5623	2.3619	6.0896	0.0082	0.1577	814	0.0507
Off-Highway Tractors Compos		0.1134	0.6101	0.7291	0.0017	0.0331	151	0.0102
Off-Highway Truc	175	0.0622	0.7536	0.2376	0.0014	0.0112	125	0.0056
	250	0.0730	0.3435	0.2521	0.0019	0.0085	167	0.0066
	500	0.1183	0.5319	0.3878	0.0027	0.0135	272	0.0107
	750	0.1921	0.8627	0.6384	0.0044	0.0221	442	0.0173
	1000	0.2823	1.2403	3.1782	0.0063	0.0546	625	0.0255
Off-Highway Trucks Composit		0.1140	0.5385	0.4769	0.0027	0.0142	260	0.0103
Other Constructio	15	0.0118	0.0617	0.0737	0.0002	0.0029	10.1	0.0011
	25	0.0159	0.0544	0.1008	0.0002	0.0038	13.2	0.0014
	50	0.0244	0.2188	0.1693	0.0004	0.0034	28.0	0.0022
	120	0.0379	0.5045	0.2730	0.0009	0.0087	80.9	0.0034
	175	0.0384	0.5858	0.1729	0.0012	0.0075	107	0.0035
	500	0.0792	0.4606	0.3034	0.0025	0.0099	254	0.0071
Other Construction Equipment		0.0442	0.3474	0.2021	0.0013	0.0069	123	0.0040
Other General In	15	0.0066	0.0391	0.0466	0.0001	0.0018	6.4	0.0006
	25	0.0185	0.0632	0.1170	0.0002	0.0044	15.3	0.0017
	50	0.0298	0.2099	0.1491	0.0003	0.0047	21.7	0.0027
	120	0.0436	0.4189	0.2603	0.0007	0.0120	62.0	0.0039
	175	0.0519	0.5684	0.2412	0.0011	0.0115	95.9	0.0047
	250	0.0608	0.2743	0.2679	0.0015	0.0083	136	0.0055
	500	0.1174	0.5103	0.4826	0.0026	0.0157	265	0.0106
	750	0.1939	0.8411	0.8117	0.0044	0.0262	437	0.0175
	1000	0.2627	1.1060	2.9924	0.0056	0.0579	560	0.0237
Other General Industrial Equip		0.0747	0.4438	0.3947	0.0016	0.0130	152	0.0067
Other Material Ha	50	0.0410	0.2893	0.2073	0.0004	0.0065	30.3	0.0037
	120	0.0421	0.4076	0.2541	0.0007	0.0117	60.7	0.0038

	175	0.0653	0.7197	0.3067	0.0014	0.0146	122	0.0059
	250	0.0642	0.2920	0.2863	0.0016	0.0088	145	0.0058
	500	0.0837	0.3670	0.3482	0.0019	0.0113	192	0.0075
	9999	0.3781	1.4596	3.9555	0.0073	0.0764	741	0.0341
Other Material Handling Equip		0.0696	0.4355	0.3844	0.0015	0.0124	141	0.0063
Pavers	25	0.0225	0.0768	0.1422	0.0002	0.0053	18.7	0.0020
	50	0.0574	0.2803	0.2102	0.0004	0.0114	28.0	0.0052
	120	0.0662	0.4696	0.4003	0.0008	0.0263	69.2	0.0060
	175	0.0899	0.7543	0.5238	0.0014	0.0286	128	0.0081
	250	0.1097	0.4287	0.7020	0.0022	0.0254	194	0.0099
	500	0.1263	0.5374	0.7572	0.0023	0.0284	233	0.0114
Pavers Composite		0.0717	0.4745	0.3858	0.0009	0.0220	77.9	0.0065
Paving Equipmer	25	0.0152	0.0520	0.0963	0.0002	0.0036	12.6	0.0014
	50	0.0469	0.2355	0.1789	0.0003	0.0095	23.9	0.0042
	120	0.0503	0.3671	0.3092	0.0006	0.0200	54.5	0.0045
	175	0.0687	0.5900	0.4021	0.0011	0.0219	101	0.0062
	250	0.0672	0.2648	0.4289	0.0014	0.0154	122	0.0061
Paving Equipment Composite		0.0548	0.3993	0.3281	0.0008	0.0190	68.9	0.0049
Plate Compactors	15	0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Plate Compactors Composite		0.0050	0.0263	0.0314	0.0001	0.0012	4.3	0.0005
Pressure Washer	15	0.0052	0.0301	0.0368	0.0001	0.0015	4.9	0.0005
	25	0.0087	0.0299	0.0555	0.0001	0.0022	7.1	0.0008
	50	0.0079	0.0810	0.0843	0.0002	0.0019	14.3	0.0007
	120	0.0082	0.1351	0.0897	0.0003	0.0031	24.1	0.0007
Pressure Washers Composite		0.0066	0.0531	0.0561	0.0001	0.0019	9.4	0.0006
Pumps	15	0.0089	0.0456	0.0560	0.0001	0.0024	7.4	0.0008
	25	0.0244	0.0816	0.1512	0.0002	0.0061	19.5	0.0022
	50	0.0299	0.2394	0.2138	0.0004	0.0061	34.3	0.0027
	120	0.0365	0.4656	0.3062	0.0009	0.0129	77.9	0.0033
	175	0.0499	0.7342	0.3301	0.0016	0.0142	140	0.0045
	250	0.0572	0.3604	0.3745	0.0023	0.0107	201	0.0052
	500	0.0959	0.6034	0.5922	0.0034	0.0178	345	0.0087
	750	0.1593	0.9975	0.9991	0.0057	0.0297	571	0.0144
	9999	0.4488	2.4388	6.8114	0.0136	0.1186	1,355	0.0405
Pumps Composite		0.0270	0.2617	0.2079	0.0006	0.0078	49.6	0.0024
Rollers	15	0.0074	0.0386	0.0461	0.0001	0.0018	6.3	0.0007
	25	0.0161	0.0549	0.1017	0.0002	0.0038	13.3	0.0015
	50	0.0345	0.2258	0.1776	0.0003	0.0068	26.0	0.0031
	120	0.0392	0.3801	0.2647	0.0007	0.0137	59.0	0.0035
	175	0.0553	0.6096	0.3030	0.0012	0.0156	108	0.0050
	250	0.0656	0.3037	0.3629	0.0017	0.0127	153	0.0059
	500	0.0920	0.4189	0.4752	0.0022	0.0174	219	0.0083
Rollers Composite		0.0410	0.3763	0.2501	0.0008	0.0122	67.0	0.0037
Rough Terrain Fo	50	0.0381	0.3041	0.2193	0.0004	0.0054	33.9	0.0034
	120	0.0369	0.4106	0.2316	0.0007	0.0087	62.4	0.0033
	175	0.0569	0.7229	0.2450	0.0014	0.0112	125	0.0051
	250	0.0671	0.3372	0.2625	0.0019	0.0084	171	0.0061
	500	0.0999	0.4838	0.3682	0.0025	0.0123	257	0.0090
Rough Terrain Forklifts Compo		0.0396	0.4430	0.2336	0.0008	0.0090	70.3	0.0036
Rubber Tired Doz	175	0.1163	0.8019	0.6895	0.0015	0.0386	129	0.0105
	250	0.1329	0.4624	0.8841	0.0021	0.0340	183	0.0120
	500	0.1817	0.7490	1.1543	0.0026	0.0448	265	0.0164
	750	0.2747	1.1262	1.7818	0.0040	0.0684	399	0.0248
	1000	0.4321	1.7954	4.5523	0.0060	0.1202	592	0.0390
Rubber Tired Dozers Compos		0.1672	0.6620	1.0824	0.0025	0.0419	239	0.0151
Rubber Tired Loa	25	0.0204	0.0697	0.1291	0.0002	0.0048	16.9	0.0018
	50	0.0418	0.2904	0.2109	0.0004	0.0069	31.1	0.0038
	120	0.0397	0.3916	0.2476	0.0007	0.0115	58.9	0.0036
	175	0.0546	0.6199	0.2592	0.0012	0.0130	106	0.0049
	250	0.0661	0.3041	0.3040	0.0017	0.0107	149	0.0060
	500	0.1034	0.4654	0.4455	0.0023	0.0164	237	0.0093
	750	0.2119	0.9532	0.9273	0.0049	0.0338	486	0.0191
	1000	0.2701	1.1927	3.2272	0.0060	0.0615	594	0.0244
Rubber Tired Loaders Compos		0.0559	0.4311	0.2835	0.0012	0.0121	109	0.0050
Scrapers	120	0.0887	0.6472	0.5218	0.0011	0.0330	93.9	0.0080
	175	0.1025	0.8864	0.5654	0.0017	0.0307	148	0.0092

	250	0.1187	0.4642	0.7040	0.0024	0.0254	209	0.0107
	500	0.1755	0.7332	0.9727	0.0032	0.0364	321	0.0158
	750	0.3043	1.2657	1.7266	0.0056	0.0638	555	0.0275
Scrapers Composite		0.1495	0.7187	0.8387	0.0027	0.0335	262	0.0135
Signal Boards	15	0.0072	0.0377	0.0450	0.0001	0.0018	6.2	0.0006
	50	0.0332	0.2686	0.2268	0.0005	0.0063	36.2	0.0030
	120	0.0394	0.4898	0.3076	0.0009	0.0127	80.2	0.0036
	175	0.0587	0.8292	0.3433	0.0017	0.0152	155	0.0053
	250	0.0794	0.4676	0.4435	0.0029	0.0132	255	0.0072
Signal Boards Composite		0.0111	0.0909	0.0718	0.0002	0.0029	16.7	0.0010
Skid Steer Loade	25	0.0167	0.0568	0.1055	0.0002	0.0040	13.8	0.0015
	50	0.0194	0.1977	0.1446	0.0003	0.0015	25.5	0.0017
	120	0.0175	0.2665	0.1240	0.0005	0.0022	42.8	0.0016
Skid Steer Loaders Composite		0.0186	0.2104	0.1354	0.0004	0.0019	30.3	0.0017
Surfacing Equipm	50	0.0171	0.1105	0.0934	0.0002	0.0035	14.1	0.0015
	120	0.0385	0.3950	0.2869	0.0007	0.0146	63.8	0.0035
	175	0.0386	0.4642	0.2429	0.0010	0.0119	85.8	0.0035
	250	0.0504	0.2604	0.3275	0.0015	0.0111	135	0.0045
	500	0.0800	0.4236	0.4893	0.0022	0.0174	221	0.0072
	750	0.1260	0.6643	0.7833	0.0035	0.0275	347	0.0114
Surfacing Equipment Compos		0.0638	0.3590	0.3924	0.0017	0.0142	166	0.0058
Sweepers/Scrubb	15	0.0124	0.0729	0.0870	0.0002	0.0034	11.9	0.0011
	25	0.0237	0.0808	0.1495	0.0002	0.0056	19.6	0.0021
	50	0.0308	0.2762	0.1942	0.0004	0.0033	31.6	0.0028
	120	0.0395	0.4895	0.2530	0.0009	0.0068	75.0	0.0036
	175	0.0565	0.8005	0.2201	0.0016	0.0084	139	0.0051
	250	0.0587	0.3179	0.1898	0.0018	0.0062	162	0.0053
Sweepers/Scrubbers Compos		0.0410	0.4840	0.2255	0.0009	0.0061	78.5	0.0037
Tractors/Loaders	25	0.0191	0.0653	0.1209	0.0002	0.0045	15.9	0.0017
	50	0.0316	0.2678	0.1895	0.0004	0.0037	30.3	0.0029
	120	0.0281	0.3379	0.1761	0.0006	0.0055	51.7	0.0025
	175	0.0420	0.5839	0.1613	0.0011	0.0072	101	0.0038
	250	0.0633	0.3389	0.2157	0.0019	0.0073	172	0.0057
	500	0.1263	0.6506	0.4127	0.0039	0.0144	345	0.0114
	750	0.1896	0.9760	0.6256	0.0058	0.0216	517	0.0171
Tractors/Loaders/Backhoes C		0.0336	0.3586	0.1857	0.0008	0.0059	66.8	0.0030
Trenchers	15	0.0099	0.0517	0.0617	0.0001	0.0024	8.5	0.0009
	25	0.0397	0.1355	0.2509	0.0004	0.0094	32.9	0.0036
	50	0.0687	0.3197	0.2467	0.0004	0.0140	32.9	0.0062
	120	0.0625	0.4341	0.3863	0.0008	0.0259	64.9	0.0056
	175	0.1009	0.8327	0.6152	0.0016	0.0338	144	0.0091
	250	0.1247	0.4925	0.8480	0.0025	0.0309	223	0.0112
	500	0.1661	0.7370	1.0663	0.0031	0.0400	311	0.0150
	750	0.3147	1.3882	2.0666	0.0059	0.0766	587	0.0284
Trenchers Composite		0.0674	0.4085	0.3481	0.0007	0.0215	58.7	0.0061
Welders	15	0.0075	0.0381	0.0468	0.0001	0.0020	6.2	0.0007
	25	0.0141	0.0473	0.0876	0.0001	0.0035	11.3	0.0013
	50	0.0280	0.2077	0.1684	0.0003	0.0053	26.0	0.0025
	120	0.0223	0.2476	0.1601	0.0005	0.0073	39.5	0.0020
	175	0.0430	0.5400	0.2396	0.0011	0.0111	98.2	0.0039
	250	0.0423	0.2236	0.2294	0.0013	0.0069	119	0.0038
	500	0.0585	0.3040	0.2969	0.0016	0.0095	168	0.0053
Welders Composite		0.0214	0.1745	0.1373	0.0003	0.0052	25.6	0.0019

Attachment B

To Be Filed Under Separate Cover

Attachment C

ENVIRONMENTAL
V I S I O N
2550 NINTH STREET
S U I T E 2 0 5
BERKELEY CA 94710
5 1 0 . 5 4 0 . 4 8 8 2
FAX 510.540.1154

Kara Miles
President
Stanton Energy Reliability Center, LLC
650 Bercut Drive, Suite A
Sacramento, CA 95811

April 9, 2018

Dear Kara,
We have reviewed the updated drawing and information regarding reconfiguration of the warehouse on the SERC project site to be located at the western end of Parcel 2. Our findings are outlined briefly bellow.

We note several minor changes as follows. The building footprint dimensions have changed from 40 by 40 feet to 30 by 73 feet and in addition, the footprint is now oriented lengthwise along the north-south axis. However, with respect to its height the final warehouse design is the same as the 15-foot tall warehouse building that was evaluated in the AFC visual analysis.

These minor changes in the configuration of the SERC warehouse building are consistent with the AFC findings and conclusion that the SERC project would not result in significant visual resources effects.

Please feel free to contact us regarding the above information.

Sincerely,

Marsha Gale
Managing Principal

Attachment D

PROJECT DESCRIPTION

John Heiser, AICP

INTRODUCTION

The Preliminary Staff Assessment (PSA) for the Stanton Energy Reliability Center (Stanton or project) contains 23 technical analyses of potential environmental effects and engineering factors associated with the development and operation of the project. The Stanton Energy Reliability Center, LLC (applicant or project owner), is proposing to construct, own, and operate the electrical generating plant in Orange County, California, in the city of Stanton south of Standustrial Street along Dale Avenue and across from the Southern California Edison (SCE) Barre peaker power plant and Barre Substation. Project Description Figure 1 presents the project's location at a regional scale.

The project site is adjacent to the Union Pacific Rail Road tracks to the south, industrial and commercial warehouses to the north that are located along Standustrial Street and adjacent to Dale Avenue on the east and near Pacific Street to the west.

As proposed, Stanton would consist of two natural gas-fired, simple-cycle combustion turbine electrical generating (CTG) facilities rated at a nominal generating capacity of 49 megawatts (MW) each, co-located with two sets of lithium-ion batteries housed in purpose-built battery enclosures, each with a nominal capacity of 10 MW (total 20 MW) and ~~5~~ 4.3 megawatt-hours (MWh) storage (total ~~10~~ 8.6 MWh).

Stanton would also feature ~~clutch~~ technology that ~~would~~ allows the ~~turbines to serve as~~facility to provide synchronous ~~condensers~~ condensing capabilities ~~to~~ for ~~provide~~ voltage support ~~without using natural gas once started~~to the electrical grid when needed.

The applicant is a joint venture of W Power, LLC, and Wellhead Energy, LLC. W Power, LLC, the majority partner, is a 100-percent female-owned business, and possesses Diverse Business Enterprise (DBE) certification from the State of California as a Women Business Enterprise under the California Public Utilities (CPUC) certification process.

PROECT SETTING, LOCATION AND SITE DESCRIPTION

Stanton would be located within the city limits of Stanton at 10711 Dale Avenue. Access to the site would be from Dale Avenue either from Katella Avenue or from West Cerritos Avenue (Project Description Figure 3). The main access to the Stanton project site would be from Dale Avenue. There is secondary access which would be from the west off of Pacific Street.

The Stanton site is located in an Industrial General zoned district of the city of Stanton. Land uses surrounding the site include the city's industrial area to the north and south, consisting of commercial/industrial warehouse-based businesses, a public storage facility, an elementary

school to the north of the industrial/commercial area, public/quasi-public utility areas to the east, consisting of the Southern California Edison (SCE) Barre peaker power plant and Barre Substation, and high- and medium-density residential uses to the southeast and northwest.

The proposed project would require two new bridges crossing the Orange County Flood Control District storm water channel that bisects the project site: 1) a utility bridge that would support piping, electrical conduits, and cable tray, but no foot traffic or vehicles; and 2) a bridge that would be used for foot traffic and vehicles.

The combined 3.978-acre Stanton site comprises Parcel 1, which is 1.764 acres and is undeveloped, and Parcel 2, which is 2.214 acres, paved, and used for vehicle and equipment storage. The combined parcels are predominantly undeveloped – vacant land with a flood channel bisecting the two parcels and the location of wooden pallets, oil and tanker truck storage, wood garage, wood shed and vehicle and equipment storage. The two project parcels are comprised of three Assessor's Parcel Numbers, which are 126-531-43 ~~and~~, 126-531-40, and 126-553-18. Project Description Figure 4A and Figure 4B show the proposed site plan of the project site depicting the arrangement of the buildings, battery energy storage system, turbine locations, bridge locations, access road and support buildings.

Temporary construction facilities would include an approximate 0.7-acre ~~a 2.89-acre~~ worker parking area at the Bethel Romanian Pentecostal Church (2.89 acres total), 350 feet south of the Stanton site along Dale Avenue. The construction laydown area for the power plant would be on Parcel 2, the location of the battery storage system. Project Description Figure 2 illustrates the architectural rendering of the power plant and battery array.

APPLICANT'S PROJECT PURPOSE AND OBJECTIVES

Stanton's primary goal is to be a state-of-the-art energy reliability resource. Stanton has been designed to deliver reliability services with a minimal carbon footprint and a low emissions profile that would combine dispatchable, operationally flexible, and efficient energy generation with state-of-the-art energy storage technology to meet the need for new local capacity and reliability services, specifically in the West Los Angeles (LA) Basin local reliability area of SCE's service territory.

Operationally flexible resources are increasingly valuable to assist with the integration of intermittent renewable resources such as solar and wind facilities for grid operation to continuously balance electricity supply and demand. Stanton would have the ability to start and achieve full operational capacity within 10 minutes, using the onsite batteries (starting turbines from a completely cold and idle state) without the need for a diesel fueled emergency generator. This would be likely to significantly reduce the project's incremental air quality impact.

Stanton's project objectives are as follows:

- Safely construct and operate an electrical energy reliability facility to meet SCE's need for local capacity in the West LA Basin local reliability area of its service territory.
- Use Wellhead's patented ~~pending~~ EGT technology to provide the following:
  - Greenhouse gas (GHG)-free operating reserve;
  - Flexible capacity without start time;
  - Peaking energy for local contingencies;
  - Voltage support and primary frequency response without fuel burn;
  - Superior transient response attributable to co-location of gas turbines and battery;
  - Gas turbine management of battery state-of-charge in real time;
- Site the project as near as possible to an SCE substation with available transmission capacity to serve the West LA Basin and minimize the generation tie-line length.
- Site the project in an existing industrial area on a previously disturbed site to minimize environmental impacts.
- Site the project in a community that embraces the project and its new technology.
- Safely construct and operate an electrical energy reliability project that would satisfy the commercial obligations of both Resource Adequacy Purchase Agreements (RAPAs) approved for Stanton by the CPUC.

Stanton is planning to operate with an expected annual capacity factor of 12.3 percent or less. How the project would be dispatched would vary as market conditions evolve. In order to respond to the changing market conditions, for the air quality impact analysis, the applicant evaluated a base case operational profile (Case 1) that assumes a maximum of 1,000 turbine starts and ~~1,432~~1,276 turbine-hours of full load operation per year (e.g., 500 starts and ~~716~~ 638 full load hours per turbine). In addition, the applicant evaluated a second operational profile (Case 2) that is based on only 200 turbine-starts and ~~2,092~~1,700 turbine-hours of full-load operation per year. (e.g., 100 turbine starts and ~~1,046~~850 full load hours per turbine).

PROJECT COMPONENTS

Stanton would consist of two simple-cycle generating facilities consisting of two General Electric (GE) LM6000 hybrid enhanced gas turbine (Hybrid EGT™) systems. The Hybrid EGT™ combines a combustion gas turbine with an integrated battery storage component operated by a proprietary software system developed by GE based upon Wellhead's patent. The integrated system will be capable of providing synchronous condensing, ~~as well as~~ GHG-free spinning reserve, ~~and will~~ ~~Clutch gear would also allow synchronous condenser operation, enabling contingency (spinning) reserve at Stanton without fuel burn between demand events. This~~ ~~also enables~~ high speed regulation, primary frequency response, and voltage support ~~(-8 to +5 MVAR)~~ with the combined response of the gas turbine and battery storage system. ~~Wellhead Power Solutions and GE have a patent pending on the technology.~~ Project Description Figure 4A and Figure 4B present the general arrangements.

Stanton would interconnect to the grid at the SCE Barre Substation through a 0.35 mile – long underground generator tie-line (or underground transmission line). Project Description Figure 1 and Figure 3 illustrate the transmission line route including linear routes for the proposed alternatives for the ~~SCE~~ SoCalGas natural gas pipeline (Route A and Route B). Process and potable water would be supplied by Golden State Water Company via connections in Dale Avenue and Pacific Street.

Based on the selection by SCE, Stanton is proposing the following:

- Two GE LM6000 PC combustion turbine generators (CTGs) equipped with selective catalytic reduction (SCR), air emissions control equipment, and associated support equipment for nitrogen oxides (NOx) and carbon monoxide (CO) control;
- Each CTG would generate approximately 49 MWs at full load under average ambient conditions;
- Each CTG would be designed to burn only natural gas during operations;
- Hybrid EGT operation utilizing battery storage would provide near greenhouse gas (GHG)-free operating reserve, regulation up and regulation down, frequency regulation, and voltage regulation; Each CTG is designed to start and ramp up to achieve full capacity within 10 minutes. This fast-start capability is designed to meet the needs of the grid which is rapidly becoming increasingly dependent on intermittent renewable resources. Each ~~CTG~~ Hybrid EGT also provides various ancillary services, such as spinning reserve, allowing Stanton to readily adapt to changing conditions in the energy and ancillary services markets.
- Two sets of lithium-ion batteries housed in purpose-built battery enclosures, each with a nominal capacity of 10 MW (total 20 MW) and ~~5~~ 4.3 megawatt-hours (MWh) storage (total ~~10~~ 8.6 MWh). The battery system could be charged either by the grid or the onsite combustion turbines. The batteries ~~would also provide spinning reserve for~~enable the gas turbines to supply spinning reserve by providing~~, which equates to~~ approximately 10 minutes of ramping profile for the gas turbines. In total, Stanton is proposing to provide 98 MWs (net) of capacity to the grid;
- The battery storage system would be constructed after the combustion turbine part of the Hybrid EGTs is complete;
- Each LM6000 PC would require a 50-foot tall exhaust stack with an exhaust diffuser at the top of the stack for a combined height of 70-feet. Each exhaust stack would be housed in a 70-foot tall enclosure that would contain acoustic barriers;
- Noise from Hybrid EGT operations would be decreased by an open roofless enclosure around each LM6000 PC CTG package. Each enclosure would be 35 feet in height with a minimum of 24-gauge metal cladding with interior acoustic absorption treatment;
- The simple-cycle CTGs do not use steam for combined-cycle power generation, therefore do not use water in evaporative (wet) cooling towers;
- Interconnection to SCE's Barre Substation via a 0.35-mile-long underground generator tie-line that would run from the Stanton site east under Dale Avenue to the substation;

- ~~The project applicant also proposes construction of a transition pole at the east of the project site connecting to a new underground generator-tie line that would cross Dale Avenue to connect to the Southern California Edison (SCE) Barre Substation.~~
- Equipment (generators, lube oil, gas compressors, and HVAC) would be air cooled;
- Natural gas connection via either a new 12- or 16-inch-diameter pipeline that would extend either 2.75 miles north along Dale Avenue to Southern California Gas Company's (SoCal Gas's) Line 1014 in La Palma Avenue ~~or 1.78 miles south along Dale Avenue to SoCal Gas's Line 1244 in Lampson Avenue;~~
- Process and potable water supply from Golden State Water Company via connections in Dale Avenue and Pacific Street;
- Water supplied by Golden State Water Company will be used for fire protection and service water, potable outlets, and safety showers;
- Golden State Water Company has provided the applicant with a will-serve letter demonstrating they have adequate supply available and are able to serve the project both during the construction and operation phases.
- Average daily water use estimates, depending on daily temperatures and Hybrid EGT operations, would range between 151.9 gallons per minute to 186 gallons per minute, with water use per year between 13.4 to 34 acre-feet;
- Stanton will use demineralized potable water for inlet air cooling, controlling Nitrogen oxides and power augmentation for the gas turbines.
- The product water from the demineralizer system will be stored in a 100,000 gallon storage tank,
- Estimated wastewater discharge to the sewer would range between 42.2 gallons per minute up to 51.6 gallons per minute. The annual wastewater discharge to the city of Stanton sanitary sewer line would range between 1.2 to 34 gallons per minute. The sanitary sewer line is located in Pacific Street to the west of Parcel 2 ~~or Dale Avenue;~~ and
- Temporary construction facilities would include a 2.89-acre worker parking area at the Bethel Romanian Pentecostal Church, 350 feet south of the Stanton site along Dale Avenue. The construction laydown area for the gas-fired power plant would be on Parcel 2, the location of the battery storage system.

Natural gas pipeline construction staging areas include staging yard A, a one-half acre parcel adjacent to the Stanton site, which is owned by SCE. Staging area B is a one half-acre area within a parking lot 700 feet south of the intersection of Crescent and Dale avenues (open area on Dale Avenue surrounded by a parking lot). Access to the natural gas pipeline route would be along existing urban streets. The natural gas pipeline trench would be 6 feet deep; approximately 4-6 feet wide, with a minimum cover depth of 36 inches.

The two GE LM6000 PG CTGs would be equipped with selective catalytic reduction (SCR) air emissions control equipment and associated support equipment for nitrogen oxide (NOx) and an oxidation catalyst for carbon monoxide (CO) and volatile organic compound (VOC) control. Stanton would have a net generation capacity of 98 MW. The facility is expected to have an overall annual availability of 92 to 98 percent, including scheduled and forced outages. The

design of the plant would provide for operating flexibility. Each CTG system consists of a stationary CTG, supporting systems, and associated auxiliary equipment. The CTGs will be equipped with the following required accessories to provide safe and reliable operation:

- Air inlet system complete with a modular filtration system
- Inlet air fogging system
- Weatherproof acoustic enclosures with explosion-proof lighting
- Fuel system, including an electronically controlled fuel metering valve
- Two lube oil systems: one synthetic for the gas turbine and one mineral for the generator~~/clutch assembly~~
- Stainless steel lube oil reservoirs, valve trim, and piping
- Lube oil cooling provided by an air-cooled fin-fan cooler
- Electro-hydraulic start system
- 24-volt direct current (DC) battery system
- Generator protective relays
- Water injection for NOx control
- Compressor wash system
- Fire detection and protection system
- Turbine/generator base plate

MAJOR ELECTRICAL EQUIPMENT AND SYSTEMS

The electric power generated by Stanton would be transmitted to the electrical grid, with the exception of the power required for onsite auxiliaries such as pumps, fans, gas compressors, and other parasitic loads.

Power would be generated by two EGTs at 13.8 kV and then stepped up using a single 13.8/66-kV, oil-filled generator step-up transformer to support connection to the local 66-kV network at the Barre Substation. Surge arrestors protect the transformer from surges in the 66-kV system caused by lightning strikes or other system disturbances.

The transformer will be set on a concrete foundation that includes a secondary oil containment reservoir to contain the transformer oil in the event of a leak or spill. The high-voltage side of the generator step-up transformer will be connected to a single circuit, three-phase, 66-kV line, which will be connected to the SCE 66-kV switchyard at the Barre Substation east of the Stanton site via an approximately 0.35-mile underground generator tie-line.

The 15-kV switchgear interface point allows the switchgear to be back-fed from the local grid when the CTGs are not running, or directly from the CTGs when they are in operation. Each CTG will have a 15-kV rated breaker between the generator and the generator step-up transformer for generator synchronization and isolation.

A detailed discussion of the electric transmission system is provided in the Transmission System Engineering section of this staff assessment.

~~Each~~ The two EGTs will ~~have its own~~utilizeuse a common 125-volt DC power supply system for control power and control computers on uninterruptible power sources, consisting of ~~one 100~~two 50-percent capacity battery banks, two 100-percent static battery chargers, ~~and~~ a ~~switchboard~~125 VDC panelboard, an inverter, and a ~~; and two or more~~ distribution panel~~s will be supplied~~ for ~~the~~ essential balance of plant (BOP) and ~~essential~~ CTG equipment.

Under normal operating conditions, the battery chargers supply DC power to the DC loads. The battery chargers are fed by 480-volt alternating current (VAC) and continuously charge the battery banks while supplying power to the DC loads.

Under abnormal or emergency conditions, when power from the alternating current (AC) power supply (480-volt) system is unavailable, the batteries supply DC power to the DC system loads. Recharging of a discharged battery occurs whenever 480-volt power becomes available from the AC power supply system.

The 125-volt DC system will also be used to provide control power to the 13.8-kV switchgear, the 4,160-volt switchgear, the 480-volt load centers, critical control circuits, the plant control system, and the emergency DC motors.

(Notably, this power plant battery power supply system would be separate and apart from the ~~onsite~~ Hybrid EGTs energy storage system battery arrays comprised of ~~ing 20~~ lithium-ion batteries ~~that would be charged off the grid during the day (when excess power exists from wind and solar resources) and then used to provide up to four hours of 25 MWs of electricity during peak periods of energy demand after the sun goes down~~.)

Fuel System

The CTGs would be designed to burn only natural gas. Applicant-provided data suggests the natural gas requirement during operation at annual average ambient temperature would be approximately 938.4 million British thermal units per hour (MMBtu/hr) with higher heat value (HHV) basis totals for the two CTG units. Natural gas would be delivered to Stanton via ~~one of~~ the following: ~~(1)~~ a 2.75-mile-long pipeline extending north along Dale Avenue to La Palma Avenue~~., or (2) a 1.78-mile-long pipeline running south along Dale Avenue to Lampson Avenue.~~ At the project site, the natural gas will flow through either a 12-inch- or 16-inch pipeline, turbine-meter set, gas scrubber/filtering equipment, a gas pressure control station, electric-driven booster compressors, and coalescing and final fuel filters prior to entering the combustion turbines.

A minimum floating delivery pressure of 300 pounds per square inch gauge, as measured downstream of a nonregulated meter set, is expected from Southern California Gas Company (SoCalGas). One 100-percent-capacity, electric-driven fuel gas compressor will be provided to boost the pressure to that required by the CTGs. The gas compressor will be located outdoors and will be housed in an acoustical enclosure to reduce the compressor noise level.

Inlet Air Fogging System

Combustion air for each CTG will be cooled via the use of a fogging-based system. Fogging systems are based upon the extremely high pressurization of demineralized water being forced through nozzles to create a fine mist or fog. The fogging system will cool the inlet air to the wet bulb temperature of the inlet air. The fogging system will be in service only when the CTGs are at or near full load, and will not be placed in service for ambient dry bulb conditions below 50°F.

Waste Management

Waste management is the process whereby all wastes produced at Stanton would be properly collected, treated if necessary, and disposed of in accordance with all applicable laws, ordinances, regulations and standards (LORS). This document organizes Stanton's waste streams as follows: wastewater (process wastewater, sanitary wastewater, stormwater runoff), nonhazardous solid waste, and hazardous waste (both liquid and solids).

Nonhazardous Solid Wastes

Stanton would produce construction, operation, and maintenance nonhazardous solid wastes typical of power generation operations. Construction wastes generally include soil, scrap wood, excess concrete, empty containers, scrap metal, and insulation. Generation plant wastes include oily rags, scrap metal and plastic, insulation material, defective or broken electrical materials, empty containers, and other solid wastes, including the typical refuse generated by workers. As the facility is constructed, metal, wood, sheetrock, rigid plastic, and other construction materials can be recovered and made into recycled construction material. Solid wastes would be trucked offsite for recycling or for disposal at a local facility by a licensed waste disposal company. Management of solid waste is discussed in more detail in the Waste Management section of this staff assessment.

Hazardous Materials and Wastes

Project hazardous and nonhazardous wastes would be taken to landfills in southern and central California as detailed in the Waste Management section of this staff assessment. A variety of chemicals would be stored and used during the construction and operation of Stanton. The storage, handling, and use of all chemicals would be conducted in accordance with applicable laws, ordinances, regulations, or standards (LORS). Chemicals would be stored in appropriate chemical storage facilities. Bulk chemicals would be stored in storage tanks, and most other chemicals would be stored in returnable delivery containers. Chemical storage and chemical feed areas would be designed to contain leaks and spills. Concrete containment pits and drain piping design would allow a full-tank capacity spill without overflowing the containment area. Please review the Hazardous Materials Management section of this staff assessment for more details.

Emission Control and Monitoring

Air emissions from the combustion of natural gas in the CTGs would be controlled to the standards of best available control technology, (BACT) as determined by the South Coast Air

Quality Management District. To ensure that the systems perform correctly, continuous emissions monitoring for NOx and CO would be required. The Air Quality section of this staff assessment includes additional information on emission controls and monitoring requirements.

The CTGs selected for Stanton would use demineralized water injection and selective catalytic reduction (SCR) to control emissions of NOx. One-hour NOx emissions would be controlled at the stack to 2.5 parts per million by volume, dry basis (ppmvd), corrected to 15 percent oxygen. The SCR process would use 19 percent aqueous ammonia. Ammonia slip, or the concentration of unreacted ammonia in the stack exhaust, would be limited to 5 parts per million by volume (ppmv). The project would use an ammonia delivery system which consists of a 5,000-gallon ammonia tank, spill containment basin, and refilling station with a spill containment basin and sump.

Carbon Monoxide (CO) and volatile organic compound (VOC) emissions would be controlled by means of CO oxidation catalyst. The oxidation catalyst would limit 1-hour stack CO emissions to 4 ppmvd. VOC emissions would also be limited to ~~1~~ 2 ppmvd.

Particulate emissions would be controlled by the best combustion practices along with the exclusive use of pipeline-quality natural gas (low in sulfur), and the use of high efficiency air inlet filtration.

For each CTG, a separate continuous emission monitoring system (CEMS) would sample, analyze, and record fuel gas flow rate, oxygen, NOx and CO concentration levels in the stack near the exit, and report concentrations calculated at the percentage of oxygen. The CEMS sensors would transmit data to a data acquisition system (DAS) that would store the data and generate emission reports in accordance with permit requirements. The DAS would also include alarm features that send signals to the plant ~~survey~~ supervisory control ~~station~~ system (SCS) when the emissions approach or exceed pre-selected allowable emissions limits.

Fire Protection

The Stanton fire protection system would be designed to protect personnel and limit property loss and plant downtime in the event of a fire. The system would include a fire protection water system, hydrants, carbon dioxide (CO2) fire suppression systems for the CTGs, and portable fire extinguishers. A fire loop~~, consisting of a water supply storage tank, pumps, and~~ using underground piping to connect two separate Golden State Water Company supply mains~~,~~ would be designed to protect Stanton, and the system would be designed in accordance with:

- Federal, state and local fire codes, occupational health and safety regulations, and other jurisdictional requirements
- California Building Code (CBC)
- National Fire Protection Association (NFPA) standard practices

The fire loop water supply ~~and pumping~~ system will provide fire-fighting-water to yard hydrants, hose stations, and water spray and sprinkler systems. The system would be capable of supplying maximum water demand for any automatic sprinkler system, plus water for fire hydrants and hose stations. Hydraulic calculations would be performed to demonstrate that

the fire protection loop has sufficient capacity to provide all the required fire-fighting-water for the power plant. A plant firewater loop, designed and installed in accordance with National Fire Protection Association Standards (NFPA), would be provided to reach all parts of the facility. Both the fire hydrants and ~~the~~ any fixed suppression systems would be supplied from the firewater loop. The firewater systems would have sectionalizing valves to allow a failure in any part of the system to be isolated, so that the remainder of the system can continue to function properly. Fixed fire suppression systems would be installed at determined fire risk areas, such as at the gas compressors and turbine lube oil equipment. Separation criteria, as defined by NFPA and the CBC, would be used to determine spacing of the transformers, ammonia storage, and other areas that pose a fire risk or health hazard, such as natural gas-fired equipment, lube oil and hydraulic oil piping and containment, and ammonia storage and unloading equipment~~, and the fire pump skid~~.

Sprinkler systems would also be installed in the control room building, the warehouse/maintenance building, and fire pump enclosure (as required by NFPA), as well as anywhere required by local code requirements. The CO_2 fire-suppression system provided for each CTG will include a CO_2 storage tank, CO_2 piping and nozzles, fire detection sensors, and a control system. The control system would automatically shut down the affected CTG turbines, turn off ventilation, close ventilation openings, and release CO_2 upon detection of a fire. The CO_2 fire suppression system would cover the turbine enclosure and accessory equipment enclosure of each CTG.

Portable CO_2 and dry chemical extinguishers would be located throughout the power plant site, including switchgear rooms, with size, rating, and spacing in accordance with NFPA 10. The Worker Safety/Fire Protection section of this document includes additional information for fire and explosion risk and local fire protection capability.

Plant Auxiliaries

The lighting system provides personnel with illumination for operation under normal conditions and for egress or manual equipment operations under emergency conditions. The lighting system would be designed in accordance with the Illuminating Engineering Society of North America. The lighting plan would include the following components: Photo cells to control

- outdoor lighting
- Frequently switched indoor lighting (such as office and maintenance areas) would be controlled by wall-mounted switches. Infrequently switched indoor lighting (such as in equipment buildings) would be controlled by panel board circuit breakers.
- Self-contained battery-backed emergency lighting and exit signs would be furnished to provide safe personnel egress from buildings during a total loss of plant power. Emergency lighting would be designed to maintain the necessary illumination for a minimum of 90 minutes.

The Stanton electrical system is susceptible to ground faults, lightning, and switching surges that can constitute a hazard to site personnel and electrical equipment. The Stanton grounding system provides a path to permit the dissipation of hazardous energy created by these events. Site ground resistivity readings would be used to determine the quantity of grounding electrodes and grid spacing to ensure safe step and touch potentials under severe fault

conditions. Bare copper conductors would be installed below-grade based on the calculated grid spacing. Each junction of the grid would be electrically bonded together. All building steel and non-energized metallic parts of electrical equipment would be electrically bonded to the ground grid.

The ~~survey~~ supervisory control ~~station~~ system (SCS) provides modulating control, digital control, monitoring, and indicating functions for the plant power block systems. The SCS would provide the following functions:

- Controlling the CTGs and other systems in a coordinated manner
- Controlling the BOP systems in response to plant demands
- Monitoring controlled plant equipment and process parameters and delivery of this information to plant operators (via logs, video monitors)
- Providing alarms for out-of-limit parameters or parameter trends, displaying on alarm video monitors(s), and recording on an alarm log printer
- Providing storage and retrieval of historical data

o Interface with the control systems furnished by the CTG supplier to provide remote control capabilities. The system would be designed with sufficient redundancy to preclude a single device failure from significantly affecting overall plant control and operation. The design would also ensure critical control and safety systems have redundancy of control and uninterruptable power sources. As part of the quality control program, daily operator logs would be available for review to determine the status of the operating equipment.

Project Schedule and Construction

Based on the applicant's proposed schedule and assuming the project is approved by the Energy Commission, construction of the generating facility, from site preparation and grading to commercial operation, is expected to take place from November 2018 to December 2019 (approximately 14 months total). Major milestones are listed in Project Description Table 1.

Project Description Table 1
Major Project Milestones

Activity	Date
Begin Construction	November 2018
Startup and Test	September 2019
Commercial Operation	December 2019

The applicant expects project construction to last 12 months, from November 2018 until October 2019, with commercial operation expected to start at the end of December 2019. The project's construction workforce would average 48 workers over the 12month period and reach a peak of 78 workers in month 8 (June 2019)

Typically, construction would be scheduled to occur between 7 a.m. and 8 p.m. on weekdays and Saturdays. Additional hours may be necessary to make up schedule deficiencies or to complete critical construction activities (e.g., pouring concrete at night during hot weather, and

working around time-critical shutdowns and constraints). During some construction periods and during the startup phase of the project, some project activities would occur 24 hours per day, 7 days per week. However, in accordance with the city of Stanton noise ordinance, noisy construction work would not take place on
Sundays or federal holidays, or between 8 p.m. and 7 a.m. Monday through Saturday.

Facility Operation

Stanton will have an operations and maintenance manager, plant technicians, and an instrument technician working periodically at the project site during the standard 5-day, 8 hour-per-day, workweek for the performance of preventive and corrective work orders. Otherwise, the facility will be unmanned. Project operation will take place remotely from SERC, LLC's control room in Sacramento, California. Plant technicians will be dispatched to Stanton by remote operators for trouble and service calls when needed.

Stanton is expected to have an annual plant availability of 92 to 98 percent, including scheduled outages for maintenance and forced outages. SERC, LLC expects to operate Stanton in a similar fashion to a peaker unit, with some amount of load following and cycling. The facility is expected to be operated during high demand times (typically afternoon hours) to supplement base-load and renewable generation capacity. The exact operational profile of the plant, however, cannot be defined in detail because operation of the facility depends on the variable demand in the Stanton service area.

Facility Closure

Stanton closure can be temporary or permanent. Temporary closure is defined as a shutdown for a period exceeding the time required for normal maintenance, with an intention to restart in the future. Causes for temporary closure include a disruption in the supply of natural gas or damage to the plant from earthquake, fire, storm, or other natural acts. Permanent closure is defined as a cessation in operations with no intent to restart operations.

For a temporary closure where there is no release of hazardous materials, Stanton would maintain security of the Stanton facilities and would notify the Energy
Commission and other responsible agencies, as required by law. Where the temporary closure includes damage to the facility, and there is a release or threatened release of regulated substances or other hazardous materials into the environment, procedures would be followed as set forth in a Risk Management Plan and the Hazardous Materials Business Plan (HMBP) to be developed as described in the Hazardous Materials Management section of this staff assessment. The HMBP would include methods to control releases, notification of applicable authorities and the public, emergency response, and training for plant personnel in responding to and controlling releases of hazardous materials.

If the facility is permanently closed, the closure procedure would follow a plan that would be developed as described in the Compliance Conditions and Compliance Monitoring Plan section of this staff assessment.

REFERENCES

SERC 2016a – Stanton Energy Reliability Center, LLC (TN 214206-2 to 27). Application for Certification Vol.1, dated October 26, 2016. Submitted to CEC/Docket Unit on October 27, 2016.