Air Quality Technical Report

For the C-470 Corridor
Revised Environmental Assessment

June 2015

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CONTENTS

1.0 INTRODUCTION **1**
1.1 Project Description 1
1.2 Air Quality Legislative and Regulatory Background 3
1.3 Comparison of the 2006 Analysis and the 2015 Analysis 4

2.0 AFFECTED ENVIRONMENT **5**
2.1 General Project Setting 5
2.2 Climate and Meteorological Parameters 6
2.3 Sensitive Receptors 8
2.4 Attainment Status 10
2.5 Air Quality Trends in the Denver Region 11
2.6 Conforming Regional Transportation Plan 12

3.0 METHODOLOGY AND COORDINATION **13**

4.0 ENVIRONMENTAL CONSEQUENCES **13**
4.1 Changes to Transportation and Traffic Circulation 13
4.2 Criteria Pollutant Emissions 14
4.3 CO Hotspot Predicted Concentrations 15
4.4 Particulate Matter Hotspot Analysis 16
4.5 Mobile Source Air Toxics 16
4.6 Pollutant Emissions from Project Construction Activities 17
4.7 Conformity Conclusion 17

5.0 MITIGATION **17**

6.0 REFERENCES **18**

ATTACHMENTS
A – CDPHE METHODOLOGY CONCURRENCE **19**
B – CAL3QHC MODEL RUN FOR NO-ACTION ALTERNATIVE **25**
C – CAL3QHC MODEL RUN FOR PROPOSED ACTION **43**

LIST OF FIGURES

1 C-470 Corridor and its Surrounding Vicinity……..……..… 1
2 Existing and Proposed C-470 Typical Cross Sections……..……..... 2
3 C-470 Existing, Interim and Ultimate Configuration……..……..... 2
4 Typical Cross Sections for C-470 Proposed Action…..... 3
5 Project Area in Relation to Denver Metropolitan Area……
6 Representative Elevations near the C-470 Project Area…… 6
7 Normal Monthly Temperatures and Precipitation at Centennial Airport, 1981-2010…….. 7
8 Photo of Residences Adjacent to C-470……... 7
9 Photo of Preschool to Grade 8 School Adjacent to C-470……. 9
10 DRCOG-Predicted Regional Transportation Emissions as a Percentage of Allowed Emissions Budgets, 2015-2040…….. 9
11 2015 Air Quality Classification of the Denver Metropolitan Area…….. 10
12 CO Hotspot Modeling Site: Quebec Street Intersection with County Line Road…… 15

LIST OF TABLES

1 2015 Air Quality Classification of the Denver Metropolitan Area…..... 10
2 Projected C-470 Criteria Pollutant Vehicular Emissions……..... 14
3 Predicted Worst Case CO Concentrations……..... 16
4 Estimated Emissions of MSATs on C-470..... 17

LIST OF ACRONYMS

APCD – Air Pollution Control Division

C-470 – Colorado State Highway 470
CAMP – Air quality monitoring site at 2105 Broadway, Denver
CDOT – Colorado Department of Transportation
CDPHE – Colorado Department of Public Health and Environment
CFR – Code of Federal Regulations
CO – Carbon Monoxide

DOT – Department of Transportation
DRCOG – Denver Regional Council of Governments

EA – Environmental Assessment
EL – Express Lanes (tolled)
EPA – Environmental Protection Agency

FHWA – Federal Highway Administration

GHG – Greenhouse Gas
GPL – General Purpose Lanes

MPH – Miles Per Hour
MSAT – Mobile Source Air Toxic

NAAQS – National Ambient Air Quality Standards
NEPA – National Environmental Policy Act
NOx – Oxides of Nitrogen

O_3 – Oxone

$PM_{2.5}$ – Particulate Matter smaller than 2.5 microns in diameter
PM_{10} – Particulate Matter smaller than 10 microns in diameter
POM – Polycyclic organic matter
PPM – Parts per Million

RTP – Regional Transportation Plan

SIP – State Implementation Plan

TIP – Transportation Improvement Program
TMA – Transportation Management Area

USC – United States Code

VHT – Vehicle Hours of Travel
VMT – Vehicle Miles of Travel
VOC – Volatile Organic Compounds

1.0 INTRODUCTION

This Air Quality Technical Report examines potential impacts to air quality as the result of proposed improvements to Colorado State Highway 470 (C-470) in the southwestern part of the Denver metropolitan area.

C-470 is located about 13 miles south of downtown Denver. It passes through Arapahoe, Douglas, and Jefferson counties, as shown in **Figure 1**. In 2013, the Federal Highway Administration (FHWA) and Colorado Department of Transportation (CDOT) initiated a Revised Environmental Assessment (EA) for the 13.75-mile portion of C-470 between Kipling Parkway and Interstate 25 (I-25) to address congestion and delay, and to improve travel time reliability for C-470 users. The Proposed Action in the Revised EA differs slightly from the Express Lanes (EL) alternative identified in the previous EA that was approved by CDOT and FHWA in 2006.

Figure 1. C-470 Corridor and its Surrounding Vicinity

1.1 Project Description

The existing C-470 freeway includes two general purpose lanes in each direction with a depressed median, resulting in a typical cross section approximately 110 feet wide, as shown in **Figure 2**. This width expands near grade-separated interchanges to include off-ramps, on-ramps, and in some cases, auxiliary lanes. In the No-Action Alternative, this configuration would remain unchanged. C-470 would receive maintenance as needed to maintain the safety and functionality of the existing four-lane freeway.

The C-470 Proposed Action would add express lanes and auxiliary lanes to improve traffic flow, and would reconstruct more than half of the existing pavement to address structural deficiencies. It is expected to be built in two phases. A $269 million construction project to be built by the end of 2017 would provide interim improvements with currently available funds. Additional improvements resulting in the ultimate configuration would complete the Proposed Action by the year 2034. For details, see **Figure 3.**

Figure 2
Existing C-470 Typical Cross Sections

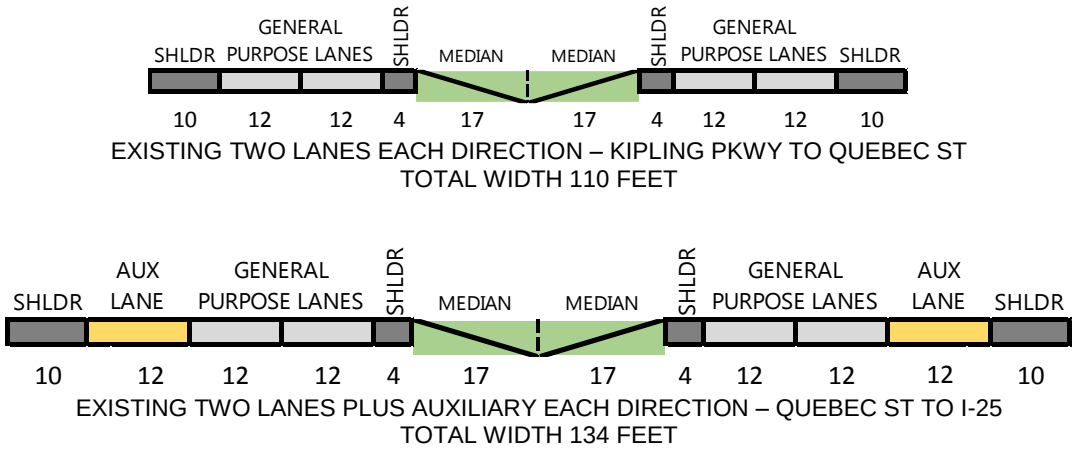
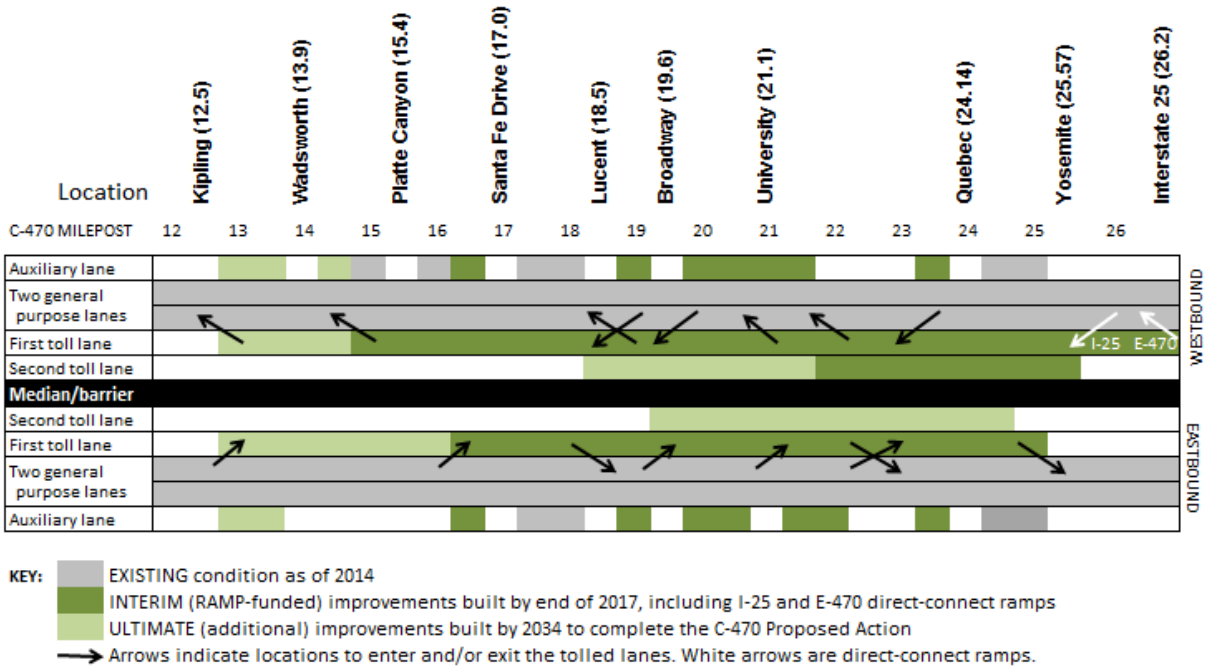


Figure 3
C-470 Existing, Interim and Ultimate Configuration

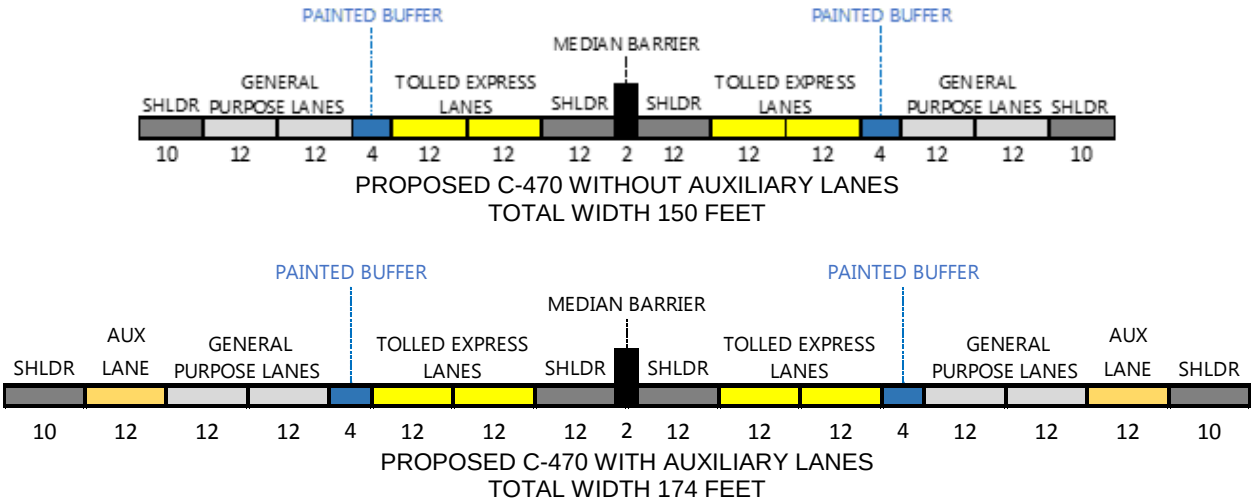


In the more heavily travelled, eastern half of the project, the Proposed Action would add <u>two tolled Express Lanes in each direction</u>, expanding the four-lane freeway to an eight-lane freeway. To aid motorists in merging onto or off of the highway, <u>auxiliary lanes</u> will be provided between closely spaced interchanges (e.g., one mile apart). The typical cross-section will vary from 154 feet without auxiliary lanes to 174 feet in areas with auxiliary lanes.

In the less heavily travelled, western half of the project, the Proposed Action would add only one tolled Express Lane in each direction, but would be designed to accommodate an additional lane in the future. Westbound, the second toll lane would end at Lucent Boulevard, and the westbound single toll lane would end about one mile east of Kipling Parkway. Eastbound, the first toll lane would begin east of Kipling. The second eastbound toll lane would begin in the vicinity of Broadway.

The new proposed typical sections are shown in **Figure 4**, with typical widths of 150 feet and 174 feet.

Figure 4
Typical Cross Sections for C-470 Proposed Action



The Proposed Action includes no new interchanges and no major interchange modifications, except for the addition of two “direct-connect” ramps in the western half of the I-25/C-470 interchange. A new westbound ramp will enable exiting E-470 traffic to reach the rightmost westbound C-470 lane without having to merge across several lanes of through traffic. A new westbound lane will carry southbound I-25 traffic directly into the westbound C-470 tolled express lane without having to merge across those same lanes.

1.2 Air Quality Legislative and Regulatory Background

Air pollutant emissions from transportation systems can be harmful to human beings, the natural environment, and the integrity of man-made materials. Emissions may also contribute to regional haze, degrading visibility. Some pollutants contribute to degradation of the tropospheric ozone layer that protects Earth from solar radiation.

Air quality is regulated under the 1970 Clean Air Act (United States Code, Title 42, Chapter 85), as amended in 1977 and 1990. The purpose of the Clean Air Act is to protect and enhance air quality to promote public health, welfare, and the productive capacity of the nation. The Clean Air Act mandated the U.S. Environmental Protection

Agency (EPA) to establish National Ambient Air Quality Standards, or NAAQS, for air pollutants determined to be harmful to human health (primary standards) and the natural and man-made environment (secondary standards).

Federal air quality conformity regulations were developed during the 1990s to ensure that transportation plans, programs and projects would not jeopardize attainment of the NAAQS. These regulations comprise Section 176 of the Clean Air Act, and are also enforceable through Colorado's State Implementation Plan (SIP) for air quality. Under the SIP, emissions budgets are established for non-attainment and attainment-maintenance areas to ensure future NAAQS compliance.

1.3 Comparison of the 2006 Analysis and the 2015 Analysis

An air quality analysis was prepared for the C-470 EA that was approved by CDOT and FHWA in 2006. Since that time, major updates to transportation assumptions and vehicle emission methodology have occurred. Thus an entirely new air quality analysis is necessary at this time, using current modeling methods and most recent planning assumptions.

The prior air quality analysis was prepared using the EPA-mandated on-road mobile source emissions model in place at that time, MOBILE6.2, which has subsequently been replaced by a new modeling tool, the Motor Vehicle Emissions Simulator (MOVES). EPA created MOVES as a state-of-the-art model for estimating emissions from all on-road vehicles including cars, trucks, motorcycles, and buses. MOVES can be used to estimate exhaust and evaporative emissions as well as brake and tire wear emissions from all types of on-road vehicles for any part of the country, except California. Since its initial introduction, the MOVES model has been revised several times. The version currently used is MOVES2014.

The 2006 EA air quality analysis was based on transportation assumptions consistent with the regional transportation planning documents that were applicable at that time, adopted in 2004 and 2005. These have been updated during the past nine years. The currently applicable planning documents are:

- DRCOG 2040 Fiscally Constrained Regional Transportation Plan, February 2015
- DRCOG 2016-2021 TIP, April 2015

DRCOG transportation plans are based on the latest available regional socioeconomic forecasts for population and employment, which were updated in 2010.

Since 2006, there have also been changes in the applicable transportation conformity regulations (discussed later in this report), and developments with respect to NAAQS:

- In 2008, EPA tightened the 8-hour standard for ozone from the previous 0.80 ppm, to 0.75 ppm.
- In 2010, EPA completed a court-ordered review of the NAAQS for carbon monoxide, and retained the previous standards with no change.
- In 2010, EPA added a one-hour standard for nitrogen dioxide (NO_2).

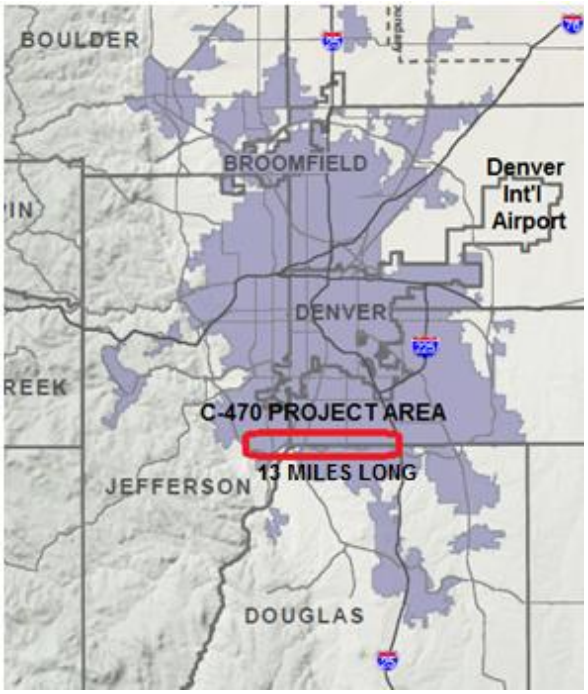
- In 2012, based on the 2008 tighter 8-hour ozone standard, EPA classified the Denver region as being in “marginal” nonattainment status for ozone.
- In 2012, EPA tightened the annual standard for fine particulate matter to 12 micrograms per cubic meter, without changing the daily standard for $PM_{2.5}$.
- In December 2014, EPA published a Proposed Rule to tighten the 8-hour ozone standard to a lower value in the range of 0.065 to 0.070 ppm.

2.0 AFFECTED ENVIRONMENT

2.1 General Project Setting

The C-470 project corridor, 13.75 miles long, is located in the southwestern quadrant of the Denver metropolitan area, as indicated in Figure 5. Its setting is largely suburban, with no central business district, no concentration of industry, no crossing freeways and no intermodal transfer facilities. There is no airport in the immediate project vicinity. Freight railroad tracks cross C-470 only at Santa Fe Drive, with a future light rail extension to Lucent Boulevard also crossing at that location. There is a fairly high concentration of parks and open space along the corridor, including Chatfield State Park that fronts the highway for three miles.

Figure 5
Project Area in Relation to the Denver Urbanized Area

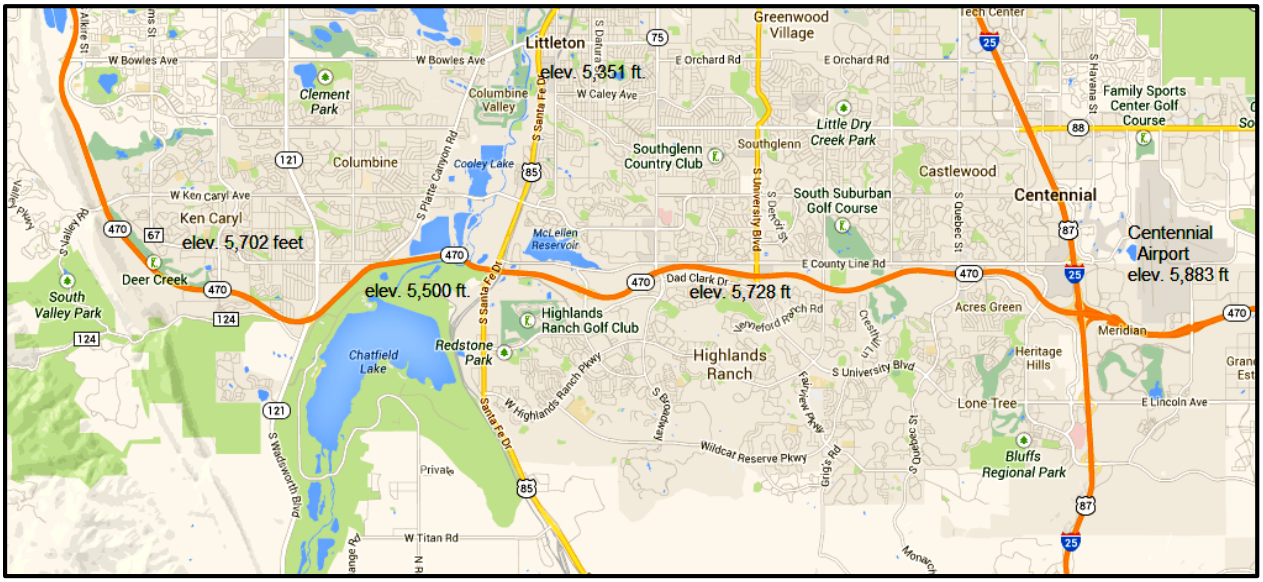


The Front Range of the Rocky Mountains Range greatly limits development at the western end of the project corridor. In winter months, this mountainous terrain can restrict air flow, trapping pollutants in the project area during thermal inversion conditions.

Representative elevations in the vicinity of the project area are shown in Figure 6. A relative low spot, influencing air and water drainage, is the South Platte River, flowing northward from the Chatfield Dam (elevation 5,500 feet) along Santa Fe Drive down toward Denver, the Mile High City (elevation 5,280 feet).

Given the lack of other notable emission sources within the C-470 project area, motor vehicle emissions are the predominant source of local air pollutant emissions.

Figure 6
Representative Elevations near the C-470 Project Area



Background concentrations of pollutants from motor vehicles and other sources in the metro area of 2.9 million residents are substantial. As an example, violations of the national air quality standard for ozone have been recorded at the six-square mile, largely “undeveloped” Chatfield State Park. The proximity of this monitor to C-470 is coincidental, not a cause-and-effect situation. These violations resulted from metro area emissions cooking in the atmosphere and drifting miles southward and rising as the air heats up during hot summer days. Violations have also been recorded two miles north (downslope) of C-470, by a monitor at University Boulevard and Belleview Avenue. There have been violations elsewhere in the region as well, far from C-470. Thus, it is clear that ozone is a regional air quality issue.

2.2 Climate and Meteorological Parameters

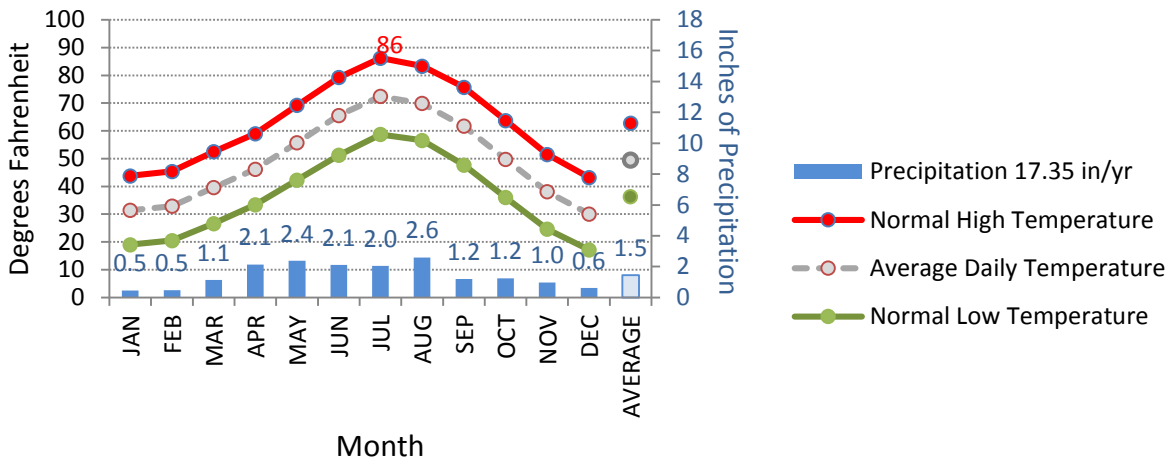
Robust, historic weather data applicable for the C-470 project area are available from the Centennial Airport, located just east of the project, as seen earlier in Figure 3. Normal monthly temperatures and precipitation recorded at the Centennial Airport over a recent 30-year period are displayed in Figure 4. The climate is generally characterized by low relative humidity, light precipitation, and abundant sunshine.

Figure 7 shows that normal daytime high temperatures in summer reach 86 degrees Fahrenheit in July, comparing to the annual average daily high in the low sixties. Daily summer temperatures can occasionally be extreme (100 degrees Fahrenheit or more). Hot summer days are conducive to the formation of ground-level ozone pollution.

Normal daily low temperatures are coolest on December nights, dipping to 18 degrees, compared to the annual average low of 37. December also has the shortest days of the year, in terms of daylight between sunrise and sunset. Coupled with calm winds, cool temperatures and short days may result in thermal inversions that trap polluted air close

to the ground overnight. Cool nights also are associated with increased fireplace use, although the Denver region sometimes issues temporary bans on woodburning.

Figure 7
Normal Monthly Temperatures and Precipitation at Centennial Airport, 1981 to 2010



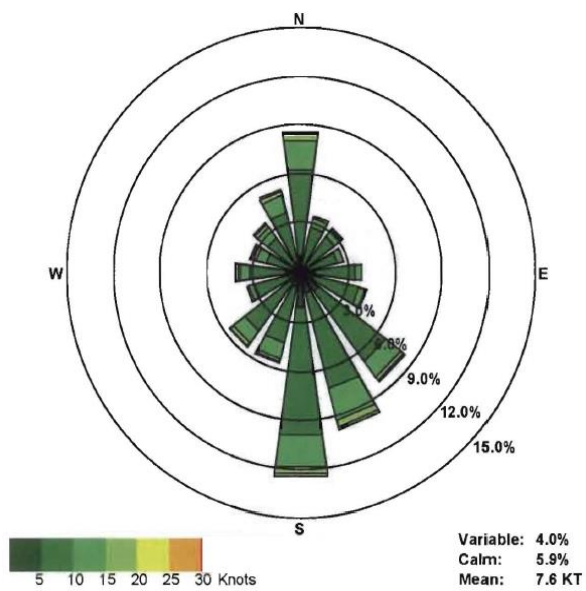
Source for Figures 7 and 8: NOAA, 2015

Precipitation at the Centennial Airport has averaged 17.35 inches per year, or nearly 1.5 inches per month. On a monthly basis, more than two inches of rain is normal between May and August, often produced by late afternoon thunderstorms. Fall and winter months are fairly dry, with heaviest snowfalls occurring in March or April.

Wind speed and direction recorded at the Centennial Airport are presented by the wind rose shown in Figure 8.

In Figure 8, each concentric band indicates an additional three percent of the readings when the wind blew in a given direction, and the color variations indicate the wind speeds recorded. The most prominent winds were northerly and southerly. The average wind speed was 7.6 knots, and almost six percent of the readings were considered calm conditions.

Figure 8
Wind Speed and Direction at Centennial Airport



The concentration of a pollutant in the atmosphere depends on the amount of pollutant released, the nature of the source, and the ability of the atmosphere to transport and disperse the pollutant. The main determinants of transport and dispersion are wind, atmospheric stability or turbulence, topography, and the existence of inversion layers.

The Denver metropolitan area is located in the South Platte River drainage area, with mountains located to the west and relatively high terrain to the south and north. Under certain meteorological conditions, the local topography has the tendency to trap pollutants, resulting in elevated ambient concentrations. The pollutants can be trapped under strong inversions that inhibit dispersion and cause poor air quality.

Regarding visibility, twelve national parks or wilderness areas in Colorado are designated as impaired for visual air quality by the Federal Land Manager responsible for the respective area(s). Federal laws and regulations call for prevention of significant deterioration in visibility for these designated Class I areas. A Regional Haze Plan adopted by Colorado in 2011 and approved by the U.S. Environmental Protection Agency in December 31, 2012 details the issue and measures being taken to address it. Much of this plan focuses on reducing pollutant emissions from power plants.

The Class I visibility area closest to the C-470 project area is Rocky Mountain National Park, located about 85 miles north-by-northwest from the C-470 project area. Given the distance, normal prevailing directions, and topographical factors involved, transportation facilities in the C-470 project area are not expected to meaningfully impact any Class I visibility areas.

2.3 Sensitive Receptors

Persons considered to be sensitive to poor air quality include children, the elderly, and those with pre-existing serious health problems affected by air pollution. Sensitive air quality receptors are the places where sensitive individuals are likely to spend time, including schools and schoolyards, parks and playgrounds, daycare centers, nursing homes, hospitals, and residential communities. (EPA, 2013). It was noted above that the C-470 project area is largely suburban and that it includes a considerable amount of parkland and open space. Not surprisingly, there are sensitive receptors along the C-470 corridor.

Generally, the eastern portion of the C-470 project area is abutted by commercial development and the western portion is abutted by parks and open space, but there are locations where the adjacent land is residential, including homes or apartment buildings. For example, Figure 9 is a photograph taken from C-470 to the north, between University Boulevard and Colorado Boulevard. Note the C-470 (Centennial) Trail in the foreground.

A detailed distribution of the more than 800 residences within 500 feet of the highway can be found in the Noise Technical Report for the C-470 Revised EA.

Figure 9
Photo of Residences Adjacent to C-470

Most potential air quality sensitive receptors are located near C-470 but beyond 500 feet distant from it. However, some notable receptors include:

- Children's Hospital South, opened in December 2013 at 1811 Plaza Drive, south of C-470 and west of Lucent Boulevard
- Wind Crest Senior Living Community for up to 700 senior citizens, opened in 2007 at 3235 Mill Vista Road, south of C-470 and west of Erickson Boulevard
- Fly'n B Park, opened in 2010, south of C-470 and east of Erickson Boulevard
- Wolhurst Community, more than 300 residences for persons aged 55 or older (identified in the C470 EA as a low income population), north of C-470 and west of Santa Fe Drive
- Denver Christian School, Highlands Ranch preschool to grade 8 campus, enrolling 350 students, at 1733 E. Dad Clark Drive, south of C-470 and west of University Boulevard (see Figure 7, noting the white basketball backboards and green athletic fields that face the highway).
- SkyView Academy, preschool to grade 12 charter school at 6161 Business Center Drive, Highlands Ranch (south of C-470, west of Quebec Street.

The list above is not intended to be comprehensive but merely to demonstrate that there are numerous potential receptors in proximity to C-470, including several that have been built since the 2006 C-470 EA was completed. Easy access to C-470 is touted as a positive attribute by some of these new developments on their websites.

Figure 10
Photo of Preschool to Grade 8 School Adjacent to C-470

2.4 Attainment Status

National ambient air quality standards (NAAQS) for various air pollutants have been established by EPA pursuant to the Clean Air Act, and air quality monitoring stations exist in metropolitan areas to determine whether or not the respective NAAQS are being met. Some of these standards have been changed and tightened over time. In cases where monitoring detects violations of the NAAQS, EPA takes formal action to designate the region as a "non-attainment" area. Non-attainment areas are given deadlines within which to attain the NAAQS, and when successful, they can be reclassified as attainment/maintenance areas. Table 1 below indicates that the C-470 project area is part of an air shed that currently is classified as non-attainment for ozone pollution. EPA has re-designated PM_{10} and carbon monoxide to attainment status. These pollutants are in the last few years of their respective sustained attainment/maintenance plans.

Table 1
2015 Air Quality Classification of the Denver Metropolitan Area

Pollutant	Most Recent Violation	Current Classification	Applicable State Implementation Plan
Ozone (O_3)	Ongoing (2010-2014)	"Marginal" Nonattainment	8-Hour Ozone Attainment Plan (Dec. 2008) deemed adequate for conformity effective Mar. 2010
Carbon Monoxide (CO)	1996	Attainment/ Maintenance	CO Maintenance Plan (Dec. 2005) approved by EPA effective Oct. 2007
Particulate Matter (PM_{10})	1993	Attainment/ Maintenance	PM_{10} Maintenance Plan (Dec. 2005) approved by EPA effective Jan. 2008
Other pollutants	None	Not applicable – no violations ever recorded in the region	

The four "other" pollutants referenced in Table 1 are fine particulate matter ($PM_{2.5}$), lead, sulfur oxides, and nitrogen dioxide. NAAQS have been established for these pollutants but no violations have ever been recorded in the Denver region. Monitored concentrations of these pollutants have been extremely low and no increases are foreseen.

The various pollutants listed in Table 1 are related to motor vehicle use in different ways:

- CO is a pollutant emitted directly from vehicle tailpipes as a byproduct of carbon-based fuel combustion.
- PM_{10} refers to solid or liquid particles up to ten microns in diameter, which can include dust that is kicked up off the pavement and re-entrained in the air by the passage of motor vehicles.
- Ozone is a compound formed in the atmosphere by photochemical reactions involving vehicle emissions of nitrogen oxides (NO_x) and volatile organic compounds (VOCs). VOCs are not a specific chemical compound but refer to a class of compounds with similar properties and common constituents.

Some other types of pollutants generated by motor vehicles include greenhouse gas emissions (carbon dioxide, methane and others) and Mobile Source Air Toxics (MSATs). No NAAQS have been established for these pollutants. MSATs are discussed in this Air Quality Technical Report. Greenhouse gas emissions are addressed separately in the C-470 Revised EA.

Regarding ozone, the EPA in April 2012 classified the Denver region as “marginal” nonattainment, which means that monitored concentrations do not greatly exceed the NAAQS. The marginal nonattainment designation did not impose any new planning requirements on the State of Colorado, but the Denver region must meet the 8-hour ozone standard before 2015 or new requirements may be imposed.

Notwithstanding the above, however, EPA in December 2014 published a Proposed Rule to tighten the 8-hour ozone standard to a new lower value in the range from 0.65 0.065 to 0.070 ppm. It is unlikely that the Denver region would meet the proposed range of NAAQS, which may result in new planning requirements and further emission reduction efforts. In the long-term, continued improvements in motor vehicle technology will help to reduce mobile source emissions. Accomplishing near-term reductions may be more challenging.

2.5 Air Quality Trends in the Denver Region

Monitoring for gaseous pollutants (carbon monoxide, sulfur dioxide, oxides of nitrogen and ozone) began in 1965 when the Federal Government established the CAMP station in downtown Denver at the intersection of 21st Street and Broadway Street. Ambient air pollution concentrations have diminished greatly nationwide and in Denver since the NAAQS were established pursuant to the 1977 Clean Air Act Amendments.

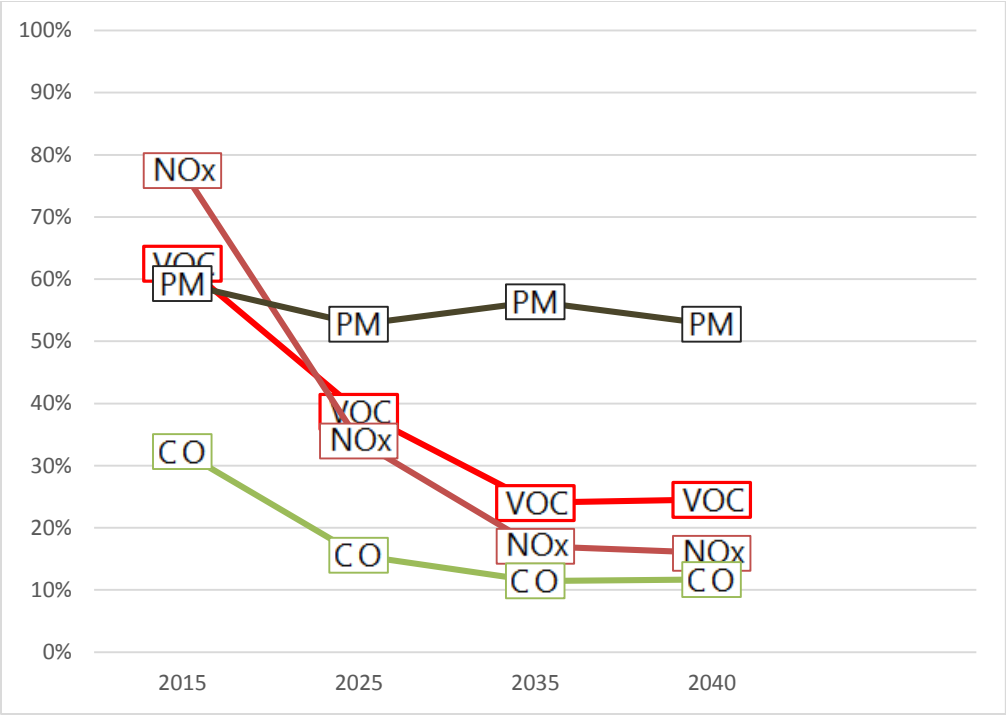
The *Colorado 2013 Air Quality Data Report* (CDPHE, 2015) provides some examples of the impressive magnitude of improvement that have been achieved over several decades, largely due to cleaner motor vehicles and fuels. For example, the CO maximum 8-hour concentration recorded in the Denver region in 1974 was 33.9 ppm, and in 2013 the maximum was 4.4 ppm, a reduction of 87%. For the 8-hour ozone standard, the maximum concentration in 1973 was 0.264 ppm and in 2012 the maximum was 0.106 ppm, a reduction of 60%.

A look forward into the future is provided from the conformity analysis for the DRCOG 2040 RTP. As a tool for predicting and ensuring NAAQS compliance, Colorado’s air quality State Implementation Plans include established emission budgets for on-road mobile sources in the Denver region. Each budget is a given number of tons per day for that pollutant. Figure 11 shows that DRCOG expects transportation emissions to remain well under these various budgets through the year 2040.

Based on this information, there is no reason for concern that the region would experience NAAQS violations in the future for CO or PM_{10}, with or without implementation of the C-470 Proposed Action. C-470 accounts for a fairly small

percentage of total regional VMT, and this will remain true with or without the addition of tolled express lanes.

Figure 11
DRCOG-Predicted Regional Transportation Emissions
As a Percentage of Allowed Emission Budgets, 2015 – 2040



For ozone, the region faces the challenge of meeting the existing 8-hour NAAQS, and could face a tougher standard in the near future. Since ozone is a regional pollutant, not readily analyzed for individual roadway projects, a project-level analysis is not required. A regional ozone analysis is conducted as part of the DRCOG air quality conformity determination.

2.6 Conforming Regional Transportation Plan

The C-470 Proposed Action received a $100 million allocation of RAMP funding from the State Transportation Commission in 2013. A $269 million interim construction project is anticipated in the 2017-18 timeframe, and the ultimate configuration is planned for completion before 2035. Project funding is reflected in both of the current, adopted regional transportation documents which have been demonstrated to meet all applicable conformity requirements:

- DRCOG 2040 Fiscally Constrained Regional Transportation Plan, February 2015
- DRCOG 2016-2021 TIP, April 2015

3.0 METHODOLOGY AND COORDINATION

Air quality analysis for future years is conducted using adopted regional growth assumptions and transportation network assumptions consistent with the adopted DRCOG Regional Transportation Plan. Emission rates for specific future years are provided by CDPHE, using the EPA-approved MOVES2014 emission factor model, which takes into account local meteorology and vehicle fleet characteristics. With all of these assumptions as given, the analysis basically focuses on how the Proposed Action would affect traffic volumes and speeds on an hourly basis at locations within the study area. All of these factors are discussed in interagency consultation between CDOT and CDPHE at the outset of the air quality analysis to ensure agreement of appropriate modeling methods. Interagency consultation for this project was conducted by letter. CDOT's proposed methodology letter describing the proposed methodology received CDPHE concurrence on January 15, 2015. This letter is provided in Attachment A.

Future traffic volumes and speeds within the C-470 project area were predicted using traffic simulation models that took into account the effects of toll prices that would vary by time of day. Traffic in the express lanes would travel at a higher speed than the traffic in the adjacent general purpose lanes, and the model takes this into account.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 Changes to Transportation and Traffic Circulation

With the No-Action Alternative, traffic on four-lane C-470 would become much more congested than it is today, and for a larger portion of the day. Some motorists intending to use C-470 would divert to the nearby arterial street system, where emissions would be generated in closer proximity to a large number of sensitive air quality receptors.

With the Proposed Action, all lanes would operate with less congestion and at higher speeds than in the No-Action Alternative. Through pricing that varies by time of day, CDOT would manage the tolled express lanes to ensure that they operate at a high level of service. The tolled express lanes would carry less traffic, at higher speeds, than the adjacent general purpose lanes. The speed difference between the less congested toll lanes and the more congested general purpose lanes would be greatest during the morning and evening peak periods. The availability of the added toll express lanes would accommodate additional trips on C-470, thus reducing the need for trips to divert to the nearby arterial streets.

The Proposed Action would carry more VMT on C-470 than the No-Action Alternative, but at higher speeds. The results in 2035 would be a projected reduction of Vehicle Hours of Travel by 8% in the 6:00am to 1:00pm time period and 24% reduction during the 1:00pm to 8:00pm time period. The added capacity would have negligible effects overnight between 8:00pm and 6:00am, when existing capacity is adequate to handle the day's lowest traffic demand.

4.2 Criteria Pollutant Emissions

Air pollutant emissions output from the MOVES model were projected based on predicted future traffic on C-470, its ramps and connecting arterial streets for the years 2025 (Proposed Action interim configuration) and 2035 (Proposed Action ultimate configuration) for comparison with the No-Action Alternative. Traffic volumes and speeds for each link for ten different time periods of the day were submitted to APCD, which ran the MOVES2014 model with weather and vehicle fleet characteristics consistent with DRCOG regional transportation modeling.

Table 2 reports the resulting emission projections for carbon monoxide, ozone's precursor emissions (VOC and NOx), and particulate matter ($PM_{2.5}$ and PM_{10}). Emissions were projected for winter temperatures (February) and summer temperatures (July) for all pollutants. Since ozone is typically more of a summertime problem while CO and PM are typically wintertime concerns, Table 2 below reports the key season findings, and not the similar but less relevant off-season findings.

Table 2
Projected C-470 Criteria Pollutant Vehicle Emissions (tons per day)

Pollutant	Month	2025 No-Action	2025 Interim Project	2035 No-Action	2035 Proposed Action
Carbon Monoxide	Feb	4.0	4.7	2.6	3.3
Volatile Organic Compounds (VOC)	Jul	0.13	0.15	0.07	0.11
Oxides of Nitrogen (NOx)		0.42	0.48	0.23	0.26
Particulate Matter ($PM_{2.5}$) exhaust	Feb	0.02	0.02	0.01	0.02
Particulate Matter (PM_{10}) exhaust		0.08	0.08	0.03	0.14
$PM_{2.5}$ road dust	Ann. Avg.	0.17	0.19	0.21	0.23
PM_{10} road dust		0.69	0.78	0.80	0.94

In most cases, projected emissions for the Proposed Action are higher than emissions for the No-Action Alternative, because the Proposed Action accommodates nearly 50% more vehicle miles of travel. However, the emissions difference is not a 50% increase but generally about 20% because the traffic would be less congested and the vehicles operating more efficiently. In no case is there a difference of as much as one ton per ton, and most of the differences are a matter of pounds. Note for example, that the difference in NOx in 2035 is 0.26 tons versus 0.23 tons. This difference of .03 tons is 60 pounds per day.

Despite increased VMT for both the Proposed Action and No-Action Alternative in the future, compared to existing and 2025, emissions for most pollutants in 2035 will be decreasing. For example, compare 4.7 tons of CO for the Proposed Action in 2025 declining to 3.3 tons per day in 2035, even as VMT increase during that decade. However, particulate matter in road dust will not decline over time but instead will increase as VMT does. Therefore road dust particulate matter emissions in 2035 would exceed 2025 levels for both alternatives.

4.3 CO Hotspot Predicted Concentrations

Carbon monoxide hotspot concentrations were predicted with the EPA-approved CAL3QHC model for the most congested signalized intersection in the C-470 project area for a hypothetical scenario of worst case conditions. This analysis was conducted for the intersection of South Quebec Street at County Line Road, where future traffic Level of Service is predicted to be LOS F for both the Proposed Action and the No-Action Alternative. The modeled network for hotspot analysis also included the C-470 northern ramps intersection with Quebec Street. In Figure 12, traffic signal icons identify these two signalized intersections that were analyzed together in the CAL3QHC model run.

Figure 12
CO Hotspot Modeling Site: Quebec Street Intersection with County Line Road

This scenario uses 2035 projected traffic levels (higher traffic volumes than in 2025 or 2015) and 2015 CO emission factors (higher than the emission rates in 2025 and 2035, that will decline due to improved vehicle fuel efficiency). As noted previously, this approach was proposed by CDOT and accepted by APCD based on the assumption that actual hotpot concentrations in 2025 and 2035 could not be worse than this scenario. The results of the hotspot modeling are presented in Table 3.

Table 3
Predicted Worst Case CO Concentrations*(parts per million)

Metric	CAL3QHC Microscale Modeled Prediction			
	8-hour average		1-hour average	
	No-Action Alternative	Proposed Action	No-Action Alternative	Proposed Action
Intersection Contribution	3.4	3.8	5.9	6.7
Background Concentration	0.7	0.7	2.1	2.1
Total Concentration	4.1	4.5	8.0	8.8
National standard	9.0		35.0	
Demonstrates conformity?	Yes	Yes	Yes	Yes

** Worst-case future (2035) traffic with worst-case 2015 emission rates at the corridor's most congested, signalized intersection. Does not reflect an actual expected future condition.*

The results of the CO hotspot modeling for the 8-hour average indicate worst-case concentrations of 4.1 ppm and 4.5 ppm for the two alternatives, both meeting the NAAQS of 9.0 ppm. For the 1-hour average NAAQS of 35.0 ppm, the alternatives resulted in total concentrations of 8.0 and 8.8 ppm. The modeled scenario was constructed to produce higher concentrations than would actually occur at the site in 2015, 2025 or 2035. Based on these results, it is concluded that there would be no future violations of the CO 8-hour NAAQS within the C-470 project area for either alternative.

4.4 Particulate Matter Hotspot Analysis

Microscale analysis was not conducted for particulate matter because C-470 carries minimal (1.2%) heavy truck volumes and the Proposed Action would not encourage increased diesel truck use. Also, the C-470 corridor has no truck stops, intermodal terminals or other sites where a large amount of diesel truck activity would be concentrated. CDPHE concurred with this assessment in interagency consultation as documented in Attachment A.

4.5 Mobile Source Air Toxics

The MOVES2014 model was also applied to predict future emissions of MSATs within the project area. For this analysis, traffic only on C-470 and its ramps was included, as vehicle classification data regarding heavy trucks was not available for connecting arterials. As noted previously, C-470 carries a smaller percentage of heavy trucks (1.2%) than any other major highway in the Denver region, and the Proposed Action would not attract additional heavy truck traffic as the proposed express lanes would discourage heavy truck use through high tolls. Table 4 presents the prediction future MSAT emissions. Note that the results are presented in terms of pounds per day.

As with predicted emissions presented earlier for other pollutants, the results in Table 4 reflect slightly higher emissions for the Proposed Action than for the No-Action Alternative because C-470 with more lanes would be able to carry more traffic. However, emissions in 2035 would decline from 2025 levels due to continuing Federally-mandated improvements in motor vehicle fuel efficiency. Again, the declining emission rates would more than compensate for increased VMT, resulting in lower future MSAT emissions despite increased traffic.

Table 4
Estimated Emissions of MSATs on C-470 (pounds per day)

Pollutant	2025 No-Action	2025 Interim Project	2035 No-Action	2035 Proposed Action
Benzene	5.9	6.9	3.0	4.8
Formaldehyde	2.5	2.9	1.5	2.7
1,3-Butadiene	0.2	0.2	<0.1	<0.1
Acrolein	0.1	0.2	0.1	0.1
Naphthalene	0.3	0.3	0.2	0.3
Polycyclic organic matter (POM)	0.1	0.2	0.1	0.1
Diesel particulate matter	4.1	4.8	1.9	3.0

4.6 Pollutant Emissions from Project Construction Activities

During construction, the use of heavy equipment operation and earth moving machinery would create exhaust emissions and fugitive dust. Storage piles of construction material also would have potential to generate fugitive dust.

4.7 Conformity Conclusion

Based on the analysis performed for this project, it is concluded that the Proposed Action demonstrates air quality conformity at both the project and regional level.

5.0 MITIGATION

With the No-Action Alternative, no mitigation would be provided.

With the Proposed Action, no mitigation would be required for pollutant emissions resulting from vehicle use of the new roadway components. However, regarding construction air quality impacts, all contractors would be required to obtain a construction permit and develop a fugitive emissions particulate emissions control plan to be implemented during construction in accordance with the Colorado Air Quality Control Commission Regulation No. 1, Part 3D, and Regulation No. 3, Applicable Permit Requirements. The contractor would also be required to minimize airborne dust during construction through construction phasing to prevent exposing bare dirt on the whole site at once; stabilize soils through seeding and mulching; and suppressing dust through regular watering and applications of dust palliatives as appropriate.

6.0 REFERENCES

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ATTACHMENT A
CDPHE METHODOLOGY CONCURRENCE

COLORADO
Department of Transportation
Division of Transportation Development

Environmental Programs Branch
4201 E. Arkansas Ave. Shumate Bldg
Denver, CO 80222-3400

January 15, 2015

Chris Colclasure, Planning & Policy Program Mgr
Air Pollution Control Division
Colorado Department of Public Health & Environment
4700 Cherry Creek Drive South
Denver, CO 80901

Dear Sir:

The Colorado Department of Transportation (CDOT) is requesting your concurrence with the following air quality analytical methodology for the C-470 Corridor Revised Environmental Assessment.

As part of a Revised Environmental Assessment (EA) for proposed tolled express lanes on State Highway C-470 in the Denver metro area, the Colorado Department of Transportation is updating air quality analysis to satisfy requirements of the National Environmental Policy Act and air quality conformity regulations. This letter describes our proposed analytical methodology and supporting rationale. We request that APCD review these details and provide your written concurrence. Factors outside our control have put the air quality analysis on a critical time path for the revised EA, so CDOT is eager to resolve any methodological issues expeditiously. CDOT will provide any additional information you may need or to answer any questions about the proposed project, methodology and assumptions.

PROJECT BACKGROUND
CDOT and FHWA approved an EA completed in 2006 which proposed tolled express lanes on C-470 between I-25 and Kipling Parkway, a distance of 13.75 miles, affecting the southern portion of the Denver metro area. However, the project lacked funding and unified local support, so it did not proceed to construction at that time. As a part of the EA, air quality analyses were performed in consultation with APCD staff, and the results met all applicable air quality requirements under NEPA and transportation conformity.

Project funding has now been secured for 2015 and public consensus has been achieved so the project is ready to move forward. However, the approved EA is nine years old and therefore is being revised to update the air quality analysis and other resource analyses as needed before a decision document of Finding of No Significant Impact can be issued.

PROJECT CHANGES, 2006 to 2015
The main feature of the 2015 Proposed Action, as in the 2006 EA, is constructing two tolled express lanes between I-25 and Kipling Parkway. The existing two lanes in each direction will continue to act as (free) general purpose lanes. The 2015 action newly adds extensive auxiliary lanes, which will greatly improve merge and diverge movements near interchanges, improving travel speeds and safety. Additionally,

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previously proposed ramps to provide new C-470 access at Colorado Boulevard have been eliminated. New direct-connect ramps have been added to allow motorists to enter or exit the express lanes at I-25 without having to merge across all lanes of C-470. Thus, the 2015 Proposed Action is similar, but not identical, to the action that underwent earlier air quality analysis.

CHANGES IN REGIONAL PLANNING CONTEXT

The 2006 preferred action was analyzed for a 2025 planning horizon year, and was not yet included in the conforming DRCOG 2025 Regional Transportation Plan. The 2015 Proposed Action has been added to the DRCOG 2035 Metro Vision Regional Transportation Plan, and will need to be analyzed for a 2035 planning horizon year. A near-term interim project will build much of the Proposed Action by 2018, and the remainder of the project will be completed by 2035. Unlike the 2006 analysis, the 2015 analysis can be based on a known project phasing approach.

NEW AIR QUALITY EMISSION FACTORS

EPA-developed MOVES emission factors are available now to replace the MOBILE6.2 emission factors that were used in the previous C-470 air quality analysis. These analyses will use the recently released MOVES2014 emissions model. CDOT would acquire revised inventories, emissions factors, and background concentrations from APCD for our new analysis.

CARBON MONOXIDE MICROSCALE ANALYSIS

Although the last violation of the national carbon monoxide standard in the Denver region was in 1995, microscale CO analysis is conducted to show that a proposed action will not cause or contribute to a future National Ambient Air Quality Standard (NAAQS) violation. Traffic level of service (LOS) analysis was performed in 2006 for 31 signalized intersections at or near C-470 interchanges, and three congested intersections underwent CO microscale analysis for 2025 and interim years. The most congested (LOS F) intersection with the most traffic was Quebec Street at County Line Road, 500 feet north of the C-470 westbound ramp intersection. It produced the highest predicted 2025 CO concentration at 6.80 parts per million (ppm), including an assumed background concentration of 3.0 ppm. The other two modeled intersections yielded 6.54 ppm and 4.55 ppm. The national CO standard for an 8-hour average is 9.0 ppm, and our worst operating intersection was well below that.

New LOS analysis of the same 31 intersections for the year 2035 finds that the same intersection (Quebec/County Line) is again projected to be the most congested (LOS F) with by far the highest traffic volume, so it is again the top candidate for hotspot analysis. In 2035, it will carry 13 percent more traffic than was modeled in the 2025 microscale analysis. For 2035, the second busiest LOS F intersection is Quebec Street at the C-470 westbound ramps, roughly 500 feet away from the intersection previously modeled.

The C-470 Proposed Action (interim and ultimate improvements) will not modify the geometry of the Quebec/County Line or Quebec/WB C-470 ramp intersections. It will only affect the amount of traffic approaching these intersections and their signal timing. CDOT proposes to model the combined two-intersection complex for 2035 traffic conditions. CDOT also proposes to utilize a worst case analysis, which utilizes the highest traffic volumes expected over the project planning timeline (2035) with the worst emissions rates expected over that same timeframe (current 2015 emission rates). The results of this type of analysis adequately simulate the highest potential carbon monoxide concentrations possible over the 20-year timeframe, eliminating the need for interim year analyses. If the results of a worst-case analysis are less than the NAAQS for CO, then no voilation is likely to be caused by the project actions. If the results indicate a higher concentration than the NAAQS, then a more extensive analyses will be required comparing No Build and Build traffic and emissions for 2035. EPA approved this approach for the I-70 East Supplemental DEIS.

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PM10 MICROSCALE ANALYSIS

C-470 has among the lowest truck percentages of any major highway in the Denver region, as the corridor has little industrial development and no significant intermodal facilities. The proposed C-470 express lanes will have a toll structure that discourages commercial truck use. No PM10 hotspot modeling is recommended because the total diesel truck volume is less than 1.5 % on C-470, the percentage of diesel vehicles is not projected to increase, and no change in truck circulation patterns are expected as a result of the Proposed Action.

CRITERIA POLLUTANTS

In addition to micro-scale analyses for conformity purposes, CDOT will also include qualitative discussion of criteria pollutants affecting regional ozone nonattainment, including ozone, nitrogen oxides, volatile organic compounds, and other criteria pollutants.

MSAT EMISSION ANALYSIS

Multiple segments of the 13.75-mile project area would exceed an AADT of 140,000 vehicles per day in 2035 under the Proposed Action, triggering the need for a quantitiative MSAT analysis. Despite the minimal truck volumes, CDOT proposes to conduct quantitative inventory of priority MSAT emissions for the Proposed Action and No-Action alternatives. EPA identified seven priority compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers which will be included in this analysis:

- acrolein;
- benzene;
- 1,3-butidiene;
- diesel particulate matter plus diesel exhaust organic gases (diesel PM);
- formaldehyde;
- naphthalene; and
- polycyclic organic matter.

CDOT proposes to limit this analysis to the year 2035 and to only assess freeway mainline traffic for this analysis. Meaningful differences in MSAT emissions for the two alternatives are not anticipated.

GREENHOUSE GAS EMISSIONS

Per current FHWA guidance, CDOT plans to provide a summary assessment of the direct, indirect and cumulative effects of GHG emissions from the project, including a comparative analyses of global, statewide and project generated GHG emissions.

Thank you for your consideration of our proposed analytical approach. For your convenience, a concurrence signature block is provided below for your possible use. If you feel there is a need for an interagency consultation meeting regarding this project, please contact me at (303) 757-9016 (jill.schlaefer@state.co.us) so that a meeting can be scheduled as soon as possible. Again, if you or your staff has any questions regarding this project-level air quality analysis, please let me know.

Cordially,

Jill Schlaefer
Air Quality and Noise Programs Manager

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APCD CONCURRENCE:
For the Air Pollution Control Division of the Colorado Department of Public Health and Environment, I concur that the project-level analytical approach described above for the C-470 Corridor Revised EA re-analysis is acceptable and appropriate for this project.

Christopher L. Williams
Signature

Jan. 15, 2015
Date

Planning and Policy Program Manager
Title

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ATTACHMENT B
CAL3QHC MODEL RUN FOR
THE NO-ACTION ALTERNATIVE

```
                        CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION
2.0 Dated 95221                        PAGE  1

      JOB: QBC/CLR NO BUILD 2035 PR                              RUN: NOBLD
2035 PR

      DATE :  6/10/15
      TIME :  9:23: 8

         The MODE flag has been set to C for calculating CO averages.

       SITE & METEOROLOGICAL VARIABLES
       -------------------------------
       VS =   0.0 CM/S       VD =   0.0 CM/S       Z0 = 175. CM
        U =  1.0 M/S         CLAS =   4  (D)     ATIM =  60. MINUTES
MIXH =  1000. M   AMB =  0.0 PPM

       LINK VARIABLES
       --------------
         LINK DESCRIPTION     *         LINK COORDINATES (FT)          *
LENGTH  BRG TYPE   VPH    EF      H   W    V/C QUEUE
                              *   X1        Y1        X2        Y2     *
(FT)  (DEG)            (G/MI)  (FT) (FT)       (VEH)
      -------------------------*----------------------------------------*--
-------------------------------------------------------
       1. QBC NB APPR         * 216139.7  319323.0  216135.9  319709.5 *
387.   359. AG   1821.  27.0   0.0 56.0
       2. QBC NB Q            * 216136.1  319669.7  216137.5  319539.2 *
131.   179. AG    220. 100.0   0.0 36.0 0.62   6.6
       3. QBC NB LT Q         * 216103.4  319670.3  216149.7  318258.8 *
1412.   178. AG    196. 100.0   0.0 23.0 1.82  71.7
       4. QBC NB RT Q         * 216155.3  319669.4  216156.7  319629.1 *
40.   178. AG     19. 100.0   0.0 10.0 0.28   2.0
       5. QBC NB DPTR         * 216135.1  319738.8  216128.5  320138.8 *
400.   359. AG   1353.   3.9   0.0 56.0
       6. QBC SB APPR         * 216090.0  320138.8  216070.4  319738.6 *
401.   183. AG   2060.  18.0   0.0 44.0
       7. QBC SB Q            * 216074.0  319812.3  216186.3  322104.1 *
2295.     3. AG    141. 100.0   0.0 24.0 1.36 116.6
       8. QBC SB LT Q1        * 216100.7  319812.5  216100.0  319902.2 *
90.   360. AG    190. 100.0   0.0 21.0 0.81   4.6
       9. QBC SB LT Q2        * 216097.2  319942.4  216171.0  321338.9 *
1398.     3. AG     95. 100.0   0.0 10.0 1.63  71.0
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      11. QBC SB DPTR         * 216070.4  319738.6  216069.9  319455.0 *
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      12. CLR EB APPR         * 215702.0  319714.6  216101.8  319709.7 *
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      13. CLR EB Q            * 216025.3  319710.6  214409.1  319730.6 *
1616.   271. AG    176. 100.0   0.0 24.0 1.40  82.1
      14. CLR EB LT Q         * 216028.2  319733.9  215437.4  319733.9 *
591.   270. AG    220. 100.0   0.0 20.0 2.26  30.0
```

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67.   270. AG     20. 100.0   0.0 11.0 0.47   3.4
      16. CLR EB DPTR         * 216101.8  319709.7  216640.7  319716.8 *
539.    89. AG   1603.  20.5   0.0 44.0
      17. CLR WB APPR         * 216640.7  319771.0  216103.0  319767.0 *
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      18. CLR WB Q            * 216176.4  319767.6  217358.1  319776.3 *
1182.    90. AG    147. 100.0   0.0 24.0 1.16  60.0
      19. CLR WB LT Q1        * 216177.7  319744.0  217970.2  319757.7 *
1793.    90. AG    190. 100.0   0.0 21.0 1.64  91.1
      20. CLR WB LT Q2        * 216466.2  319752.4  222403.8  319752.4 *
5938.    90. AG     95. 100.0   0.0 10.0 3.27 301.6
      21. CLR WB RT Q         * 216175.3  319785.0  216203.5  319785.3 *
28.    90. AG     20. 100.0   0.0 12.0 0.20   1.4
      22. CLR WB DPTR         * 216103.0  319767.0  215702.0  319766.2 *
401.   270. AG   2075.  21.1   0.0 44.0
      23. QBCS NB APPR        * 216144.5  318742.0  316144.5  319168.7 *
*****    90. AG   1327.  27.0   0.0 56.0
      24. QBCS NB Q           * 216144.5  319113.8  216144.5  318991.1 *
123.   180. AG    164. 100.0   0.0 36.0 0.51   6.2
      25. QBCS NB LT Q1       * 216116.0  319098.2  216116.0  318573.9 *
524.   180. AG    211. 100.0   0.0 22.0 2.10  26.6
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      27. QBCS NB DPTR        * 216144.5  319168.7  216139.7  319323.0 *
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527.   277. AG   1880.   4.4   0.0 32.0
      34. 470 WB TRL Q        * 216190.4  319174.4  216190.8  319174.4 *
0.    90. AG     61. 100.0   0.0 12.0 0.00   0.0
      35. 470 WB LT Q         * 216189.8  319163.6  225565.5  317913.2 *
9459.    98. AG     61. 100.0   0.0 12.0 2.33 480.5
      36. 470 WB RT Q1        * 216202.4  319222.8  216217.2  319212.6 *
18.   125. AG      9. 100.0   0.0 12.0 0.23   0.9
      37. 470 WB RT Q2        * 216265.1  319176.8  216282.9  319174.5 *
18.    97. AG      9. 100.0   0.0 12.0 0.23   0.9
      38. 470 WB DPTR         * 216107.2  319178.2  215662.9  319097.7 *
452.   260. AG    743.   4.4   0.0 32.0
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2035 PR

      DATE :  6/10/15
      TIME :  9:23: 8

       ADDITIONAL QUEUE LINK PARAMETERS
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SATURATION   IDLE   SIGNAL   ARRIVAL
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FLOW RATE   EM FAC   TYPE     RATE
                              *     (SEC)   (SEC)    (SEC)      (VPH)
(VPH)    (gm/hr)
      -------------------------*-----------------------------------------
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1600      42.05      2        3
       3. QBC NB LT Q         *     120      104       3.0       533
1600      42.05      2        3
       4. QBC NB RT Q         *     120       20       0.0       369
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       8. QBC SB LT Q1        *     120      101       3.0       303
1600      42.05      2        3
       9. QBC SB LT Q2        *     120      101       3.0       303
1600      42.05      2        3
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      13. CLR EB Q            *     120       90       3.0       931
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      14. CLR EB LT Q         *     120      112       3.0       176
1600      43.86      2        3
      15. CLR EB RT Q         *     120       20       0.0       615
1600      43.86      2        3
      18. CLR WB Q            *     120       75       3.0      1236
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      19. CLR WB LT Q1        *     120       97       3.0       782
1600      43.86      2        3
      20. CLR WB LT Q2        *     120       97       3.0       782
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      21. CLR WB RT Q         *     120       20       0.0       258
1600      43.86      2        3
      24. QBCS NB Q           *     120       58       3.0      1162
1600      42.05      2        3
      25. QBCS NB LT Q1       *     120      112       3.0       165
1600      42.05      2        3
      26. QBCS NB LT Q2       *     120      112       3.0       165
1600      42.05      2        3
      29. QBCS SB Q           *     120       68       3.0      2270
1600      42.05      2        3
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```
      30. QBCS SB RT Q1       *     120       10       0.0       577
1600      42.05      2        3
      31. QBCS SB RT Q2       *     120       10       0.0       577
1600      42.05      2        3
      34. 470 WB TRL Q        *     120       65       3.0         1
1600      42.26      2        3
      35. 470 WB LT Q         *     120       65       3.0      1550
1600      42.26      2        3
      36. 470 WB RT Q1        *     120       10       0.0       329
1600      42.26      2        3
      37. 470 WB RT Q2        *     120       10       0.0       329
1600      42.26      2        3

       RECEPTOR LOCATIONS
       ------------------
                               *           COORDINATES (FT)          *
         RECEPTOR              *      X          Y          Z        *
     --------------------------*-------------------------------------*
      1. Rec 1                 *    216271.9   319803.6        6.0   *
      2. Rec 2                 *    216231.9   319803.2        6.0   *
      3. Rec 3                 *    216201.9   319802.8        6.0   *
      4. Rec 4                 *    216181.9   319806.8        6.0   *
      5. Rec 5                 *    216167.1   319820.2        6.0   *
      6. Rec 6                 *    216160.7   319840.2        6.0   *
      7. Rec 7                 *    216160.7   319870.2        6.0   *
      8. Rec 8                 *    216160.6   319910.2        6.0   *
      9. Rec 9                 *    216045.1   319906.2        6.0   *
     10. Rec 10                *    216044.8   319866.4        6.0   *
     11. Rec 11                *    216044.6   319836.3        6.0   *
     12. Rec 12                *    216040.9   319816.3        6.0   *
     13. Rec 13                *    216026.7   319802.2        6.0   *
     14. Rec 14                *    216006.7   319798.6        6.0   *
     15. Rec 15                *    215976.7   319798.9        6.0   *
     16. Rec 16                *    215936.7   319799.2        6.0   *
     17. Rec 17                *    215922.3   319677.1        6.0   *
     18. Rec 18                *    215962.3   319676.7        6.0   *
     19. Rec 19                *    215992.3   319676.3        6.0   *
     20. Rec 20                *    216012.3   319673.2        6.0   *
     21. Rec 21                *    216024.9   319657.6        6.0   *
```

PAGE 3
JOB: QBC/CLR NO BUILD 2035 PR RUN: NOBLD 2035 PR

DATE : 6/10/15
TIME : 9:23: 8

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
22. Rec 22	216028.9	319637.6	6.0
23. Rec 23	216028.9	319607.6	6.0
24. Rec 24	216028.8	319567.6	6.0
25. Rec 25	216175.6	319569.8	6.0
26. Rec 26	216174.2	319609.8	6.0
27. Rec 27	216173.3	319639.7	6.0
28. Rec 28	216178.3	319659.7	6.0
29. Rec 29	216192.4	319673.9	6.0
30. Rec 30	216212.4	319678.6	6.0
31. Rec 31	216242.4	319678.8	6.0
32. Rec 32	216282.4	319679.0	6.0
33. Rec 33	216337.2	319192.8	6.0
34. Rec 34	216280.7	319195.5	6.0
35. Rec 35	216254.6	319206.4	6.0
36. Rec 36	216229.8	319224.0	6.0
37. Rec 37	216215.9	319238.3	6.0
38. Rec 38	216204.0	319254.8	6.0
39. Rec 39	216190.7	319283.9	6.0
40. Rec 40	216184.8	319311.6	6.0
41. Rec 41	216182.6	319368.1	6.0
42. Rec 42	216027.8	319368.9	6.0
43. Rec 43	216026.8	319312.3	6.0
44. Rec 44	216021.6	319270.2	6.0
45. Rec 45	216010.6	319241.2	6.0
46. Rec 46	216000.6	319223.8	6.0
47. Rec 47	215988.5	319207.9	6.0
48. Rec 48	215965.8	319187.2	6.0
49. Rec 49	215926.7	319170.8	6.0
50. Rec 50	215982.8	319122.1	6.0
51. Rec 51	216010.8	319127.1	6.0
52. Rec 52	216039.0	319129.7	6.0
53. Rec 53	216042.0	319101.5	6.0
54. Rec 54	216042.2	319073.3	6.0
55. Rec 55	216173.2	319047.8	6.0
56. Rec 56	216173.2	319087.8	6.0
57. Rec 57	216173.2	319116.2	6.0
58. Rec 58	216176.0	319144.3	6.0
59. Rec 59	216204.3	319143.4	6.0
60. Rec 60	216232.4	319139.7	6.0

```
PAGE  4
      JOB: QBC/CLR NO BUILD 2035 PR                                RUN: NOBLD
2035 PR

       MODEL RESULTS
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       REMARKS : In search of the angle corresponding to
                 the maximum concentration, only the first
                 angle, of the angles with same maximum
                 concentrations, is indicated as maximum.

 WIND ANGLE RANGE:  10.-360.

 WIND  * CONCENTRATION
 ANGLE *      (PPM)
 (DEGR)* REC1  REC2  REC3  REC4  REC5  REC6  REC7  REC8  REC9  REC10 REC11
REC12 REC13 REC14 REC15 REC16 REC17 REC18 REC19 REC20
 ------*-------------------------------------------------------------------
-------------------------------------------------------
  10.  *   0.0   0.0   0.0   0.1   0.2   0.3   0.3   0.3   2.8   3.0   3.0
2.6   1.8   1.2   0.8   0.6   3.0   3.3   3.6   3.9
  20.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   3.1   3.2   3.2
3.1   2.2   1.6   1.0   0.8   3.2   3.5   4.0   3.9
  30.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.9   2.8   3.1
2.9   2.3   1.8   1.2   1.0   3.3   3.7   3.8   3.8
  40.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.7   2.7   2.7
2.7   2.1   1.6   1.2   0.9   3.3   3.8   3.6   3.6
  50.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.5   2.5   2.6
2.6   2.1   1.6   1.3   0.9   3.5   3.6   3.5   3.7
  60.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.2   2.3   2.5
2.4   1.9   1.6   1.2   0.9   3.6   3.8   3.6   3.8
  70.  *   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   2.0   2.2   2.3
2.3   2.0   1.5   1.3   1.0   3.7   3.8   4.1   4.1
  80.  *   0.8   0.8   0.8   0.6   0.4   0.3   0.0   0.0   2.1   2.4   2.6
2.7   2.3   2.3   2.0   1.7   3.8   3.8   4.0   4.3
  90.  *   1.8   1.8   1.9   1.7   1.2   1.0   0.6   0.5   2.6   3.0   3.5
3.6   3.4   3.3   3.1   2.8   3.1   3.2   3.6   3.8
 100.  *   2.8   2.9   2.9   2.7   2.1   1.7   1.2   0.8   3.1   3.7   4.1
4.2   4.0   4.2   3.9   3.8   2.2   2.5   2.9   3.3
 110.  *   3.1   3.1   3.1   2.8   2.2   2.0   1.5   1.2   3.5   3.7   4.1
4.0   3.9   3.9   3.8   3.8   1.7   2.0   2.4   2.7
 120.  *   2.8   2.9   3.0   2.7   2.3   1.9   1.4   1.3   3.5   3.9   3.8
3.7   4.1   3.8   3.8   3.7   1.6   1.9   2.3   2.6
 130.  *   2.6   2.6   2.6   2.5   2.2   1.7   1.5   1.3   3.6   3.9   3.8
3.8   4.2   3.9   3.9   4.0   1.7   1.9   2.2   2.9
 140.  *   2.4   2.4   2.4   2.3   2.1   1.6   1.4   1.2   3.9   3.9   4.1
4.2   4.5   4.3   4.1   4.1   1.7   2.0   2.4   2.9
 150.  *   2.3   2.3   2.3   2.3   1.8   1.6   1.4   1.2   4.4   4.3   4.7
4.9   4.9   4.6   4.3   4.2   1.5   2.1   2.5   3.0
 160.  *   2.3   2.3   2.3   2.3   1.9   1.7   1.2   1.1   4.8   5.0   5.4
5.5   5.2   4.8   4.5   3.9   1.5   1.8   2.3   3.0
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 170.  *   2.3   2.4   2.6   2.6   2.6   2.5   2.3   1.9   5.0   5.6   5.9
5.7   5.1   4.7   4.1   3.5   0.8   1.5   2.0   2.7
 180.  *   2.7   3.0   3.6   3.8   3.9   3.5   3.2   2.9   4.1   4.3   4.6
4.7   4.2   3.7   3.1   2.7   0.4   0.6   1.0   1.7
 190.  *   3.2   3.8   4.4   4.4   4.2   3.9   3.5   3.1   2.4   2.6   3.1
3.1   2.8   2.7   2.5   2.4   0.0   0.1   0.2   0.4
 200.  *   3.7   4.3   4.5   4.3   3.7   3.5   3.2   2.8   1.4   1.6   1.9
2.1   2.3   2.3   2.3   2.3   0.0   0.0   0.0   0.0
 210.  *   3.9   4.2   3.8   3.7   3.2   2.9   2.7   2.6   1.2   1.4   1.7
2.0   2.3   2.4   2.4   2.4   0.0   0.0   0.0   0.0
 220.  *   3.7   3.7   3.4   3.4   2.9   2.9   2.6   2.6   1.1   1.5   1.7
2.1   2.4   2.5   2.5   2.5   0.0   0.0   0.0   0.0
 230.  *   3.6   3.5   3.1   3.1   3.0   2.9   2.8   2.7   1.1   1.5   1.9
2.2   2.6   2.8   2.8   2.8   0.0   0.0   0.0   0.0
 240.  *   3.6   3.4   3.3   3.2   3.0   3.0   2.9   2.8   1.0   1.4   1.8
2.2   2.8   2.9   2.9   2.9   0.0   0.0   0.0   0.0
 250.  *   3.5   3.4   3.4   3.4   3.2   3.0   2.9   2.4   0.7   1.1   1.6
2.2   2.8   3.0   2.9   2.8   0.1   0.1   0.1   0.1
 260.  *   3.1   3.0   3.3   3.2   2.7   2.6   2.4   2.0   0.3   0.7   1.1
1.6   2.3   2.4   2.4   2.2   0.5   0.5   0.6   0.5
 270.  *   2.3   2.4   2.5   2.4   2.2   2.2   1.9   1.6   0.1   0.2   0.5
0.9   1.3   1.5   1.4   1.3   1.2   1.3   1.4   1.3
 280.  *   1.6   1.5   1.5   1.6   1.5   1.7   1.5   1.3   0.0   0.0   0.1
0.2   0.5   0.6   0.6   0.4   2.1   2.3   2.4   2.1
 290.  *   0.9   1.0   1.1   1.2   1.4   1.6   1.5   1.3   0.0   0.0   0.0
0.0   0.1   0.1   0.1   0.1   2.7   2.9   2.9   2.7
 300.  *   0.8   0.9   1.0   1.2   1.6   1.5   1.4   1.4   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   2.8   2.9   3.0   2.9
 310.  *   0.7   0.9   1.0   1.2   1.5   1.5   1.4   1.4   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   2.8   2.8   2.8   2.7
 320.  *   0.8   0.8   1.1   1.3   1.5   1.4   1.4   1.4   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   2.7   2.7   2.7   2.6
 330.  *   0.7   0.8   1.1   1.4   1.5   1.5   1.4   1.4   0.1   0.1   0.1
0.0   0.0   0.0   0.0   0.0   2.6   2.5   2.5   2.3
 340.  *   0.5   0.8   1.0   1.2   1.3   1.4   1.3   1.3   0.3   0.3   0.3
0.2   0.0   0.0   0.0   0.0   2.3   2.3   2.3   2.3
 350.  *   0.3   0.6   0.8   0.8   1.1   1.2   1.2   1.3   0.8   0.8   0.8
0.6   0.4   0.2   0.1   0.0   2.4   2.4   2.5   2.6
 360.  *   0.1   0.3   0.3   0.6   0.6   0.8   0.8   0.8   1.8   1.9   1.9
1.7   1.1   0.8   0.4   0.2   2.6   2.8   3.1   3.1
 ------*-------------------------------------------------------------------
-------------------------------------------------------
 MAX   *   3.9   4.3   4.5   4.4   4.2   3.9   3.5   3.1   5.0   5.6   5.9
5.7   5.2   4.8   4.5   4.2   3.8   3.8   4.1   4.3
 DEGR. *  210   200   200   190   190   190   190   190   170   170   170
170   160   160   160   150    80    70    70    80
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PAGE  5
      JOB: QBC/CLR NO BUILD 2035 PR                                RUN: NOBLD
2035 PR

       MODEL RESULTS
       -------------

       REMARKS : In search of the angle corresponding to
                 the maximum concentration, only the first
                 angle, of the angles with same maximum
                 concentrations, is indicated as maximum.

 WIND ANGLE RANGE:  10.-360.

 WIND  * CONCENTRATION
 ANGLE *      (PPM)
 (DEGR)* REC21 REC22 REC23 REC24 REC25 REC26 REC27 REC28 REC29 REC30 REC31
REC32 REC33 REC34 REC35 REC36 REC37 REC38 REC39 REC40
 ------*-------------------------------------------------------------------
-------------------------------------------------------
  10.  *   3.9   3.9   3.6   3.5   1.3   1.4   1.5   1.6   1.9   2.0   2.0
2.0   0.5   0.5   0.5   0.7   0.6   0.6   0.7   0.9
  20.  *   4.0   3.9   3.8   3.6   1.1   1.3   1.5   1.6   1.9   2.0   2.0
2.0   0.4   0.5   0.5   0.6   0.6   0.6   0.7   0.7
  30.  *   3.7   3.9   3.6   3.6   1.0   1.2   1.4   1.7   2.0   2.1   2.1
2.0   0.4   0.4   0.4   0.4   0.4   0.6   0.6   0.6
  40.  *   3.6   3.6   3.7   3.9   1.1   1.3   1.5   1.9   2.1   2.2   2.2
2.2   0.2   0.3   0.4   0.4   0.4   0.4   0.4   0.4
  50.  *   3.7   3.7   3.9   4.0   1.1   1.3   1.6   1.9   2.2   2.3   2.3
2.3   0.2   0.2   0.2   0.2   0.2   0.3   0.4   0.4
  60.  *   3.7   4.1   4.1   4.2   1.0   1.3   1.7   2.0   2.3   2.4   2.4
2.4   0.1   0.1   0.1   0.1   0.1   0.2   0.2   0.2
  70.  *   4.1   4.3   4.2   4.1   0.9   1.3   1.7   2.0   2.5   2.7   2.6
2.6   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1
  80.  *   4.2   4.4   4.1   3.7   0.6   0.8   1.3   1.6   2.1   2.3   2.3
2.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
  90.  *   4.0   3.9   3.8   3.4   0.3   0.5   0.8   1.0   1.3   1.6   1.5
1.3   0.4   0.4   0.4   0.3   0.2   0.2   0.2   0.2
 100.  *   3.2   3.4   3.3   3.1   0.2   0.2   0.3   0.4   0.6   0.6   0.6
0.6   0.5   0.6   0.5   0.5   0.5   0.5   0.4   0.3
 110.  *   3.1   3.3   3.2   3.1   0.2   0.2   0.2   0.2   0.2   0.2   0.2
0.2   0.6   0.6   0.5   0.5   0.4   0.4   0.4   0.3
 120.  *   3.0   3.2   3.2   3.0   0.1   0.1   0.1   0.1   0.1   0.1   0.1
0.1   0.5   0.6   0.5   0.5   0.5   0.4   0.4   0.4
 130.  *   3.2   3.4   3.2   3.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1
0.1   0.5   0.5   0.5   0.5   0.5   0.4   0.4   0.4
 140.  *   3.2   3.4   3.2   3.4   0.1   0.1   0.1   0.1   0.1   0.1   0.1
0.1   0.5   0.5   0.5   0.5   0.4   0.4   0.4   0.4
 150.  *   3.4   3.6   3.5   3.6   0.1   0.2   0.2   0.1   0.1   0.1   0.1
0.1   0.5   0.5   0.5   0.5   0.4   0.4   0.4   0.3
 160.  *   3.6   3.8   3.7   3.9   0.2   0.2   0.3   0.2   0.1   0.1   0.1
0.1   0.5   0.5   0.5   0.4   0.4   0.4   0.3   0.3
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 170.  *   3.1   3.4   3.4   3.4   0.8   0.9   0.9   0.8   0.6   0.3   0.1
0.1   0.5   0.5   0.5   0.4   0.4   0.5   0.4   0.5
 180.  *   2.0   2.2   2.2   2.3   2.1   2.2   2.5   2.1   1.3   1.1   0.6
0.3   0.5   0.6   0.6   0.6   0.8   0.8   1.1   1.2
 190.  *   0.8   0.8   0.9   0.8   3.1   3.4   3.6   3.2   2.4   1.8   1.2
0.8   0.7   0.8   0.9   1.1   1.2   1.4   1.8   2.2
 200.  *   0.0   0.2   0.1   0.1   3.5   3.8   4.0   3.7   3.0   2.3   1.7
1.3   0.8   1.1   1.3   1.4   1.5   1.7   2.4   2.7
 210.  *   0.0   0.0   0.0   0.0   3.3   3.8   3.9   3.7   3.0   2.4   2.1
1.5   1.1   1.4   1.5   1.4   1.7   2.1   2.3   2.5
 220.  *   0.0   0.0   0.0   0.0   3.2   3.6   3.7   3.5   3.0   2.4   1.9
1.6   1.2   1.4   1.5   1.4   1.8   2.1   2.2   2.4
 230.  *   0.0   0.0   0.0   0.0   3.2   3.5   3.6   3.3   2.8   2.3   2.0
1.6   1.1   1.3   1.4   1.5   1.6   2.1   2.2   2.3
 240.  *   0.0   0.0   0.0   0.0   3.1   3.3   3.3   3.0   2.6   2.2   1.9
1.6   1.1   1.3   1.4   1.4   1.6   1.8   2.1   2.3
 250.  *   0.0   0.0   0.0   0.0   3.0   3.1   3.1   3.0   2.6   2.3   1.9
1.7   1.2   1.2   1.3   1.5   1.6   1.9   2.1   2.2
 260.  *   0.2   0.1   0.0   0.0   3.0   3.1   3.3   3.2   3.1   2.7   2.5
1.9   1.1   1.2   1.2   1.5   1.6   1.7   2.1   2.2
 270.  *   0.8   0.5   0.3   0.1   3.2   3.6   3.9   3.9   3.8   3.5   3.2
2.9   1.0   1.2   1.4   1.5   1.6   1.8   2.1   2.2
 280.  *   1.6   1.0   0.6   0.4   3.6   4.1   4.4   4.4   4.2   4.0   3.5
3.2   0.9   1.3   1.4   1.7   1.7   1.8   2.2   2.3
 290.  *   2.0   1.5   1.1   0.7   3.9   4.3   4.5   4.5   4.1   3.7   3.4
3.3   1.1   1.4   1.6   1.8   1.8   1.9   2.3   2.4
 300.  *   2.3   1.8   1.3   1.0   4.4   4.6   4.5   3.9   3.5   3.0   2.9
3.0   1.1   1.5   1.6   1.8   1.9   2.2   2.5   2.7
 310.  *   2.2   1.8   1.4   1.1   4.5   4.5   4.1   3.5   3.0   2.8   2.7
2.9   1.4   1.9   2.1   2.2   2.4   2.7   2.8   3.1
 320.  *   2.1   1.8   1.5   1.2   4.5   4.2   3.7   3.3   3.0   2.8   2.9
2.9   1.3   1.9   2.2   2.3   2.5   2.8   3.3   3.4
 330.  *   2.0   1.6   1.4   1.2   4.0   3.7   3.6   3.1   2.7   2.7   2.7
2.7   1.4   1.9   2.1   2.5   2.8   3.1   3.3   3.5
 340.  *   2.0   1.6   1.3   1.2   3.9   3.6   3.2   3.0   2.7   2.9   2.8
2.6   1.3   1.7   2.0   2.2   2.4   2.7   3.1   3.4
 350.  *   2.3   2.2   1.8   1.7   3.3   3.1   2.9   2.6   2.5   2.6   2.5
2.4   0.6   0.9   1.4   1.8   2.0   2.3   2.8   3.0
 360.  *   3.1   3.0   2.8   2.8   2.4   2.3   2.4   2.1   2.3   2.4   2.2
2.1   0.5   0.8   0.9   1.0   1.1   1.4   1.6   1.8
 ------*-------------------------------------------------------------------
-------------------------------------------------------
 MAX   *   4.2   4.4   4.2   4.2   4.5   4.6   4.5   4.5   4.2   4.0   3.5
3.3   1.4   1.9   2.2   2.5   2.8   3.1   3.3   3.5
 DEGR. *   80    80    70    60   310   300   290   290   280   280   280
290   310   310   320   330   330   330   320   330
```

```
PAGE  6
      JOB: QBC/CLR NO BUILD 2035 PR                                  RUN: NOBLD
2035 PR

       MODEL RESULTS
       -------------

       REMARKS : In search of the angle corresponding to
                 the maximum concentration, only the first
                 angle, of the angles with same maximum
                 concentrations, is indicated as maximum.

 WIND ANGLE RANGE:  10.-360.

 WIND  * CONCENTRATION
 ANGLE *      (PPM)
 (DEGR)* REC41 REC42 REC43 REC44 REC45 REC46 REC47 REC48 REC49 REC50 REC51
REC52 REC53 REC54 REC55 REC56 REC57 REC58 REC59 REC60
 ------*-------------------------------------------------------------------
-----------------------------------------------------
  10.  *   0.9   3.3   3.4   3.3   2.8   2.4   2.1   1.7   1.0   2.2   2.9
4.6   5.1   5.2   0.9   1.0   1.3   1.3   1.1   0.9
  20.  *   0.7   3.9   3.7   3.4   3.0   2.7   2.6   2.2   1.8   2.3   2.9
4.2   4.5   4.5   0.6   0.6   0.7   0.8   0.9   0.8
  30.  *   0.6   4.1   3.9   3.8   3.3   2.8   2.7   2.3   1.5   2.4   2.8
3.9   4.1   4.2   0.4   0.5   0.7   0.7   0.8   0.8
  40.  *   0.6   3.8   3.8   3.6   3.1   2.8   2.5   2.3   2.0   2.4   2.7
3.8   3.9   4.0   0.3   0.5   0.7   0.8   0.9   0.7
  50.  *   0.4   3.6   3.3   3.0   2.7   2.5   2.3   2.1   1.8   2.2   2.5
3.4   3.3   3.1   0.3   0.3   0.4   0.6   0.7   0.6
  60.  *   0.3   3.1   2.9   2.8   2.5   2.2   2.1   1.7   1.3   1.7   2.1
2.9   2.8   2.9   0.3   0.3   0.4   0.6   0.6   0.6
  70.  *   0.2   2.9   2.6   2.4   2.3   2.1   1.9   1.5   1.2   1.8   2.0
2.8   2.4   2.5   0.2   0.2   0.3   0.5   0.6   0.6
  80.  *   0.2   2.8   2.5   2.4   2.1   2.0   1.7   1.5   1.3   1.7   2.1
2.6   2.7   3.0   0.3   0.3   0.4   0.7   0.7   0.7
  90.  *   0.2   2.7   2.7   2.5   2.5   2.2   2.0   1.8   1.5   1.9   2.3
2.9   3.1   3.4   0.4   0.5   0.5   0.8   0.9   0.9
 100.  *   0.2   2.9   2.8   2.8   2.5   2.2   2.0   1.8   1.5   2.0   2.3
2.8   3.0   3.2   0.5   0.4   0.5   0.7   0.7   0.7
 110.  *   0.3   2.8   2.8   2.7   2.3   2.0   1.8   1.8   1.5   1.9   2.1
2.8   2.9   3.0   0.3   0.3   0.3   0.5   0.5   0.5
 120.  *   0.3   3.1   2.8   2.7   2.0   1.7   1.8   1.6   1.5   1.9   2.3
2.9   3.1   3.1   0.3   0.3   0.3   0.2   0.2   0.2
 130.  *   0.3   3.2   2.9   2.6   2.1   1.8   1.8   1.6   1.6   1.8   2.2
3.1   3.2   3.2   0.3   0.3   0.2   0.2   0.2   0.2
 140.  *   0.3   3.2   2.9   2.7   2.0   2.0   2.0   1.8   1.5   1.8   2.4
3.2   3.4   3.4   0.3   0.2   0.2   0.2   0.2   0.2
 150.  *   0.3   3.3   3.0   2.6   2.3   2.2   2.0   1.8   1.5   1.9   2.6
3.5   3.7   3.7   0.3   0.2   0.2   0.2   0.2   0.2
 160.  *   0.2   3.3   3.0   2.7   2.3   2.1   1.9   1.7   1.1   1.7   2.5
3.7   3.9   3.9   0.2   0.2   0.2   0.2   0.2   0.2
```

```
 170.   *   0.7   2.9   2.6   2.3   2.0   1.9   1.5   1.0   0.7   1.1   1.9
3.8   4.1   4.1   0.4   0.5   0.5   0.5   0.3   0.2
 180.   *   1.6   1.7   1.6   1.3   1.1   1.1   0.9   0.5   0.2   0.6   1.1
2.7   3.1   3.2   1.0   1.0   1.0   1.0   0.7   0.5
 190.   *   2.5   0.6   0.5   0.4   0.3   0.3   0.2   0.2   0.1   0.1   0.3
1.3   1.8   1.9   1.5   1.7   1.9   1.6   1.0   0.6
 200.   *   2.8   0.2   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.1
0.5   0.8   0.9   2.0   2.1   2.2   2.1   1.4   1.2
 210.   *   2.7   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0
0.2   0.4   0.5   2.2   2.4   2.3   2.2   1.8   1.4
 220.   *   2.7   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0
0.2   0.3   0.3   2.3   2.4   2.4   2.1   1.8   1.3
 230.   *   2.6   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.0   0.0
0.1   0.2   0.2   2.3   2.3   2.2   1.7   1.6   1.4
 240.   *   2.5   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0
0.1   0.2   0.2   2.2   2.1   2.0   1.5   1.4   1.3
 250.   *   2.5   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.0   0.0
0.0   0.1   0.1   2.0   2.1   1.9   1.4   1.2   1.1
 260.   *   2.4   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1
0.1   0.0   0.0   2.0   2.0   1.7   1.3   1.0   1.1
 270.   *   2.5   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
0.1   0.0   0.0   2.1   2.0   1.4   1.3   1.3   1.2
 280.   *   2.5   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
0.1   0.1   0.0   1.9   1.8   1.4   1.5   1.5   1.2
 290.   *   2.6   0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.1   0.1
0.1   0.1   0.1   1.9   1.7   1.3   1.8   1.8   1.7
 300.   *   2.9   0.2   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.2   0.2
0.2   0.3   0.2   2.3   1.9   1.4   2.0   2.0   1.8
 310.   *   3.2   0.3   0.2   0.2   0.1   0.1   0.1   0.1   0.1   0.2   0.2
0.2   0.4   0.3   2.1   1.9   1.8   2.5   2.4   2.2
 320.   *   3.5   0.5   0.4   0.4   0.3   0.2   0.2   0.2   0.1   0.2   0.3
0.3   0.5   0.4   2.4   2.3   2.4   3.0   3.0   2.7
 330.   *   3.8   0.6   0.6   0.4   0.4   0.4   0.4   0.4   0.2   0.4   0.5
0.5   0.8   0.7   2.7   2.8   2.8   3.6   3.3   2.8
 340.   *   3.9   0.7   0.7   0.6   0.6   0.6   0.4   0.4   0.4   0.5   0.5
0.9   1.1   1.1   3.1   3.1   3.3   3.8   3.0   2.6
 350.   *   3.1   1.4   1.3   1.2   1.0   0.9   0.8   0.7   0.4   0.7   0.9
1.7   2.2   2.2   3.0   3.2   3.6   3.8   2.8   2.3
 360.   *   1.9   2.4   2.3   2.1   1.8   1.5   1.4   1.2   1.0   1.2   1.7
3.1   3.8   3.8   2.2   2.2   2.4   2.7   1.5   1.3
 ------*-------------------------------------------------------------------
-------------------------------------------------------
 MAX    *   3.9   4.1   3.9   3.8   3.3   2.8   2.7   2.3   2.0   2.4   2.9
4.6   5.1   5.2   3.1   3.2   3.6   3.8   3.3   2.8
 DEGR.  *  340    30    30    30    30    30    30    40    40    30    10
10    10    10   340   350   350   340   330   330

 THE HIGHEST CONCENTRATION OF    5.90 PPM OCCURRED AT RECEPTOR REC11.
```

```
PAGE  7
      JOB: QBC/CLR NO BUILD 2035 PR                                RUN: NOBLD
2035 PR

      DATE :  6/10/15
      TIME :  9:23: 8


      RECEPTOR - LINK MATRIX FOR THE ANGLE PRODUCING
      THE MAXIMUM CONCENTRATION FOR EACH RECEPTOR

          *    CO/LINK  (PPM)
          *    ANGLE (DEGREES)
          *  REC1  REC2  REC3  REC4  REC5  REC6  REC7  REC8  REC9  REC10
REC11 REC12 REC13 REC14 REC15 REC16 REC17 REC18 REC19 REC20
   LINK # *   210   200   200   190   190   190   190   190   170   170
170   170   160   160   160   150    80    70    70    80
   -------*-------------------------------------------------------------
-------------------------------------------------------
       1  *   0.6   0.7   0.9   1.0   1.0   0.8   0.7   0.5   0.5   0.5
0.6   0.5   0.7   0.5   0.4   0.4   0.2   0.1   0.2   0.4
       2  *   0.1   0.1   0.2   0.2   0.2   0.2   0.1   0.1   0.1   0.1
0.1   0.1   0.1   0.1   0.0   0.1   0.0   0.0   0.0   0.1
       3  *   0.2   0.2   0.3   0.3   0.3   0.3   0.3   0.2   0.3   0.3
0.3   0.3   0.3   0.3   0.3   0.2   0.0   0.0   0.0   0.0
       4  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       5  *   0.0   0.0   0.0   0.0   0.1   0.2   0.2   0.2   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       6  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   1.0   1.0
0.9   0.6   0.3   0.0   0.0   0.0   0.1   0.1   0.1   0.0
       7  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.1
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       8  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       9  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      10  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      11  *   0.3   0.3   0.4   0.3   0.4   0.5   0.5   0.5   0.6   0.8
1.0   1.2   1.1   1.0   0.7   0.6   0.5   0.6   0.8   1.1
      12  *   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.2   0.3
0.4   0.5   0.5   0.6   0.6   0.6   1.0   1.1   1.0   0.4
      13  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.1   0.2   0.2   0.2   0.2   0.0   0.0
      14  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.1   0.3   0.3   0.0   0.0   0.0   0.0
      15  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      16  *   0.5   0.5   0.5   0.5   0.4   0.3   0.3   0.2   0.1   0.1
0.1   0.0   0.1   0.0   0.0   0.0   0.5   0.4   0.5   0.8
      17  *   1.1   1.1   1.1   1.0   0.9   0.7   0.5   0.4   0.1   0.1
0.0   0.0   0.0   0.0   0.0   0.0   0.5   0.6   0.7   0.5
```

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      18  *   0.3   0.3   0.3   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.1   0.2   0.2
      19  *   0.3   0.3   0.2   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.2   0.2   0.3
      20  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.0   0.0   0.1
      21  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      22  *   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.4   0.6
0.8   0.9   1.1   1.2   1.2   1.3   0.1   0.2   0.1   0.0
      23  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0
      24  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      25  *   0.0   0.0   0.0   0.1   0.1   0.0   0.0   0.0   0.0   0.1
0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      26  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      27  *   0.0   0.1   0.0   0.1   0.1   0.1   0.1   0.1   0.1   0.1
0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0
      28  *   0.2   0.3   0.3   0.3   0.3   0.3   0.2   0.2   0.2   0.2
0.2   0.3   0.1   0.2   0.2   0.1   0.0   0.0   0.0   0.0
      29  *   0.2   0.2   0.2   0.2   0.2   0.2   0.2   0.2   1.0   1.0
1.0   0.8   0.6   0.4   0.3   0.2   0.2   0.2   0.3   0.4
      30  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      31  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      32  *   0.1   0.2   0.1   0.2   0.2   0.2   0.2   0.2   0.1   0.2
0.2   0.2   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0
      33  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      34  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      35  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      36  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      37  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      38  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
```

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PAGE  8
JOB: QBC/CLR NO BUILD 2035 PR                                RUN: NOBLD 2035
PR

      DATE :  6/10/15
      TIME :  9:23: 8


      RECEPTOR - LINK MATRIX FOR THE ANGLE PRODUCING
      THE MAXIMUM CONCENTRATION FOR EACH RECEPTOR

          *    CO/LINK  (PPM)
          *    ANGLE (DEGREES)
          *  REC21 REC22 REC23 REC24 REC25 REC26 REC27 REC28 REC29 REC30
REC31 REC32 REC33 REC34 REC35 REC36 REC37 REC38 REC39 REC40
   LINK # *    80    80    70    60   310   300   290   290   280   280
280   290   310   310   320   330   330   330   320   330
   -------*-------------------------------------------------------------
-------------------------------------------------------------
       1  *   0.6   0.7   0.7   0.7   1.5   1.4   1.3   1.2   1.0   0.7
0.5   0.2   0.3   0.3   0.5   0.7   0.8   0.9   0.9   1.5
       2  *   0.1   0.2   0.2   0.2   0.6   0.5   0.5   0.2   0.1   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       3  *   0.1   0.2   0.2   0.3   0.3   0.2   0.2   0.1   0.0   0.0
0.0   0.0   0.1   0.2   0.2   0.2   0.3   0.3   0.3   0.3
       4  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       5  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       6  *   0.0   0.0   0.0   0.0   0.1   0.0   0.0   0.1   0.0   0.1
0.1   0.2   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       7  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       8  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       9  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      10  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      11  *   1.2   1.3   1.3   1.4   0.7   0.7   0.7   0.7   0.6   0.5
0.4   0.2   0.1   0.1   0.2   0.3   0.4   0.4   0.3   0.5
      12  *   0.1   0.0   0.0   0.0   0.4   0.6   0.7   0.8   0.8   0.7
0.6   0.3   0.1   0.1   0.1   0.2   0.2   0.2   0.2   0.2
      13  *   0.0   0.0   0.0   0.0   0.1   0.2   0.2   0.2   0.3   0.3
0.2   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1
      14  *   0.0   0.0   0.0   0.0   0.1   0.2   0.2   0.2   0.3   0.3
0.2   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1
      15  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      16  *   0.7   0.6   0.5   0.4   0.0   0.0   0.0   0.2   0.4   0.7
0.8   1.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      17  *   0.4   0.3   0.4   0.4   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.3   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
```

```
      18  *   0.2   0.2   0.2   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      19  *   0.3   0.3   0.2   0.2   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      20  *   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      21  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      22  *   0.0   0.0   0.0   0.0   0.4   0.5   0.5   0.6   0.5   0.5
0.5   0.5   0.1   0.1   0.1   0.2   0.2   0.2   0.2   0.2
      23  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      24  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      25  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      26  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      27  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.1   0.3   0.3   0.2   0.2   0.3   0.4   0.0
      28  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.3   0.4   0.4   0.3   0.3   0.3   0.5   0.3
      29  *   0.4   0.5   0.5   0.5   0.3   0.3   0.2   0.2   0.2   0.2
0.2   0.2   0.1   0.2   0.2   0.2   0.2   0.3   0.3   0.3
      30  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      31  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      32  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      33  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      34  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      35  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      36  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      37  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      38  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
```

```
PAGE  9
      JOB: QBC/CLR NO BUILD 2035 PR                                RUN: NOBLD
2035 PR

      DATE :  6/10/15
      TIME :  9:23: 8


      RECEPTOR - LINK MATRIX FOR THE ANGLE PRODUCING
      THE MAXIMUM CONCENTRATION FOR EACH RECEPTOR

          *    CO/LINK  (PPM)
          *    ANGLE (DEGREES)
          *  REC41 REC42 REC43 REC44 REC45 REC46 REC47 REC48 REC49 REC50
REC51 REC52 REC53 REC54 REC55 REC56 REC57 REC58 REC59 REC60
   LINK # *   340    30    30    30    30    30    30    40    40    30
10    10    10    10   340   350   350   340   330   330
   -------*-------------------------------------------------------------
-------------------------------------------------------
       1  *   1.7   0.7   0.7   0.7   0.6   0.6   0.6   0.4   0.4   0.4
0.4   0.5   0.5   0.4   0.2   0.5   0.6   0.4   0.3   0.4
       2  *   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0
0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       3  *   0.3   0.3   0.3   0.3   0.2   0.2   0.2   0.2   0.2   0.2
0.2   0.2   0.3   0.3   0.5   0.4   0.4   0.4   0.3   0.2
       4  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       5  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       6  *   0.2   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.0
       7  *   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.1   0.1   0.1   0.1   0.0   0.1   0.1   0.0   0.0   0.0
       8  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       9  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      10  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      11  *   0.6   0.6   0.3   0.2   0.2   0.2   0.2   0.1   0.1   0.1
0.3   0.3   0.3   0.2   0.2   0.3   0.3   0.3   0.2   0.2
      12  *   0.2   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1
      13  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
      14  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.1   0.0   0.0   0.1   0.1   0.1
      15  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      16  *   0.1   0.2   0.2   0.2   0.2   0.1   0.1   0.1   0.1   0.1
0.1   0.1   0.1   0.1   0.0   0.0   0.1   0.0   0.0   0.0
      17  *   0.1   0.2   0.2   0.2   0.2   0.2   0.2   0.1   0.1   0.1
0.1   0.1   0.1   0.1   0.0   0.1   0.1   0.0   0.0   0.0
```

```
      18  *   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.1   0.1   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      19  *   0.0   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      20  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      21  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      22  *   0.2   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1
      23  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      24  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.3   0.0   0.0   0.0   0.0   0.0
      25  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      26  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      27  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1
0.0   0.1   0.1   0.2   0.4   0.7   0.9   1.2   0.8   0.5
      28  *   0.0   1.2   1.4   1.4   1.2   1.0   0.9   0.8   0.6   0.9
0.9   1.6   1.3   1.1   0.6   0.4   0.3   0.6   0.6   0.4
      29  *   0.3   0.6   0.5   0.5   0.4   0.4   0.4   0.3   0.2   0.3
0.4   0.5   0.5   0.4   0.3   0.3   0.3   0.3   0.3   0.2
      30  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      31  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      32  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.6   1.4   2.0   0.1   0.0   0.0   0.0   0.0   0.0
      33  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.1   0.1   0.2   0.2   0.3   0.3
      34  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      35  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.2
      36  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      37  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      38  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1
0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0
```

ATTACHMENT C
CAL3QHC MODEL RUN FOR THE PROPOSED ACTION

CO hotspot analysis was conducted for a worst-case scenario involving 2035 traffic volumes and speeds with 2015 emission factors

```
CAL3QHC: LINE SOURCE DISPERSION MODEL - VERSION 2.0 Dated 95221   PAGE  1
JOB: QBC/CLR INTERIM 2035 PR                        RUN: INTERIM 2035 PR
DATE :  6/10/15
TIME :  9:12:53

The MODE flag has been set to C for calculating CO averages.

SITE & METEOROLOGICAL VARIABLES
-------------------------------
VS =   0.0 CM/S       VD =   0.0 CM/S       Z0 = 175. CM
U =  1.0 M/S         CLAS =   4  (D)     ATIM =  60. MINUTES     MIXH =
1000. M   AMB =  0.0 PPM

LINK VARIABLES
--------------
         LINK DESCRIPTION     *         LINK COORDINATES (FT)          *
LENGTH  BRG TYPE   VPH    EF      H   W    V/C QUEUE
                              *   X1        Y1        X2        Y2     *
(FT)  (DEG)            (G/MI)  (FT) (FT)       (VEH)
      ------------------------*----------------------------------------*--
-------------------------------------------------------
       1. QBC NB APPR         * 216139.7  319323.0  216135.9  319709.5 *
387.   359. AG   1820.  25.3   0.0 56.0
       2. QBC NB Q            * 216136.1  319669.7  216137.3  319553.6 *
116.   179. AG    231. 100.0   0.0 36.0 0.59   5.9
       3. QBC NB LT Q         * 216103.4  319670.3  216166.5  317744.0 *
1927.   178. AG    199. 100.0   0.0 23.0 2.42  97.9
       4. QBC NB RT Q         * 216155.3  319669.4  216157.0  319618.6 *
51.   178. AG     19. 100.0   0.0 10.0 0.36   2.6
       5. QBC NB DPTR         * 216135.1  319738.8  216128.5  320138.8 *
400.   359. AG   1174.   3.9   0.0 56.0
       6. QBC SB APPR         * 216090.0  320138.8  216070.4  319738.6 *
401.   183. AG   2031.  17.2   0.0 44.0
       7. QBC SB Q            * 216074.0  319812.3  216214.9  322688.0 *
2879.     3. AG    149. 100.0   0.0 24.0 1.52 146.3
       8. QBC SB LT Q1        * 216100.7  319812.5  216099.8  319934.7 *
122.   360. AG    194. 100.0   0.0 21.0 0.97   6.2
       9. QBC SB LT Q2        * 216097.2  319942.4  216188.4  321668.2 *
1728.     3. AG     97. 100.0   0.0 10.0 1.94  87.8
      10. QBC SB RT Q         * 216061.6  319812.2  216062.3  319841.4 *
29.     1. AG     19. 100.0   0.0 10.0 0.20   1.5
      11. QBC SB DPTR         * 216070.4  319738.6  216069.9  319455.0 *
284.   180. AG   3313.  17.2   0.0 56.0
      12. CLR EB APPR         * 215702.0  319714.6  216101.8  319709.7 *
400.    91. AG   1955.  25.9   0.0 44.0
      13. CLR EB Q            * 216025.3  319710.6  209295.1  319793.8 *
6731.   271. AG    173. 100.0   0.0 24.0 2.72 341.9
      14. CLR EB LT Q         * 216028.2  319733.9  215636.8  319733.9 *
391.   270. AG    220. 100.0   0.0 20.0 1.79  19.9
      15. CLR EB RT Q         * 216023.0  319693.2  215944.7  319693.8 *
78.   270. AG     20. 100.0   0.0 11.0 0.55   4.0
```

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      16. CLR EB DPTR         * 216101.8  319709.7  216640.7  319716.8 *
539.    89. AG   1872.  25.3   0.0 44.0
      17. CLR WB APPR         * 216640.7  319771.0  216103.0  319767.0 *
538.   270. AG   2967.  18.0   0.0 44.0
      18. CLR WB Q            * 216176.4  319767.6  218274.3  319783.0 *
2098.    90. AG    135. 100.0   0.0 24.0 1.28 106.6
      19. CLR WB LT Q1        * 216177.7  319744.0  219309.9  319767.9 *
3132.    90. AG    182. 100.0   0.0 21.0 1.95 159.1
      20. CLR WB LT Q2        * 216466.2  319752.4  225625.1  319752.4 *
9159.    90. AG     91. 100.0   0.0 10.0 3.89 465.3
      21. CLR WB RT Q         * 216175.3  319785.0  216203.3  319785.3 *
28.    89. AG     20. 100.0   0.0 12.0 0.20   1.4
      22. CLR WB DPTR         * 216103.0  319767.0  215702.0  319766.2 *
401.   270. AG   2414.  23.8   0.0 44.0
      23. QBCS NB APPR        * 216144.5  318742.0  316144.5  319168.7 *
*****    90. AG   1739.  25.3   0.0 56.0
      24. QBCS NB Q           * 216144.5  319113.8  216144.5  318983.0 *
131.   180. AG    155. 100.0   0.0 36.0 0.54   6.6
      25. QBCS NB LT Q1       * 216116.0  319098.2  216116.0  317665.7 *
1432.   180. AG    203. 100.0   0.0 22.0 2.33  72.8
      26. QBCS NB LT Q2       * 216121.7  318959.2  215890.6  315186.0 *
3780.   184. AG    102. 100.0   0.0 11.0 4.67 192.0
      27. QBCS NB DPTR        * 216144.5  319168.7  216139.7  319323.0 *
154.   358. AG   1563.  25.3   0.0 56.0
      28. QBCS SB APPR        * 216069.9  319455.0  216072.0  319162.0 *
293.   180. AG   3312.  17.2   0.0 56.0
      29. QBCS SB Q           * 216071.6  319214.2  216058.0  321156.7 *
1943.   360. AG    195. 100.0   0.0 36.0 1.26  98.7
      30. QBCS SB RT Q1       * 215982.5  319174.2  216012.5  319220.0 *
55.    33. AG      9. 100.0   0.0 17.0 0.70   2.8
      31. QBCS SB RT Q2       * 216046.0  319272.0  216046.4  319326.7 *
55.     0. AG      9. 100.0   0.0 17.0 0.70   2.8
      32. QBCS SB DPTR        * 216072.0  319162.0  216053.9  318742.0 *
420.   182. AG   3983.  17.2   0.0 56.0
      33. 470 WB APPR         * 216630.6  319117.3  216107.3  319178.2 *
527.   277. AG   1932.   4.4   0.0 32.0
      34. 470 WB TRL Q        * 216190.4  319174.4  216191.2  319174.3 *
1.    92. AG     64. 100.0   0.0 12.0 0.00   0.0
      35. 470 WB LT Q         * 216189.8  319163.6  227238.6  317690.0 *
*****    98. AG     64. 100.0   0.0 12.0 2.67 566.2
      36. 470 WB RT Q1        * 216202.4  319222.8  216214.0  319214.8 *
14.   125. AG      9. 100.0   0.0 12.0 0.18   0.7
      37. 470 WB RT Q2        * 216265.1  319176.8  216279.1  319175.0 *
14.    97. AG      9. 100.0   0.0 12.0 0.18   0.7
      38. 470 WB DPTR         * 216107.2  319178.2  215662.9  319097.7 *
452.   260. AG   1437.   4.4   0.0 32.0
```

```
PAGE  2
      JOB: QBC/CLR INTERIM 2035 PR                                RUN:
INTERIM 2035 PR

      DATE :  6/10/15
      TIME :  9:12:53

       ADDITIONAL QUEUE LINK PARAMETERS
       --------------------------------
         LINK DESCRIPTION     *    CYCLE    RED     CLEARANCE  APPROACH
SATURATION   IDLE   SIGNAL   ARRIVAL
                              *    LENGTH   TIME    LOST TIME    VOL
FLOW RATE   EM FAC   TYPE     RATE
                              *     (SEC)   (SEC)    (SEC)      (VPH)
(VPH)    (gm/hr)
      -------------------------*-----------------------------------------
-------------------------------------
       2. QBC NB Q            *     120       82       3.0       778
1600      42.05      2        3
       3. QBC NB LT Q         *     120      106       3.0       577
1600      42.05      2        3
       4. QBC NB RT Q         *     120       20       0.0       465
1600      42.05      2        3
       7. QBC SB Q            *     120       79       3.0      1456
1600      42.05      2        3
       8. QBC SB LT Q1        *     120      103       3.0       308
1600      42.05      2        3
       9. QBC SB LT Q2        *     120      103       3.0       308
1600      42.05      2        3
      10. QBC SB RT Q         *     120       20       0.0       267
1600      42.05      2        3
      13. CLR EB Q            *     120       88       3.0      1955
1600      43.86      2        3
      14. CLR EB LT Q         *     120      112       3.0       140
1600      43.86      2        3
      15. CLR EB RT Q         *     120       20       0.0       716
1600      43.86      2        3
      18. CLR WB Q            *     120       69       3.0      1570
1600      43.86      2        3
      19. CLR WB LT Q1        *     120       93       3.0      1141
1600      43.86      2        3
      20. CLR WB LT Q2        *     120       93       3.0      1141
1600      43.86      2        3
      21. CLR WB RT Q         *     120       20       0.0       256
1600      43.86      2        3
      24. QBCS NB Q           *     120       55       3.0      1305
1600      42.05      2        3
      25. QBCS NB LT Q1       *     120      108       3.0       434
1600      42.05      2        3
      26. QBCS NB LT Q2       *     120      108       3.0       434
1600      42.05      2        3
      29. QBCS SB Q           *     120       69       3.0      2311
1600      42.05      2        3
```

```
      30. QBCS SB RT Q1       *     120       10       0.0      1001
1600      42.05      2        3
      31. QBCS SB RT Q2       *     120       10       0.0      1001
1600      42.05      2        3
      34. 470 WB TRL Q        *     120       68       3.0         2
1600      42.26      2        3
      35. 470 WB LT Q         *     120       68       3.0      1672
1600      42.26      2        3
      36. 470 WB RT Q1        *     120       10       0.0       258
1600      42.26      2        3
      37. 470 WB RT Q2        *     120       10       0.0       258
1600      42.26      2        3

       RECEPTOR LOCATIONS
       ------------------
                               *           COORDINATES (FT)          *
         RECEPTOR              *      X          Y          Z        *
     --------------------------*-------------------------------------*
      1. Rec 1                 *    216271.9   319803.6        6.0   *
      2. Rec 2                 *    216231.9   319803.2        6.0   *
      3. Rec 3                 *    216201.9   319802.8        6.0   *
      4. Rec 4                 *    216181.9   319806.8        6.0   *
      5. Rec 5                 *    216167.1   319820.2        6.0   *
      6. Rec 6                 *    216160.7   319840.2        6.0   *
      7. Rec 7                 *    216160.7   319870.2        6.0   *
      8. Rec 8                 *    216160.6   319910.2        6.0   *
      9. Rec 9                 *    216045.1   319906.2        6.0   *
     10. Rec 10                *    216044.8   319866.4        6.0   *
     11. Rec 11                *    216044.6   319836.3        6.0   *
     12. Rec 12                *    216040.9   319816.3        6.0   *
     13. Rec 13                *    216026.7   319802.2        6.0   *
     14. Rec 14                *    216006.7   319798.6        6.0   *
     15. Rec 15                *    215976.7   319798.9        6.0   *
     16. Rec 16                *    215936.7   319799.2        6.0   *
     17. Rec 17                *    215922.3   319677.1        6.0   *
     18. Rec 18                *    215962.3   319676.7        6.0   *
     19. Rec 19                *    215992.3   319676.3        6.0   *
     20. Rec 20                *    216012.3   319673.2        6.0   *
     21. Rec 21                *    216024.9   319657.6        6.0   *
```

PAGE 3
JOB: QBC/CLR INTERIM 2035 PR RUN: INTERIM 2035 PR

DATE : 6/10/15
TIME : 9:12:53

RECEPTOR LOCATIONS

RECEPTOR	COORDINATES (FT) X	Y	Z
22. Rec 22	216028.9	319637.6	6.0
23. Rec 23	216028.9	319607.6	6.0
24. Rec 24	216028.8	319567.6	6.0
25. Rec 25	216175.6	319569.8	6.0
26. Rec 26	216174.2	319609.8	6.0
27. Rec 27	216173.3	319639.7	6.0
28. Rec 28	216178.3	319659.7	6.0
29. Rec 29	216192.4	319673.9	6.0
30. Rec 30	216212.4	319678.6	6.0
31. Rec 31	216242.4	319678.8	6.0
32. Rec 32	216282.4	319679.0	6.0
33. Rec 33	216337.2	319192.8	6.0
34. Rec 34	216280.7	319195.5	6.0
35. Rec 35	216254.6	319206.4	6.0
36. Rec 36	216229.8	319224.0	6.0
37. Rec 37	216215.9	319238.3	6.0
38. Rec 38	216204.0	319254.8	6.0
39. Rec 39	216190.7	319283.9	6.0
40. Rec 40	216184.8	319311.6	6.0
41. Rec 41	216182.6	319368.1	6.0
42. Rec 42	216027.8	319368.9	6.0
43. Rec 43	216026.8	319312.3	6.0
44. Rec 44	216021.6	319270.2	6.0
45. Rec 45	216010.6	319241.2	6.0
46. Rec 46	216000.6	319223.8	6.0
47. Rec 47	215988.5	319207.9	6.0
48. Rec 48	215965.8	319187.2	6.0
49. Rec 49	215926.7	319170.8	6.0
50. Rec 50	215982.8	319122.1	6.0
51. Rec 51	216010.8	319127.1	6.0
52. Rec 52	216039.0	319129.7	6.0
53. Rec 53	216042.0	319101.5	6.0
54. Rec 54	216042.2	319073.3	6.0
55. Rec 55	216173.2	319047.8	6.0
56. Rec 56	216173.2	319087.8	6.0
57. Rec 57	216173.2	319116.2	6.0
58. Rec 58	216176.0	319144.3	6.0
59. Rec 59	216204.3	319143.4	6.0
60. Rec 60	216232.4	319139.7	6.0

```
PAGE  4
      JOB: QBC/CLR INTERIM 2035 PR                                RUN:
INTERIM 2035 PR

       MODEL RESULTS
       -------------

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

WIND ANGLE RANGE:  10.-360.

WIND  * CONCENTRATION
ANGLE *      (PPM)
(DEGR)* REC1  REC2  REC3  REC4  REC5  REC6  REC7  REC8  REC9  REC10 REC11
REC12 REC13 REC14 REC15 REC16 REC17 REC18 REC19 REC20
 ------*-------------------------------------------------------------------
-----------------------------------------------------
  10.  *   0.0   0.0   0.1   0.1   0.3   0.4   0.4   0.4   2.7   2.9   3.0
2.8   1.8   1.3   0.8   0.6   3.5   3.7   4.1   4.3
  20.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   3.0   3.2   3.3
3.1   2.2   1.5   1.2   0.8   3.8   4.0   4.3   4.4
  30.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.9   3.0   3.1
2.9   2.4   1.7   1.1   0.9   4.0   4.0   4.2   4.3
  40.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.6   2.8   2.9
2.7   2.1   1.7   1.3   0.9   3.9   4.3   4.3   4.2
  50.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.5   2.6   2.7
2.5   2.1   1.6   1.2   0.9   4.2   4.3   3.9   4.1
  60.  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   2.2   2.4   2.5
2.3   1.8   1.6   1.3   0.8   4.2   4.4   4.5   4.7
  70.  *   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   2.1   2.4   2.4
2.3   1.9   1.8   1.2   1.0   4.5   4.5   4.9   5.0
  80.  *   0.9   0.9   0.9   0.7   0.5   0.3   0.1   0.0   2.2   2.6   2.8
2.7   2.5   2.4   2.1   1.8   4.4   4.5   4.8   5.2
  90.  *   2.1   2.2   2.2   2.1   1.6   1.1   0.7   0.5   2.8   3.2   3.7
3.9   4.1   4.0   3.6   3.4   3.7   3.9   4.1   4.4
 100.  *   3.3   3.4   3.5   3.2   2.6   2.0   1.4   1.1   3.5   3.9   4.4
4.7   4.8   4.8   4.6   4.4   2.5   2.6   3.1   3.5
 110.  *   3.8   3.8   3.7   3.5   2.8   2.5   1.9   1.4   3.7   4.1   4.6
4.6   5.0   4.9   4.7   4.6   1.8   2.3   2.5   2.9
 120.  *   3.7   3.7   3.7   3.5   2.8   2.3   1.8   1.5   3.8   4.2   4.2
4.5   4.8   4.7   4.8   4.6   1.8   2.1   2.5   2.9
 130.  *   3.2   3.2   3.3   3.1   2.7   2.1   1.8   1.5   3.9   4.2   4.1
4.3   4.7   4.8   4.8   4.7   1.7   2.1   2.4   3.0
 140.  *   3.0   3.0   3.0   2.9   2.5   2.1   1.8   1.4   4.2   4.2   4.3
4.7   5.0   5.0   4.9   4.8   1.7   2.0   2.6   2.9
 150.  *   2.9   2.9   2.9   2.8   2.3   2.0   1.6   1.3   4.5   4.7   5.0
5.3   5.5   5.3   4.9   4.9   1.6   2.1   2.6   3.2
 160.  *   2.8   2.8   2.8   2.7   2.4   1.9   1.6   1.4   5.0   5.4   5.8
6.1   6.0   5.4   5.3   4.6   1.5   2.0   2.5   3.2
```

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 170.  *   2.8   3.0   3.0   3.0   3.0   2.9   2.6   2.2   5.5   5.8   6.2
6.4   5.8   5.4   4.8   4.3   1.2   1.6   2.2   2.7
 180.  *   3.3   3.7   4.2   4.5   4.3   3.9   3.5   3.2   4.5   4.9   5.3
5.5   4.8   4.6   3.9   3.5   0.6   0.8   1.1   1.7
 190.  *   3.9   4.4   4.9   4.8   4.7   4.2   3.9   3.6   2.7   3.1   3.5
3.6   3.4   3.4   3.1   3.0   0.0   0.1   0.2   0.5
 200.  *   4.4   4.8   5.0   4.7   4.2   4.0   3.5   3.2   1.6   1.9   2.3
2.6   2.8   2.9   2.9   2.8   0.0   0.0   0.0   0.0
 210.  *   4.5   4.8   4.5   4.2   3.7   3.5   3.1   3.0   1.6   1.7   2.0
2.5   2.9   3.0   3.0   3.0   0.0   0.0   0.0   0.0
 220.  *   4.5   4.4   4.0   3.9   3.5   3.3   2.8   2.8   1.4   1.8   2.2
2.6   3.0   3.1   3.1   3.1   0.0   0.0   0.0   0.0
 230.  *   4.3   4.0   4.0   3.9   3.6   3.2   3.0   3.2   1.4   1.8   2.4
2.7   3.2   3.5   3.4   3.3   0.0   0.0   0.0   0.0
 240.  *   4.5   4.0   4.1   3.8   3.6   3.3   3.0   3.0   1.2   1.7   2.3
2.8   3.5   3.7   3.6   3.5   0.0   0.0   0.0   0.0
 250.  *   4.3   4.3   4.1   4.0   3.5   3.2   3.0   2.5   0.8   1.4   1.9
2.7   3.4   3.7   3.5   3.3   0.1   0.1   0.1   0.1
 260.  *   3.7   3.8   3.9   3.5   3.3   2.8   2.5   2.1   0.3   0.8   1.3
2.0   2.7   3.0   2.7   2.6   0.5   0.5   0.6   0.5
 270.  *   2.6   2.7   2.7   2.5   2.4   2.2   1.8   1.7   0.1   0.3   0.6
1.0   1.6   1.8   1.7   1.6   1.4   1.5   1.6   1.5
 280.  *   1.5   1.7   1.6   1.6   1.5   1.6   1.5   1.4   0.0   0.1   0.2
0.3   0.5   0.7   0.6   0.5   2.4   2.7   2.8   2.7
 290.  *   1.0   1.0   1.1   1.2   1.4   1.4   1.5   1.4   0.0   0.0   0.0
0.0   0.1   0.2   0.2   0.1   3.2   3.4   3.6   3.3
 300.  *   0.8   1.0   1.0   1.2   1.4   1.4   1.5   1.4   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   3.4   3.6   3.6   3.5
 310.  *   0.8   0.9   1.1   1.3   1.4   1.6   1.5   1.4   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   3.4   3.5   3.6   3.3
 320.  *   0.8   0.9   1.0   1.3   1.5   1.5   1.5   1.4   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   3.2   3.2   3.3   3.1
 330.  *   0.6   0.9   1.2   1.3   1.6   1.6   1.5   1.4   0.1   0.1   0.1
0.0   0.0   0.0   0.0   0.0   3.0   3.0   3.0   3.0
 340.  *   0.5   0.8   1.0   1.2   1.4   1.6   1.5   1.5   0.3   0.3   0.3
0.2   0.0   0.0   0.0   0.0   2.9   2.8   2.8   2.8
 350.  *   0.3   0.6   0.7   0.9   1.2   1.2   1.3   1.2   0.8   0.8   0.9
0.7   0.4   0.2   0.1   0.0   2.9   3.0   3.0   3.1
 360.  *   0.2   0.3   0.4   0.6   0.7   0.8   0.8   0.7   1.8   2.0   2.1
1.8   1.2   0.8   0.4   0.2   3.2   3.4   3.8   3.7
 ------*-------------------------------------------------------------------
-------------------------------------------------------
 MAX   *   4.5   4.8   5.0   4.8   4.7   4.2   3.9   3.6   5.5   5.8   6.2
6.4   6.0   5.4   5.3   4.9   4.5   4.5   4.9   5.2
 DEGR. *  210   200   200   190   190   190   190   190   170   170   170
170   160   160   160   150    70    70    70    80
```

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PAGE  5
JOB: QBC/CLR INTERIM 2035 PR                    RUN: INTERIM 2035 PR
MODEL RESULTS
       -------------

REMARKS : In search of the angle corresponding to
the maximum concentration, only the first
angle, of the angles with same maximum
concentrations, is indicated as maximum.

 WIND ANGLE RANGE:  10.-360.

 WIND  * CONCENTRATION
 ANGLE *      (PPM)
 (DEGR)* REC21 REC22 REC23 REC24 REC25 REC26 REC27 REC28 REC29 REC30 REC31
REC32 REC33 REC34 REC35 REC36 REC37 REC38 REC39 REC40
 ------*-------------------------------------------------------------------
-------------------------------------------------------
  10.  *   4.2   4.4   4.0   3.9   1.5   1.7   1.8   2.1   2.4   2.7   2.6
2.6   0.5   0.5   0.5   0.6   0.6   0.6   0.7   1.0
  20.  *   4.5   4.4   4.2   4.1   1.3   1.7   1.8   2.0   2.4   2.6   2.6
2.6   0.5   0.5   0.6   0.6   0.6   0.6   0.7   0.9
  30.  *   4.5   4.2   3.9   3.9   1.2   1.6   1.8   2.2   2.6   2.7   2.7
2.7   0.4   0.4   0.6   0.6   0.6   0.6   0.6   0.8
  40.  *   4.3   3.9   4.2   4.2   1.4   1.6   1.9   2.3   2.7   2.9   2.9
2.9   0.2   0.4   0.4   0.4   0.4   0.5   0.6   0.6
  50.  *   4.4   4.3   4.2   4.4   1.4   1.6   2.1   2.5   2.9   3.0   3.0
3.0   0.2   0.2   0.2   0.2   0.3   0.4   0.4   0.4
  60.  *   4.5   4.6   4.6   4.5   1.3   1.7   2.1   2.6   3.0   3.2   3.2
3.2   0.2   0.2   0.2   0.2   0.2   0.2   0.2   0.2
  70.  *   4.8   4.9   4.5   4.3   1.0   1.6   2.2   2.6   3.3   3.5   3.4
3.3   0.1   0.1   0.1   0.1   0.2   0.2   0.2   0.2
  80.  *   4.7   4.7   4.4   4.2   0.7   1.0   1.6   2.0   2.7   2.9   2.9
2.7   0.1   0.2   0.2   0.2   0.2   0.1   0.1   0.2
  90.  *   4.3   4.5   4.1   3.8   0.6   0.7   1.0   1.4   1.8   2.0   2.0
1.9   0.5   0.5   0.5   0.4   0.3   0.3   0.2   0.2
 100.  *   3.3   3.7   3.5   3.3   0.2   0.2   0.4   0.5   0.7   0.8   0.8
0.7   0.6   0.7   0.5   0.5   0.5   0.5   0.4   0.4
 110.  *   3.2   3.4   3.3   3.2   0.2   0.2   0.2   0.2   0.3   0.3   0.3
0.3   0.6   0.7   0.6   0.6   0.5   0.5   0.5   0.4
 120.  *   3.3   3.4   3.3   3.2   0.2   0.2   0.2   0.2   0.2   0.2   0.2
0.2   0.6   0.7   0.6   0.6   0.6   0.5   0.4   0.4
 130.  *   3.4   3.4   3.4   3.3   0.2   0.2   0.2   0.2   0.2   0.2   0.2
0.2   0.6   0.6   0.6   0.5   0.5   0.4   0.4   0.4
 140.  *   3.4   3.6   3.5   3.7   0.2   0.2   0.2   0.1   0.1   0.1   0.1
0.1   0.5   0.5   0.5   0.5   0.5   0.4   0.4   0.4
 150.  *   3.5   3.8   3.7   3.9   0.2   0.2   0.2   0.1   0.1   0.1   0.1
0.1   0.5   0.5   0.5   0.5   0.4   0.4   0.4   0.3
 160.  *   3.9   4.2   4.1   4.0   0.2   0.2   0.3   0.2   0.1   0.1   0.1
0.1   0.5   0.5   0.5   0.5   0.4   0.4   0.3   0.3
 170.  *   3.3   3.6   3.7   3.7   0.9   0.9   1.0   0.8   0.7   0.3   0.1
0.1   0.5   0.5   0.5   0.6   0.6   0.6   0.5   0.6
```

```
 180.  *   2.3   2.4   2.4   2.3   2.2   2.3   2.5   2.1   1.4   1.2   0.9
0.4   0.7   0.8   0.8   1.0   1.0   1.0   1.3   1.4
 190.  *   0.8   1.0   1.0   0.9   3.1   3.5   3.6   3.2   2.5   1.9   1.3
1.0   0.8   1.1   1.0   1.4   1.3   1.5   2.0   2.4
 200.  *   0.1   0.2   0.2   0.2   3.5   3.7   3.9   3.7   2.9   2.4   1.9
1.4   1.0   1.1   1.4   1.6   1.6   1.8   2.5   2.8
 210.  *   0.0   0.0   0.0   0.0   3.3   3.7   4.0   3.7   3.1   2.6   2.0
1.6   1.2   1.4   1.5   1.6   1.7   2.0   2.5   2.6
 220.  *   0.0   0.0   0.0   0.0   3.1   3.6   3.7   3.6   3.0   2.4   2.0
1.6   1.3   1.4   1.5   1.5   1.7   2.0   2.3   2.6
 230.  *   0.0   0.0   0.0   0.0   3.0   3.4   3.6   3.2   2.8   2.4   1.9
1.7   1.1   1.4   1.4   1.6   1.6   2.2   2.3   2.5
 240.  *   0.0   0.0   0.0   0.0   3.0   3.3   3.3   3.0   2.6   2.3   2.0
1.7   1.1   1.3   1.3   1.6   1.8   2.0   2.3   2.5
 250.  *   0.0   0.0   0.0   0.0   2.8   3.1   3.1   3.0   2.6   2.5   2.1
1.7   1.3   1.3   1.5   1.5   1.7   1.9   2.2   2.2
 260.  *   0.2   0.2   0.1   0.0   2.9   3.2   3.4   3.2   3.4   3.0   2.8
2.4   1.2   1.3   1.4   1.8   1.8   1.9   2.2   2.3
 270.  *   1.1   0.6   0.3   0.2   3.4   3.7   4.1   4.0   4.0   3.9   3.6
3.4   1.1   1.5   1.6   1.6   1.7   1.9   2.3   2.4
 280.  *   1.9   1.3   0.8   0.3   3.6   4.2   4.5   4.7   4.7   4.9   4.4
3.9   1.1   1.4   1.4   1.8   1.9   2.0   2.4   2.5
 290.  *   2.5   1.8   1.2   0.7   4.2   4.6   5.0   5.0   4.8   4.5   4.1
4.1   1.1   1.4   1.6   1.8   1.9   2.1   2.4   2.5
 300.  *   2.8   2.2   1.6   1.2   4.8   5.0   5.0   4.6   4.2   3.9   3.7
3.6   1.3   1.5   1.7   1.8   2.0   2.1   2.4   2.7
 310.  *   2.6   2.3   1.8   1.4   4.7   4.8   4.5   4.1   3.5   3.3   3.5
3.7   1.5   1.8   1.9   2.2   2.4   2.5   2.8   3.2
 320.  *   2.6   2.2   1.7   1.5   4.6   4.5   4.0   3.8   3.6   3.4   3.5
3.4   1.8   2.1   2.3   2.6   2.7   3.0   3.3   3.4
 330.  *   2.5   2.0   1.7   1.5   4.2   4.3   3.9   3.7   3.4   3.4   3.3
3.4   1.8   2.1   2.3   2.6   2.7   3.0   3.3   3.7
 340.  *   2.4   1.9   1.8   1.5   3.9   3.6   3.7   3.3   3.3   3.5   3.2
3.1   1.4   1.8   2.1   2.6   2.7   3.0   3.4   3.7
 350.  *   2.8   2.6   2.3   2.0   3.5   3.3   3.3   3.1   3.3   3.2   3.2
3.0   0.8   1.3   1.8   1.7   2.0   2.4   2.8   3.0
 360.  *   3.7   3.4   3.2   3.0   2.4   2.6   2.7   2.7   2.9   3.0   2.9
2.8   0.6   0.8   0.9   1.0   1.1   1.4   1.8   2.1
 -------*-------------------------------------------------------------------
-------------------------------------------------------
 MAX   *   4.8   4.9   4.6   4.5   4.8   5.0   5.0   5.0   4.8   4.9   4.4
4.1   1.8   2.1   2.3   2.6   2.7   3.0   3.4   3.7
 DEGR. *   70    70    60    60   300   300   300   290   290   280   280
290   320   320   320   320   320   320   340   330
```

```
PAGE  6
      JOB: QBC/CLR INTERIM 2035 PR                                RUN:
INTERIM 2035 PR

       MODEL RESULTS
       -------------

       REMARKS : In search of the angle corresponding to
                 the maximum concentration, only the first
                 angle, of the angles with same maximum
                 concentrations, is indicated as maximum.

 WIND ANGLE RANGE:  10.-360.

 WIND  * CONCENTRATION
 ANGLE *      (PPM)
 (DEGR)* REC41 REC42 REC43 REC44 REC45 REC46 REC47 REC48 REC49 REC50 REC51
REC52 REC53 REC54 REC55 REC56 REC57 REC58 REC59 REC60
 ------*-------------------------------------------------------------------
-------------------------------------------------------
  10.  *   1.2   3.8   3.6   3.4   2.8   2.4   2.1   1.8   1.5   2.3   3.1
4.8   5.3   5.5   1.2   1.3   1.5   1.5   1.1   1.1
  20.  *   0.9   4.3   4.2   4.0   3.4   3.2   2.9   2.4   1.9   2.9   3.3
4.7   5.0   5.0   0.8   0.8   0.9   0.9   1.0   0.9
  30.  *   0.8   4.5   4.3   3.8   3.2   3.0   2.8   2.5   1.9   2.8   3.4
4.3   4.5   4.6   0.5   0.5   0.7   0.8   0.9   0.8
  40.  *   0.7   4.3   4.0   3.7   3.2   3.1   2.9   2.6   2.1   2.6   2.9
3.9   4.1   4.0   0.5   0.5   0.6   0.8   0.9   0.9
  50.  *   0.5   3.8   3.7   3.3   3.0   2.7   2.4   2.2   1.9   2.4   2.7
3.7   3.6   3.3   0.3   0.4   0.5   0.6   0.7   0.7
  60.  *   0.4   3.4   3.2   3.0   2.7   2.4   2.3   1.9   1.7   2.0   2.4
3.3   3.0   3.0   0.3   0.3   0.5   0.7   0.7   0.7
  70.  *   0.3   2.9   2.8   2.6   2.5   2.3   2.1   1.6   1.3   1.8   2.3
2.9   2.7   2.7   0.3   0.3   0.4   0.6   0.7   0.7
  80.  *   0.2   2.8   2.8   2.5   2.4   2.3   2.1   1.9   1.6   1.8   2.1
2.8   2.8   3.0   0.3   0.3   0.4   0.7   0.7   0.7
  90.  *   0.2   2.9   2.8   2.7   2.7   2.4   2.1   2.0   1.7   2.0   2.3
3.0   3.2   3.5   0.5   0.5   0.5   0.8   1.0   0.9
 100.  *   0.4   3.0   3.0   2.9   2.7   2.3   2.2   2.1   1.7   2.1   2.4
3.0   3.3   3.4   0.6   0.5   0.6   0.8   0.8   0.8
 110.  *   0.3   3.0   3.0   2.9   2.6   2.4   2.0   2.1   1.6   1.9   2.2
2.7   3.1   3.2   0.4   0.4   0.4   0.5   0.5   0.5
 120.  *   0.3   3.3   3.1   2.8   2.2   2.0   2.0   1.8   1.7   2.0   2.4
3.0   3.2   3.2   0.4   0.3   0.3   0.3   0.3   0.3
 130.  *   0.3   3.3   3.2   2.7   2.3   2.0   1.9   1.9   1.7   2.0   2.4
3.2   3.4   3.3   0.3   0.3   0.3   0.3   0.3   0.3
 140.  *   0.3   3.3   3.0   2.8   2.4   2.0   2.0   2.0   1.7   2.0   2.6
3.4   3.6   3.6   0.3   0.3   0.3   0.3   0.3   0.3
 150.  *   0.3   3.6   3.2   2.9   2.6   2.4   2.1   2.0   1.6   2.0   2.6
3.6   3.9   3.8   0.3   0.3   0.3   0.3   0.3   0.3
 160.  *   0.3   3.4   3.1   3.1   2.7   2.4   2.2   1.8   1.4   1.8   2.5
4.1   4.3   4.4   0.3   0.3   0.3   0.3   0.3   0.3
```

```
 170.  *   0.8   3.1   3.0   2.7   2.3   2.0   1.7   1.4   0.9   1.3   2.1
4.0   4.3   4.5   0.6   0.6   0.6   0.5   0.4   0.3
 180.  *   1.6   2.0   1.9   1.8   1.4   1.1   0.9   0.8   0.5   0.7   1.2
3.0   3.5   3.6   1.2   1.3   1.3   1.2   0.8   0.6
 190.  *   2.6   0.9   0.7   0.6   0.4   0.3   0.2   0.3   0.2   0.1   0.3
1.6   2.1   2.2   1.7   1.9   2.0   1.9   1.1   0.8
 200.  *   2.6   0.3   0.2   0.2   0.2   0.1   0.1   0.2   0.2   0.0   0.1
0.6   0.8   1.0   2.0   2.1   2.3   2.1   1.5   1.3
 210.  *   2.9   0.1   0.1   0.1   0.1   0.1   0.1   0.2   0.2   0.0   0.0
0.2   0.4   0.5   2.2   2.4   2.4   2.3   1.8   1.4
 220.  *   2.8   0.1   0.1   0.1   0.1   0.1   0.1   0.2   0.2   0.0   0.0
0.2   0.3   0.3   2.4   2.4   2.4   2.1   1.8   1.4
 230.  *   2.8   0.0   0.1   0.1   0.1   0.1   0.2   0.2   0.3   0.0   0.0
0.1   0.2   0.3   2.3   2.3   2.2   1.9   1.6   1.4
 240.  *   2.5   0.0   0.0   0.1   0.1   0.1   0.1   0.2   0.3   0.0   0.0
0.1   0.2   0.2   2.1   2.2   2.0   1.5   1.5   1.4
 250.  *   2.5   0.0   0.0   0.0   0.1   0.1   0.1   0.2   0.2   0.0   0.0
0.0   0.1   0.1   2.0   2.0   1.8   1.3   1.2   1.1
 260.  *   2.5   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.2   0.1   0.1
0.1   0.0   0.0   2.1   2.0   1.7   1.4   1.2   1.3
 270.  *   2.6   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.1   0.2   0.2
0.2   0.1   0.0   2.1   2.0   1.6   1.3   1.4   1.2
 280.  *   2.5   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.3   0.3
0.3   0.2   0.2   2.3   2.1   1.6   1.6   1.6   1.4
 290.  *   2.5   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.3   0.3
0.3   0.2   0.3   2.3   2.0   1.4   1.7   2.1   1.9
 300.  *   2.8   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.3   0.3
0.3   0.3   0.4   2.3   1.9   1.6   2.1   2.1   1.9
 310.  *   3.4   0.3   0.2   0.1   0.1   0.1   0.1   0.1   0.1   0.3   0.3
0.3   0.4   0.4   2.4   2.1   1.9   2.6   2.4   2.2
 320.  *   3.7   0.6   0.4   0.3   0.3   0.2   0.1   0.1   0.1   0.3   0.3
0.3   0.4   0.5   2.6   2.3   2.4   3.0   3.0   2.7
 330.  *   4.0   0.8   0.6   0.6   0.5   0.4   0.4   0.3   0.2   0.5   0.5
0.5   0.7   0.7   2.8   2.8   3.1   3.8   3.5   3.0
 340.  *   3.8   0.9   0.9   0.6   0.6   0.6   0.6   0.6   0.4   0.6   0.8
1.2   1.4   1.5   3.2   3.4   3.7   4.0   3.3   2.8
 350.  *   3.1   1.6   1.6   1.3   1.1   0.9   0.8   0.8   0.6   1.0   1.1
2.2   2.5   2.6   3.3   3.3   3.6   3.6   2.8   2.2
 360.  *   2.0   2.9   2.5   2.3   1.8   1.5   1.5   1.2   1.0   1.5   2.1
3.6   4.1   4.3   2.4   2.3   2.6   2.8   1.9   1.6
 ------*-------------------------------------------------------------------
-------------------------------------------------------
 MAX   *   4.0   4.5   4.3   4.0   3.4   3.2   2.9   2.6   2.1   2.9   3.4
4.8   5.3   5.5   3.3   3.4   3.7   4.0   3.5   3.0
 DEGR. *  330    30    30    20    20    20    20    40    40    20    30
10    10    10   350   340   340   340   330   330

 THE HIGHEST CONCENTRATION OF    6.40 PPM OCCURRED AT RECEPTOR REC12.
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PAGE  7
      JOB: QBC/CLR INTERIM 2035 PR                                RUN:
INTERIM 2035 PR

      DATE :  6/10/15
      TIME :  9:12:53


      RECEPTOR - LINK MATRIX FOR THE ANGLE PRODUCING
      THE MAXIMUM CONCENTRATION FOR EACH RECEPTOR

          *    CO/LINK  (PPM)
          *    ANGLE (DEGREES)
          *  REC1  REC2  REC3  REC4  REC5  REC6  REC7  REC8  REC9  REC10
REC11 REC12 REC13 REC14 REC15 REC16 REC17 REC18 REC19 REC20
   LINK # *   210   200   200   190   190   190   190   190   170   170
170   170   160   160   160   150    70    70    70    80
   -------*-------------------------------------------------------------
-------------------------------------------------------
       1  *   0.6   0.7   0.8   0.9   0.9   0.8   0.6   0.5   0.5   0.5
0.5   0.5   0.6   0.5   0.4   0.4   0.1   0.1   0.2   0.4
       2  *   0.1   0.1   0.2   0.2   0.2   0.1   0.1   0.1   0.1   0.1
0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.1
       3  *   0.2   0.2   0.3   0.3   0.3   0.3   0.3   0.3   0.3   0.3
0.3   0.4   0.3   0.3   0.3   0.2   0.0   0.0   0.0   0.1
       4  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       5  *   0.0   0.0   0.0   0.0   0.1   0.1   0.2   0.2   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       6  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   1.0   0.9
0.8   0.5   0.3   0.0   0.0   0.0   0.2   0.1   0.1   0.0
       7  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.2   0.1
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       8  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       9  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      10  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      11  *   0.3   0.3   0.5   0.3   0.5   0.5   0.5   0.5   0.7   0.9
1.1   1.3   1.3   1.1   0.8   0.7   0.4   0.6   0.9   1.2
      12  *   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.3   0.4
0.5   0.6   0.7   0.8   0.8   0.8   1.6   1.5   1.3   0.6
      13  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.1   0.2   0.2   0.3   0.2   0.0   0.0
      14  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.1   0.3   0.3   0.1   0.0   0.0   0.0
      15  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      16  *   0.7   0.7   0.7   0.7   0.6   0.5   0.4   0.3   0.1   0.1
0.1   0.1   0.1   0.0   0.0   0.0   0.4   0.5   0.7   1.1
      17  *   1.5   1.4   1.4   1.3   1.1   0.9   0.7   0.5   0.1   0.1
0.0   0.0   0.0   0.0   0.0   0.0   0.6   0.8   0.9   0.7
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      18  *   0.3   0.3   0.2   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.2   0.2
      19  *   0.3   0.3   0.2   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.2   0.2   0.3
      20  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1
      21  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      22  *   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.5   0.7
1.0   1.2   1.5   1.5   1.6   1.7   0.4   0.2   0.1   0.0
      23  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0
      24  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      25  *   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1   0.1   0.1
0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      26  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      27  *   0.0   0.1   0.0   0.1   0.1   0.1   0.1   0.1   0.1   0.1
0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0
      28  *   0.2   0.3   0.3   0.3   0.3   0.3   0.3   0.2   0.2   0.2
0.3   0.3   0.2   0.2   0.3   0.2   0.0   0.0   0.0   0.0
      29  *   0.2   0.2   0.2   0.2   0.2   0.2   0.2   0.3   1.1   1.0
1.0   0.9   0.6   0.4   0.3   0.2   0.2   0.2   0.3   0.4
      30  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      31  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      32  *   0.1   0.2   0.2   0.2   0.2   0.2   0.2   0.2   0.1   0.2
0.2   0.2   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0
      33  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      34  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      35  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      36  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      37  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      38  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
```

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PAGE  8
      JOB: QBC/CLR INTERIM 2035 PR                                RUN:
INTERIM 2035 PR

      DATE :  6/10/15
      TIME :  9:12:53


      RECEPTOR - LINK MATRIX FOR THE ANGLE PRODUCING
      THE MAXIMUM CONCENTRATION FOR EACH RECEPTOR

          *    CO/LINK  (PPM)
          *    ANGLE (DEGREES)
          *  REC21 REC22 REC23 REC24 REC25 REC26 REC27 REC28 REC29 REC30
REC31 REC32 REC33 REC34 REC35 REC36 REC37 REC38 REC39 REC40
   LINK # *    70    70    60    60   300   300   300   290   290   280
280   290   320   320   320   320   320   320   340   330
   -------*-------------------------------------------------------------
-------------------------------------------------------
       1  *   0.4   0.6   0.6   0.6   1.3   1.3   1.3   1.1   0.8   0.7
0.4   0.2   0.4   0.4   0.4   0.5   0.5   0.6   1.3   1.4
       2  *   0.0   0.1   0.2   0.2   0.6   0.6   0.4   0.2   0.0   0.1
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.0
       3  *   0.1   0.2   0.2   0.3   0.3   0.2   0.1   0.1   0.0   0.0
0.0   0.0   0.1   0.2   0.2   0.2   0.3   0.3   0.3   0.3
       4  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       5  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       6  *   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1
0.1   0.2   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.0
       7  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       8  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       9  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      10  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      11  *   1.4   1.4   1.5   1.5   0.8   0.8   0.7   0.7   0.5   0.6
0.4   0.2   0.3   0.2   0.2   0.2   0.2   0.2   0.5   0.6
      12  *   0.3   0.1   0.0   0.0   0.6   0.8   0.9   1.1   0.9   1.0
0.8   0.4   0.2   0.2   0.2   0.2   0.2   0.2   0.2   0.3
      13  *   0.0   0.0   0.0   0.0   0.2   0.2   0.1   0.2   0.2   0.3
0.3   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.1
      14  *   0.0   0.0   0.0   0.0   0.2   0.2   0.2   0.2   0.2   0.2
0.2   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.1
      15  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      16  *   1.0   1.0   0.7   0.6   0.0   0.0   0.2   0.3   1.0   1.0
1.2   1.6   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.0
      17  *   0.8   0.6   0.6   0.5   0.0   0.0   0.0   0.0   0.0   0.0
0.1   0.4   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.0
```

```
      18  *   0.2   0.2   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      19  *   0.2   0.2   0.2   0.2   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      20  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      21  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      22  *   0.0   0.0   0.0   0.0   0.5   0.6   0.7   0.8   0.9   0.7
0.7   0.6   0.2   0.2   0.2   0.2   0.2   0.2   0.2   0.3
      23  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      24  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      25  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      26  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      27  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.2   0.3   0.4   0.4   0.5   0.1   0.0
      28  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.2   0.3   0.4   0.5   0.5   0.6   0.1   0.3
      29  *   0.4   0.5   0.5   0.5   0.3   0.3   0.3   0.2   0.2   0.2
0.2   0.2   0.2   0.2   0.2   0.2   0.2   0.2   0.3   0.3
      30  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      31  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      32  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      33  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      34  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      35  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      36  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      37  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      38  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
```

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PAGE  9
      JOB: QBC/CLR INTERIM 2035 PR                                RUN:
INTERIM 2035 PR

      DATE :  6/10/15
      TIME :  9:12:53


      RECEPTOR - LINK MATRIX FOR THE ANGLE PRODUCING
      THE MAXIMUM CONCENTRATION FOR EACH RECEPTOR

          *    CO/LINK  (PPM)
          *    ANGLE (DEGREES)
          *  REC41 REC42 REC43 REC44 REC45 REC46 REC47 REC48 REC49 REC50
REC51 REC52 REC53 REC54 REC55 REC56 REC57 REC58 REC59 REC60
   LINK # *   330    30    30    20    20    20    20    40    40    20
30    10    10    10   350   340   340   340   330   330
   -------*-------------------------------------------------------------
-------------------------------------------------------
       1  *   1.5   0.7   0.7   0.6   0.5   0.5   0.4   0.4   0.4   0.4
0.4   0.4   0.4   0.4   0.4   0.3   0.3   0.4   0.3   0.3
       2  *   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       3  *   0.3   0.3   0.3   0.2   0.2   0.2   0.2   0.2   0.2   0.2
0.3   0.2   0.3   0.3   0.4   0.5   0.4   0.4   0.3   0.2
       4  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       5  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       6  *   0.1   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.1
0.0   0.1   0.1   0.1   0.1   0.1   0.1   0.1   0.0   0.0
       7  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0
       8  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
       9  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      10  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      11  *   0.8   0.7   0.3   0.5   0.4   0.4   0.4   0.1   0.1   0.3
0.1   0.3   0.3   0.3   0.3   0.2   0.3   0.3   0.2   0.2
      12  *   0.3   0.0   0.0   0.1   0.1   0.1   0.1   0.0   0.0   0.0
0.0   0.1   0.1   0.1   0.1   0.2   0.2   0.2   0.2   0.2
      13  *   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1
      14  *   0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.1   0.1   0.1
      15  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      16  *   0.0   0.3   0.3   0.2   0.2   0.2   0.2   0.2   0.2   0.2
0.2   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0
      17  *   0.0   0.3   0.3   0.2   0.2   0.2   0.2   0.2   0.2   0.2
0.2   0.1   0.1   0.1   0.1   0.0   0.0   0.0   0.0   0.0
```

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      18  *   0.0   0.1   0.1   0.0   0.0   0.0   0.0   0.1   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      19  *   0.0   0.1   0.1   0.0   0.0   0.0   0.0   0.1   0.1   0.0
0.1   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      20  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      21  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      22  *   0.3   0.0   0.0   0.0   0.0   0.1   0.1   0.0   0.0   0.0
0.0   0.1   0.1   0.1   0.1   0.2   0.2   0.2   0.2   0.2
      23  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      24  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.2   0.1   0.0   0.0   0.0   0.0
      25  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      26  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      27  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.1   0.0
0.2   0.1   0.1   0.2   0.5   0.6   0.9   1.2   0.8   0.5
      28  *   0.1   1.3   1.6   1.4   1.1   0.9   0.7   0.9   0.6   0.9
1.3   1.8   1.5   1.2   0.5   0.7   0.7   0.6   0.6   0.5
      29  *   0.3   0.6   0.5   0.6   0.5   0.4   0.4   0.3   0.2   0.4
0.3   0.6   0.5   0.4   0.3   0.3   0.3   0.3   0.3   0.2
      30  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      31  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      32  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.1   0.6   1.5   2.0   0.0   0.0   0.0   0.0   0.0   0.0
      33  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.1   0.1   0.2   0.2   0.3   0.3
      34  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      35  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.1   0.2
      36  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      37  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0
      38  *   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.0   0.2
0.2   0.2   0.1   0.1   0.0   0.0   0.0   0.0   0.0   0.0
```