

## DRAFT ENGINEERING EVALUATION

Facility ID No. 203117  
Elco Yards  
1635 El Camino Real, Redwood City, CA 94063  
Application No. 678778

### **Background**

Elco Yards is applying for an Authority to Construct/Permit to Operate for the following equipment:

- S-1 Emergency Standby Diesel Generator Set  
Make: Cummins Inc., Model: QSL9-G2 NR3, Model Year: 2022  
375 bhp, 2.50 MMBtu/hr  
Permit Condition Nos. 100072 and 100073**
  
- S-2 Emergency Standby Diesel Generator Set  
Make: Cummins Inc., Model: QSX15-G9, Model Year: 2022  
755 bhp, 4.14 MMBtu/hr  
Permit Condition Nos. 100072 and 100073**
  
- S-3 Emergency Standby Diesel Generator Set  
Make: Cummins Inc., Model: QSX15-G9, Model Year: 2022  
755 bhp, 4.14 MMBtu/hr  
Permit Condition Nos. 100072 and 100073**
  
- S-4 Emergency Standby Diesel Generator Set  
Make: Cummins Inc., Model: QSX15-G9, Model Year: 2022  
755 bhp, 4.14 MMBtu/hr  
Permit Condition Nos. 100072 and 100073**

The criteria pollutants are nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), precursor organic compounds (POC) from unburned diesel fuel, sulfur dioxide (SO<sub>2</sub>) and particulate matter (PM<sub>10</sub>). All of these pollutants are briefly discussed on the District's web site at [www.baaqmd.gov](http://www.baaqmd.gov).

S-1 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 Off-road standard. S-2, S-3, and S-4 meet the EPA/CARB Tier 2 Off-road standard. The engine will burn commercially available California low sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight.

This evaluation report will discuss compliance of the proposed project with all applicable rules and regulations.

**Emissions**

**Table 1. Annual and Daily Emissions from EPA/CARB Certified Data from S-1**

<b>Pollutant</b>	<b>Emission Factor (g/bhp-hr)</b>	<b>Max Daily Emissions (lb/day)</b>	<b>Annual Emissions (lb/yr)</b>	<b>Annual Emissions (tons/yr)</b>
NO <sub>x</sub>	2.670	52.93	110.37	0.055
POC	0.276	5.47	11.41	0.006
CO	2.461	48.79	101.73	0.051
PM <sub>10</sub> /PM <sub>2.5</sub> <sup>1</sup>	0.142	2.81	5.87	0.003
SO <sub>2</sub>	N/A <sup>2</sup>	0.11	0.23	0.000

Basis:

- Annual emissions: Reliability-related activity 50 hours for S-1
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family NCEXL0540AAB for S-1
- <sup>1</sup> Conservative Assumption: All PM emissions are PM<sub>2.5</sub>
- <sup>2</sup> SO<sub>2</sub> emission factor from AP-42 Table 3.4-1, SO<sub>2</sub> (15 ppm) = 0.00809\*0.0015 lb SO<sub>2</sub>/bhp-hr

**Table 2. Annual and Daily Emissions from EPA/CARB Certified Data from S-2**

<b>Pollutant</b>	<b>Emission Factor (g/bhp-hr)</b>	<b>Max Daily Emissions (lb/day)</b>	<b>Annual Emissions (lb/yr)</b>	<b>Annual Emissions (tons/yr)</b>
NO <sub>x</sub>	4.206	167.87	350.04	0.175
POC	0.075	2.99	6.24	0.003
CO	0.447	17.84	37.20	0.019
PM <sub>10</sub> /PM <sub>2.5</sub> <sup>1</sup>	0.097	3.87	8.07	0.004
SO <sub>2</sub>	N/A <sup>2</sup>	0.22	0.46	0.000

**Table 3. Annual and Daily Emissions from EPA/CARB Certified Data from S-3**

<b>Pollutant</b>	<b>Emission Factor (g/bhp-hr)</b>	<b>Max Daily Emissions (lb/day)</b>	<b>Annual Emissions (lb/yr)</b>	<b>Annual Emissions (tons/yr)</b>
NO <sub>x</sub>	4.206	167.87	350.04	0.175
POC	0.075	2.99	6.24	0.003
CO	0.447	17.84	37.20	0.019
PM <sub>10</sub> /PM <sub>2.5</sub> <sup>1</sup>	0.097	3.87	8.07	0.004
SO <sub>2</sub>	N/A <sup>2</sup>	0.22	0.46	0.000

**Table 4. Annual and Daily Emissions from EPA/CARB Certified Data from S-4**

<b>Pollutant</b>	<b>Emission Factor (g/bhp-hr)</b>	<b>Max Daily Emissions (lb/day)</b>	<b>Annual Emissions (lb/yr)</b>	<b>Annual Emissions (tons/yr)</b>
NO <sub>x</sub>	4.206	167.87	350.04	0.175
POC	0.075	2.99	6.24	0.003
CO	0.447	17.84	37.20	0.019
PM <sub>10</sub> /PM <sub>2.5</sub> <sup>1</sup>	0.097	3.87	8.07	0.004
SO <sub>2</sub>	N/A <sup>2</sup>	0.22	0.46	0.000

Basis:

- Annual emissions: Reliability-related activity 50 hours for S-2, S-3, and S-4
- Max daily emissions: 24-hour operation
- Emissions from EPA Engine Family NCEXL015.AAJ for S- S-2, S-3, and S-4
- <sup>1</sup> Conservative Assumption: All PM emissions are PM2.5
- <sup>2</sup> SO<sub>2</sub> emission factor from AP-42 Table 3.4-1, SO<sub>2</sub> (15 ppm) = 0.00809\*0.0015 lb SO<sub>2</sub>/bhp-hr

**Plant Cumulative Increase**

Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result from this application.

**Table 5. Plant Cumulative Emissions Increase, Post 4/5/91**

<b>Pollutant</b>	<b>Existing Emissions Post 4/5/91 (tons/yr)</b>	<b>Application Emissions (tons/yr)</b>	<b>Cumulative Emissions (tons/yr)</b>
NO <sub>x</sub>	0.000	0.580	0.580
POC	0.000	0.015	0.015
CO	0.000	0.107	0.107
PM <sub>10</sub> /PM <sub>2.5</sub>	0.000	0.015	0.015
SO <sub>2</sub>	0.000	0.001	0.001

**Health Risk Assessment (HRA)**

HRA was required. The diesel particulate emissions from the project are greater than the toxic trigger level of 0.26 lb/year. All PM10 emissions are considered diesel particulate emissions. The PM10 emissions from this application are summarized in Tables 1 - 4. There were no other related projects permitted in the last five years. Since the diesel particulate emissions from the project are greater than the toxic trigger level of 0.26 lb/year, an HRA is required. This application did not qualify for HRA streamlining because distance to receptors and emissions were above the streamlining threshold.

The project is in compliance with project risk requirements as recommended, limiting reliability-related activity hours by permit condition. See HRA report.

### HRA Results

This analysis estimates the incremental health risk resulting from toxic air contaminant (TAC) emissions from non-emergency operation of a standby generator diesel engine at this facility. Results from this HRA indicate that the maximum project cancer risk is estimated at 4.6 in a million, and the maximum project chronic hazard index is estimated at 0.0022. See HRA Report for more details.

**Table 6. Risk Screening Results**

<b>Maximally Exposed Receptor</b>	<b>Maximum Cancer Risk</b>	<b>Maximum Chronic Hazard Index</b>
Resident	4.6 chances in a million	0.0012
Worker	2.8 chances in a million	0.0022
Student	0.37 chances in a million	0.00014

**Table 7. Risk by Source**

<b>Maximally Exposed Receptor</b>	<b>Resident Cancer Risk</b>
S-1	0.43 chances in a million
S-2	1.2 chances in a million
S-3	1.3 chances in a million
S-4	1.6 chances in a million

### TBACT

In accordance with the District's Regulation 2-5-301, the sources S-2, S-3, and S-4 requires TBACT because the estimated source cancer risk is greater than 1.0 in a million. The source S-1 does not require TBACT because the estimated source cancer risk is less than 1.0 in a million. BACT and TBACT determinations for compression ignition engines with a rated capacity between 50-1000 bhp are described in BAAQMD BACT/TBACT Workbook for IC Engines – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document #96.1.3, Revision 8. dated 12/22/2020 (see Attachment 1). The proposed engines S-2, S-3, and S-4 comply with TBACT by having a certified PM emission rate that is less than or equal to 0.15 g/bhp-hour. The certified PM emission rate for S-2, S-3, and S-4 is 0.097 g/bhp-hour.

### Project Risk Limits

Since the proposed engine, operating at 50 hours/year for reliability related testing, complies with TBACT, and the estimated project cancer risk does not exceed 6.0 in a million, and project hazard indices do not exceed 1.0, this project complies with the District's Regulation 2-5-302 project risk requirements for permit applications deemed complete after to July 1, 2022, and for projects located within an Overburdened Community, as defined in Regulation 2-1-243.

**Best Available Control Technology (BACT)**

In accordance with Regulation 2-2-301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO<sub>2</sub>, or PM<sub>10</sub>.

BACT for this source is presented in the current BAAQMD BACT/TBACT Workbook for IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document #96.1.3, Revision 8. dated 12/22/2020. For NOx, CO, POC and PM<sub>10</sub>, BACT(2) is the CARB ATCM standard for the respective pollutant at the applicable horsepower rating. For SO<sub>2</sub>, BACT(2) is using fuel with sulfur content not to exceed 0.0015%, or 15 ppm. The more restrictive BACT(1) standards are not applicable to this engine because it will be limited to operation as an emergency standby engine.

S-1 satisfies the current BACT(2) standards for the following pollutants which exceed 10 lb/day in Table 1:

<b>Pollutant</b>	<b>Emission Factor</b>	<b>BACT(2) Standard</b>
NOx	2.67 g/bhp-hr	2.85 g/bhp-hr
CO	2.46 g/bhp-hr	2.60 g/bhp-hr

\* The standard is expressed as 3.0 g/bhp of NMHC+NOx. NOx is estimated to be 95% of the combined standard ( $3.0 * 0.95 = 2.85$  g/bhp-hr)

S-2, S-3, and S-4 satisfy the current BACT(2) standards for the following pollutants which exceed 10 lb/day in Tables 2 - 4:

<b>Pollutant</b>	<b>Emission Factor</b>	<b>BACT(2) Standard</b>
NOx	4.21 g/bhp-hr	4.56 g/bhp-hr
CO	0.45 g/bhp-hr	2.60 g/bhp-hr

\* The standard is expressed as 4.8 g/bhp of NMHC+NOx. NOx is estimated to be 95% of the combined standard ( $4.8 * 0.95 = 4.56$  g/bhp-hr)

**Offsets**

Offset must be provided for any new or modified source at a facility that will have the potential to emit more than 10 tons per year of NOx or POC, as specified in Regulation 2-2-302; 100 tons per year or more of PM<sub>2.5</sub>, PM<sub>10</sub> or sulfur dioxide, as specified in Regulation 2-2- 303.

**Table 8. Potential to Emit for FID 203117**

<b>Pollutant</b>	<b>Existing Annual Emissions (TPY)</b>	<b>Application Annual Emissions* (TPY)</b>	<b>Facility Annual Emissions* (TPY)</b>	<b>Offset Requirement (TPY)</b>	<b>Offset Required</b>
NO <sub>x</sub>	0.000	1.741	1.741	>10	N
POC	0.000	0.045	0.045	>10	N
CO	0.000	0.320	0.320	-	N
PM <sub>10</sub> /PM <sub>2.5</sub> <sup>1</sup>	0.000	0.045	0.045	≥100	N
SO <sub>2</sub>	0.000	0.002	0.002	≥100	N

\*Annual emissions: Reliability-related activity of 50 hours and emergency operation of 100 hours for S-1.

Since the facility’s potential to emit is below the offsets trigger levels specified in Regulation 2-2, offsets are not required.

**Statement of Compliance**

The owner/operator is expected to comply with all applicable requirements. Key requirements are listed below:

**Airborne Toxic Control Measure for Stationary Compression Ignition Engines**

ATCM, 5/19/2011, section 93115, title 17, CA Code of Regulations

**District Rules**

Regulation 6-1-303 (*Ringelmann No. 2 Limitation*)

Regulation 9-1-301 (*Limitations on Ground Level Concentrations of SO<sub>2</sub>*)

Regulation 9-8 (*NO<sub>x</sub> and CO from Stationary Internal Combustion Engines*)

Section 9-8-110.5 – Limited exemption for emergency standby engines

Section 9-8-330 – Hours of operation for emergency standby engines

Section 9-8-502 – Recordkeeping

**California Environmental Quality Act (CEQA)**

The City of Redwood City prepared an Environmental Impact Report for the proposed project on October 2020. The State Clearing House Number is 2019070208.

The Lead Agency has determined that air quality impacts will be less than significant with mitigation incorporated. Additionally, the project would include applicable control measures from the Clean Air Plan in addition to supporting the Plan’s goal through the promotion of land use patterns and infrastructure investments that support high-density, mixed-use, residential and employment development to facilitate walking, bicycling, and transit use, the proposed project would also create a mixed-use environment that increases vibrancy of the existing area, encourages the reduction of automobile use, and supports activities within Downtown and the El Camino Corridor.

With mitigation, the project is not expected to exceed the District’s Air Quality CEQA Thresholds of Significance (Table 9).

## Table 9. Threshold of Significance

**Table 3.2-7 Mitigated Construction-Related Annual and Average Daily Criteria Air Pollutant Emissions**

Construction Year	ROG	NO <sub>x</sub>	PM <sub>10</sub> (Exhaust)	PM <sub>2.5</sub> (Exhaust)
2020 Emissions (tons/year)	0.4	7.3	0.04	0.04
2021 Emissions (tons/year)	0.8	4.7	0.07	0.07
2022 Emissions (tons/year)	7.1	1.3	0.02	0.02
<b>Total Emissions (tons)</b>	<b>8.3</b>	<b>13.3</b>	<b>0.13</b>	<b>0.13</b>
<b>Average Daily Emissions (lb/day)<sup>1</sup></b>	<b>27.8</b>	<b>45.0</b>	<b>0.4</b>	<b>0.4</b>
BAAQMD Thresholds <sup>2</sup>	54	54	82	54
Exceeds Threshold?	No	No	No	No

Notes: Estimated by AECOM in 2019. See Appendix AQTR for detailed modeling assumptions, outputs, and results.

Totals may not add due to rounding.

<sup>1</sup> Average daily emission estimates are based on the total construction emissions divided by the total number of active construction days.

<sup>2</sup> Average daily emissions are based on the total construction emissions divided by the total number of active construction days. lb/day = pounds per day; ROG = reactive organic gases; NO<sub>x</sub> = oxides of nitrogen; PM<sub>10</sub> = particulate matter less than 10 microns in diameter; PM<sub>2.5</sub> = particulate matter less than 2.5 microns in diameter.

### **New Source Performance Standards (NSPS)**

40 CFR 60, Subpart IIII (*Stationary Compression Ignition Internal Combustion Engines*)

### **National Emissions Standards for Hazardous Air Pollutants (NESHAP)**

40 CFR 63, Subpart ZZZZ (*Stationary Reciprocating Internal Combustion Engines (RICE)*)

### **Prevention of Significant Deterioration (PSD)**

This application is not part of a PSD project as defined in Regulation 2-2.

### **Public Notification (Regulation 2-1-412)**

Because this equipment will be located within Overburdened Community, as defined in Regulation 2-1-243, and requires an HRA, the project is subject to the public notification requirements of Regulation 2-1-412 due to the increase in emissions from the project.

A public notice will be sent to all residents within 1,000 feet of the facility. There will be a 30-day public comment period.

### **Permit Conditions**

#### **Permit Condition #100072 for S-1, S-2, S-3, and S-4**

1. The owner or operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, state or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating while mitigating emergency conditions or while emission testing to show compliance with District, state or Federal emission limits is not limited.

[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

2. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained.

[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

3. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 36 months from the date of entry (60 months if the facility has been issued a Title V Major Facility Review Permit or a Synthetic Minor Operating Permit). Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.

- a. Hours of operation for reliability-related activities (maintenance and testing).
- b. Hours of operation for emission testing to show compliance with emission limits.
- c. Hours of operation (emergency).
- d. For each emergency, the nature of the emergency condition. Fuel usage for each engine(s).

[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

4. At School and Near-School Operation: If the emergency standby engine is located on school grounds or within 500 feet of any school grounds, the following requirements shall apply: The owner or operator shall not operate each stationary emergency standby diesel-fueled engine for non-emergency use, including maintenance and testing, during the following periods:

- a. Whenever there is a school sponsored activity (if the engine is located on school grounds)
- b. Between 7:30 a.m. and 3:30 p.m. on days when school is in session.

'School' or 'School Grounds' means any public or private school used for the purposes of the education of more than 12 children in kindergarten or any of grades 1 to 12, inclusive, but does not include any private school in which education is primarily conducted in a private home(s). 'School' or 'School Grounds' includes any building or structure, playground, athletic field, or other areas of school property but does not include unimproved school property.

[Basis: Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

**Permit Condition #100073 for S-1, S-2, S-3, and S-4**



The owner/operator shall not exceed the following limits per year per engine for reliability-related activities:

- 50 Hours of Diesel fuel (Diesel fuel)  
[Basis: Cumulative Increase; Regulation 2-5; Title 17, California Code of Regulations, section 93115, ATCM for Stationary CI Engines]

*End of Conditions*

**Recommendation**

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct/Permit to Operate for the equipment listed below. However, the proposed source will be located within an Overburdened Community, as defined in Regulation 2-1-243, which triggers the public notification requirements of District Regulation 2-1-412. After the comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct/Permit to Operate for the following sources:

- S-1 Emergency Standby Diesel Generator Set**  
**Make: Cummins Inc., Model: QSL9-G2 NR3, Model Year: 2022**  
**375 bhp, 2.50 MMBtu/hr**  
**Permit Condition Nos. 100072 and 100073**
- S-2 Emergency Standby Diesel Generator Set**  
**Make: Cummins Inc., Model: QSX15-G9, Model Year: 2022**  
**755 bhp, 4.14 MMBtu/hr**  
**Permit Condition Nos. 100072 and 100073**
- S-3 Emergency Standby Diesel Generator Set**  
**Make: Cummins Inc., Model: QSX15-G9, Model Year: 2022**  
**755 bhp, 4.14 MMBtu/hr**  
**Permit Condition Nos. 100072 and 100073**
- S-4 Emergency Standby Diesel Generator Set**  
**Make: Cummins Inc., Model: QSX15-G9, Model Year: 2022**  
**755 bhp, 4.14 MMBtu/hr**  
**Permit Condition Nos. 100072 and 100073**

Prepared By: Liana Solis, Air Quality Specialist I

## Attachment 1

<b>BAY AREA AIR QUALITY MANAGEMENT DISTRICT</b> <b>Best Available Control Technology (BACT) Guideline</b>
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**Source Category**

<b>Source:</b>	IC Engine-Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump	<b>Revision:</b>	8
		<b>Document #:</b>	96.1.3
<b>Class:</b>	> 50 BHP and < 1000 BHP Output	<b>Date:</b>	12/22/2020*

**Determination**

Pollutant	BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice 3. TBACT	TYPICAL TECHNOLOGY
<b>POC (NMHC)</b>	1. n/s <sup>c</sup> 2. CARB ATCM standard <sup>a</sup> for POC at applicable horsepower rating (see attached Table 1).	1. n/s <sup>c</sup> 2. Any engine certified or verified to achieve the applicable standard. <sup>a</sup>
<b>NOx</b>	1. n/s <sup>c</sup> 2. CARB ATCM standard <sup>a</sup> for NOx at applicable horsepower rating (see attached Table 1).	1. n/s <sup>c</sup> 2. Any engine certified or verified to achieve the applicable standard. <sup>a</sup>
<b>SO<sub>2</sub></b>	1. n/s <sup>c</sup> 2. Fuel sulfur content not to exceed 0.0015% (wt) or 15 ppm (wt).	1. n/s <sup>c</sup> 2. CARB Diesel Fuel (Ultra Low Sulfur Diesel)
<b>CO</b>	1. n/s <sup>c</sup> 2. CARB ATCM standard <sup>a</sup> for CO at the applicable horsepower rating (see attached Table 1).	1. n/s <sup>c</sup> 2. Any engine certified or verified to achieve the applicable standard. <sup>a</sup>
<b>PM<sub>10</sub></b>	1. n/s <sup>c</sup> 2. 0.15 g/bhp-hr  3. 0.15 g/bhp-hr	1. n/s <sup>c</sup> 2. Any engine or technology demonstrated, certified or verified to achieve the applicable standard. 3. Any engine or technology demonstrated, certified or verified to achieve the applicable standard.
<b>NPOC</b>	1. n/s 2. n/s	1. n/s 2. n/s

\* Applies to open permit applications with a complete date on or after 1/1/2020.

## References

- a. ATCM standard (listed below): Where NMHC + NOx is listed (with no individual standards for NOx or NMHC) as the standard, the portions may be considered 95% NOx and 5% NMHC. For the purposes of determining BACT NMHC = POC. Any engine which has been certified or demonstrated to meet the current year tier standard may be considered compliant with the certified emission standard for that pollutant.
- b. Deleted (no longer applies).
- c. Cost- effectiveness analysis must be based on lesser of 50 hr/yr or non-emergency operation as limited by District health risk screen analysis.

Table 1: BACT 2 Emission Limits based on CARB ATCM

<b>Emissions Standards for Stationary Emergency Standby Diesel-Fueled CI Engines <math>\geq 50</math> BHP g/Kw-hr (g/bhp-hr)</b>			
<b>Maximum Engine Power</b>	<b>PM</b>	<b>NMHC+NOx</b>	<b>CO</b>
37 $\leq$ KW < 56 (50 < HP < 75)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)
56 $\leq$ KW < 75 (75 $\leq$ HP < 100)	0.20 (0.15)	4.7 (3.5)	5.0 (3.7)
75 $\leq$ KW < 130 (100 < HP < 175)	0.20 (0.15)	4.0 (3.0)	5.0 (3.7)
130 $\leq$ KW < 225 (175 $\leq$ HP < 300)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
225 $\leq$ KW < 450 (300 < HP < 600)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
450 $\leq$ KW $\leq$ 560 (600 $\leq$ HP $\leq$ 750)	0.20 (0.15)	4.0 (3.0)	3.5 (2.6)
560 < KW < 750 ( 750 < HP < 1000)	0.20 (0.15)	6.4 (4.8)	3.5 (2.6)

