MINUTES OF THE
MARICOPA ASSOCIATION OF GOVERNMENTS
AIR QUALITY TECHNICAL ADVISORY COMMITTEE MEETING

Thursday, August 22, 2013
MAG Office
Phoenix, Arizona

MEMBERS ATTENDING

Philip McNeely, Phoenix, Chairman
William Mattingly, Peoria, Vice Chair
Daniel Culotta, Avondale
John Minear, Buckeye
Jim Weiss, Chandler
* Jamie McCullough, El Mirage
Jessica Koberna, Gilbert
Doug Kukino, Glendale
* Cato Esquivel, Goodyear
# Kazi Haque, Maricopa
* Scott Bouchie, Mesa
Sam Brown for Tim Conner, Scottsdale
Antonio DeLaCruz, Surprise
Oddvar Tveit, Tempe
* Youngtown
Ramona Simpson, Queen Creek
* American Lung Association of Arizona
Barbara Cenalmov for Kristin Watt, Salt River Project
* Rebecca Hudson, Southwest Gas Corporation
* Ann Carlton, Arizona Public Service Company
* Gina Grey, Western States Petroleum Association
Robert Forrest, Valley Metro/RPTA
* Dave Berry, Arizona Motor Transport Association
Jeannette Fish, Maricopa County Farm Bureau
* Steve Trussell, Arizona Rock Products Association
* Amy Bratt, Greater Phoenix Chamber of Commerce
# Amanda McGennis, Associated General Contractors
* Spencer Kamps, Homebuilders Association of Central Arizona
# Mannie Carpenter, Valley Forward
* Kai Umeda, University of Arizona Cooperative Extension
Beverly Chenausky, Arizona Department of Transportation
Diane Arnst, Arizona Department of Environmental Quality
* Environmental Protection Agency
Thomas Ekren, Maricopa County Air Quality Department
Michelle Wilson, Arizona Department of Weights and Measures
Ed Stillings, Federal Highway Administration
* Judi Nelson, Arizona State University
Stan Belone , Salt River Pima-Maricopa Indian Community

*Members neither present nor represented by proxy.
#Participated via telephone conference call.
+Participated via video conference call.

OTHERS PRESENT

Lindy Bauer, Maricopa Association of Governments
Dean Giles, Maricopa Association of Governments
Matt Poppen, Maricopa Association of Governments
Julie Hoffman, Maricopa Association of Governments
Kara Johnson, Maricopa Association of Governments
Feng Liu, Maricopa Association of Governments
Adam Xia, Maricopa Association of Governments
Patrick Shaw, Maricopa Association of Governments
Cathy Arthur, Maricopa Association of Governments
Taejoo Shin, Maricopa Association of Governments
Corky Martinkovic, Maricopa County Air Quality Department
Joonwon Joo, Arizona Department of Transportation
Andy Smith, Maricopa County Air Quality Department
Joe Gibbs, City of Phoenix
Heather Hodgman, City of Apache Junction

1. Call to Order

A meeting of the Maricopa Association of Governments (MAG) Air Quality Technical Advisory Committee (AQTAC) was conducted on August 22, 2013. Phil McNeely, City of Phoenix, Chair, called the meeting to order at approximately 1:30 p.m. Jim Weiss, City of Chandler; Amanda McGennis, Associated General Contractors; Antonio DeLaCruz, City of Surprise; Mannie Carpenter, Valley Forward; and Kazi Haque, City of Maricopa, attended the meeting via telephone conference call.

Chair McNeely welcomed Mr. Haque to the Committee. The City of Maricopa is a new MAG member agency.

Chair McNeely indicated that copies of the handouts for the meeting are available. He noted for members attending through audio conference, the presentations for the meeting will be posted on the MAG website under Resources for the Committee agenda, whenever possible. If it is not possible to post them before the meeting, they will be posted after the meeting.

2. Call to the Audience

Chair McNeely stated that according to the MAG public comment process, members of the audience who wish to speak are requested to fill out comment cards, which are available on the tables adjacent to the doorways inside the meeting room. Citizens are asked not to exceed a three minute time period for their comments. Public comment is provided at the beginning of the meeting for nonagenda items and nonaction agenda items. Chair McNeely noted that no public comment cards had been received.

3. New Committee Chair and Vice Chair

Lindy Bauer, Maricopa Association of Governments, stated that on June 17, 2013 the MAG Regional Council Executive Committee appointed Philip McNeely as the Chair and Bill Mattingly, City of Peoria, as the Vice Chair of the MAG Air Quality Technical Advisory Committee. According to the MAG Committee Operating Procedures, the term of office is two years.

Chair McNeely thanked Oddvar Tveit, City of Tempe, for his service as former Chair. Mr. Tveit congratulated Mr. McNeely on his appointment as Chair.

Chair McNeely thanked Mr. Mattingly for serving as the new Vice Chair. Mr. Mattingly also thanked Mr. Tveit for his service as Chair.

4. Approval of the May 23, 2013 Meeting Minutes

The Committee reviewed the minutes from the May 23, 2013 meeting. Mr. Tveit moved and Doug Kukino, City of Glendale, seconded, and the motion to approve the May 23, 2013 meeting minutes carried unanimously.

5. Update on the MAG 2012 Five Percent Plan for PM-10 and Exceptional Events

Ms. Bauer provided an update on the MAG 2012 Five Percent Plan for PM-10 and exceptional events. She stated that the 2012 Five Percent Plan contains a wide variety of existing control measures to reduce PM-10, as well as, one new measure: the Dust Action General Permit. Ms. Bauer indicated that on May 23, 2012, the MAG Regional Council adopted the Plan. The Environmental Protection Agency (EPA)

issued a completeness determination on July 20, 2012 for the Plan that stopped the 18 month and 24 month sanctions clocks. On April 19, 2013, EPA proposed approval of several statutes for measures in the Plan. Ms. Bauer mentioned the lawsuit filed on April 30, 2013 by the Arizona Center for Law in the Public Interest against EPA for failure to take action on the MAG 2012 Five Percent Plan for PM-10 by February 14, 2013. She stated that on July 1, 2013, EPA completed its review of the 2011-2012 exceptional events documentation submitted by the Arizona Department of Environmental Quality (ADEQ). Ms. Bauer indicated that collectively, EPA has concurred with 17 of the 18 packages of exceptional events documentation. EPA took no action on one package. She noted that the exceptional events approved by EPA will no longer count as exceedances against this region. Ms. Bauer explained that the region needs three years of clean data in order for EPA to find that the standard has been met. She stated that this is a major milestone.

Ms. Bauer discussed the exceptional events. She indicated that there were no exceptional events in 2010; it was a clean year. Ms. Bauer noted that there were several exceptional events, consisting of haboobs, thunderstorms, and dust storms, in 2011 and 2012. She mentioned that collectively 2011 and 2012 had 31 days of exceptional events that needed documentation. Ms. Bauer presented a photo of a haboob that occurred in July of 2011. She displayed another photo of the exceptional event documentation. Ms. Bauer stated that the purpose of showing these pictures is to demonstrate that the exceptional events are still an issue. The EPA Exceptional Events Rule is still flawed. Ms. Bauer noted that EPA has released some draft guidance documents and a Final Interim Draft Guidance on the EER. She commented that some improvements have been made, however the exceptional event documentation is still very resource intensive. ADEQ has indicated that the exceptional event documentation work has cost $550,000, which does not include the work performed by Maricopa County or MAG staff. Ms. Bauer noted that 2013 has had four exceptional events that will require documentation. She commented that currently MAG staff will be preparing the documentation for two of the four days.

Ms. Bauer reported the next steps regarding the MAG 2012 Five Percent Plan for PM-10 and exceptional events. She stated that EPA is continuing to review the Plan in light of these exceptional event approvals. The results appear to indicate that there were no violations of the PM-10 standard during 2010-2012. Ms. Bauer indicated that EPA needs to take approval action on the Five Percent Plan to avoid the imposition of a federal implementation plan. She added that the lawsuit filed by the Arizona Center for Law in the Public Interest is still out there and tied to EPA action on the plan. The EPA Exceptional Events Process is still resource intensive and needs to be streamlined. Ms. Bauer discussed that EPA intends to revise the EER. The proposed timeframe for finalizing the revision is late 2014 or early 2015. Ms. Bauer stated that the proposed revisions will likely be released sooner than this date. She noted the tremendous workload for EPA to review the exceptional event documentation submitted by ADEQ. Ms. Bauer indicated that EPA had to review all of the documentation provided and prepare technical support documents. She mentioned that EPA had dedicated a full time staff person to this effort. EPA has informally indicated that further streamlining of the exceptional event process may be possible.

Ms. Bauer thanked the Committee for all the work done on the Five Percent Plan, as well as, preventing exceedances. She stated that Maricopa County has done an excellent job with implementing the $90,000 worth of improvements to receive real time data. Ms. Bauer discussed that everyone, member agencies, private sector, and MAG, worked together to prevent exceedances throughout the region. Chair McNeely thanked MAG for its hard work as well.

Jeanette Fish, Maricopa County Farm Bureau, asked if the next step would be to create a maintenance plan for PM-10 assuming EPA approval of the plan and staying clean at the monitors. Ms. Bauer replied that is correct. Ms. Fish inquired about the timeframe on a maintenance plan. Ms. Bauer responded that first EPA would need to approve the MAG 2012 Five Percent Plan for PM-10. She stated that the typical steps following would include: EPA issuing a clean data finding and then a maintenance plan could be prepared that outlines how the standard will be maintained for ten years after redesignation with existing measures. Ms. Bauer noted that a maintenance plan could be started once the Plan is approved and a clean data finding is issued. She explained that the region needs to stay clean at the monitors; violating monitors could result in nonattainment.

Ed Stillings, Federal Highway Administration, asked about the one exceptional event package in which no action was taken by EPA. Ms. Bauer replied that EPA did not indicate why they did not take action on the one exceptional event package. She discussed that the no action was indicated in a footnote; the footnote did not state disapproval of the package or that the event was not considered an exceptional event. Ms. Bauer noted that EPA has limited resources and perhaps they only approved the documents that they felt were necessary.

Mr. Haque inquired about PM-2.5. Ms. Bauer responded that Maricopa County is not a nonattainment area for the PM-2.5 standard. She commented that EPA has proposed a clean data finding for the PM-2.5 nonattainment area in Pinal County. However, the clean data finding has not yet been finalized by EPA. Ms. Bauer reported that the proposed clean data finding is good news. Mr. Haque agreed with Ms. Bauer and stated that he was unsure if the finding was not yet finalized because of the exceptional event documentation. He thanked Ms. Bauer for her response.

Diane Arnst, Arizona Department of Environmental Quality, stated that recommendations by the Governor on the designation of the 2012 PM-2.5 standard for Arizona are due to EPA by December 13, 2013. She stated that ADEQ has opened a public comment period on the PM-2.5 designation. Ms. Arnst indicated that more information is available on the ADEQ website.

6. Update on the MAG 2013 State Implementation Plan Revision for the Removal of Stage II Vapor Recovery Controls

Matt Poppen, Maricopa Association of Governments, provided an update on the MAG 2013 State Implementation Plan Revision for the Removal of Stage II Vapor Recovery Controls. He stated that on May 16, 2012, EPA published a final rule indicating that Onboard Refueling Vapor Recovery (ORVR) on passenger vehicles was in widespread use. States may now evaluate the removal of Stage II controls at gasoline dispensing stations since ORVR and Stage II vapor recovery are redundant control systems. Mr. Poppen discussed that on August 7, 2012, EPA released guidance on removing Stage II from a state implementation plan (SIP). He indicated that the Arizona Department of Weights and Measures has been coordinating with ADEQ and MAG on the implications of removing Stage II controls in the Maricopa area.

Mr. Poppen reviewed the history of Stage II controls. He stated that Section 182(b)(3) of the Clean Air Act requires gasoline dispensing facilities located in ozone nonattainment areas classified as Serious and above to implement Stage II controls. In response, the State of Arizona passed legislation in 1992 that mandated the implementation of Stage II controls in ozone nonattainment areas classified as Moderate and above. The Arizona Department of Weights and Measures first adopted Stage II rules in August 1993 that were initially approved into the Arizona SIP by EPA in 1994. Mr. Poppen noted that Section

202(a)(6) of the Clean Air Act, which gives EPA authority to waive Stage II requirements once ORVR systems are in widespread use, now applies to the Maricopa area.

Mr. Poppen presented the difference between Stage I and Stage II controls. He discussed that Stage I controls occur when tanker trucks dispense gasoline to a facility, capturing the gasoline vapors that are pushed out while the trucks fill up the underground storage tanks. Mr. Poppen noted that Stage I controls are not addressed in the MAG 2013 State Implementation Plan Revision for the Removal of Stage II Vapor Recovery Controls. He explained that Stage II controls are designed to capture vapors that occur during the refueling of a vehicle. The vapors captured from the vehicle fuel tank are put back into the underground storage tank. Mr. Poppen commented that the Onboard Refueling Vapor Recovery systems and Stage II controls are redundant technologies. ORVR is a cannister onboard vehicles that captures vapors during the refueling process that are then burned as fuel in the engine. Mr. Poppen mentioned that incompatibility issues can occur between ORVR and Stage II controls. The incompatibility issues occur when Stage II systems utilize vacuum pumps. Over 80 percent of gasoline dispensing facilities in the Maricopa area have vacuum pumps. Mr. Poppen stated that there is a conflict when both systems are trying to pull the vapor in from the refueling process. When the two systems are both capturing the vapors, fresh air is pulled into the underground storage tanks that increases the vapor pressure of the tank which then vents out as excess emissions. Mr. Poppen discussed that it is a disbenefit to have a vehicle with ORVR and a gasoline dispensing facility with vacuum-assisted Stage II controls because it causes more emissions.

Mr. Poppen discussed the EPA requirements for the removal of Stage II controls from the SIP. He stated that the submitted SIP revision must meet the following requirements of Clean Air Act Section 110(l): the removal of Stage II controls will not interfere with attainment of the National Ambient Air Quality Standards (NAAQS), in particular the ozone standard; removal will not interfere with reasonable further progress; and the removal will not violate any other applicable Clean Air Act requirement. EPA recommends two different options for a section 110(l) demonstration: a planned removal of Stage II controls that does not increase emissions (a phased removal of Stage II to avoid any increase of emissions into the atmosphere) or if a planned removal increases emissions, offsets for the increase are required.

Mr. Poppen provided an overview of the MAG 2013 SIP Revision to remove Stage II controls. Based upon equations provided in the EPA guidance for removing Stage II controls, Stage II controls no longer provide areawide emission reductions beginning in 2018. If Stage II controls are kept in place, emissions into the atmosphere will increase in 2018. Mr. Poppen noted that the removal of Stage II controls is proposed for new stations beginning in 2014 and for all stations beginning in 2016. Excess emissions from the closure of a point source facility, Penn Racquet Sports, are used as offsets for the increase in emissions from 2014 through 2017. Mr. Poppen noted that when the Penn Racquet Sports closed they were prepared to submit the excess emissions as credits into the ADEQ emissions bank. However, according to ADEQ it appears that those credits have not been issued or completed. Mr. Poppen added that this is still under review; if the credits were issued, another offset would need to be used for the SIP revision. Mr. Poppen stated that the total mobile source emissions still decline each year after 2013 despite removal of Stage II controls, which demonstrates reasonable further progress is maintained. The statute and rule revisions removing requirements to implement Stage II controls are anticipated to be submitted to EPA in 2014 and 2015. Additionally, the revision is effective upon approval by EPA.

Mr. Poppen presented the results of the areawide emission reduction benefits of Stage II controls based upon the equations provided by EPA. He presented a table that displays the following results for the

Maricopa area for years 2013 through 2020: the percent of vehicles with ORVR; percent of vehicle miles traveled with ORVR vehicles; percent of gas dispensed to vehicles with ORVR; a compatibility factor and increment score based on EPA equations; and the volatile organic compound (VOC) emission reductions from Stage II. Mr. Poppen explained that based upon the increment equations, the increment result is negative beginning in 2018. In 2018, Stage II controls no longer provide areawide emission reduction benefits. He noted that the increment result, coupled with the gasoline throughput, provides the number of kilograms per day of VOC reduced by Stage II controls. Mr. Poppen commented that in 2017, 60 kilograms per day (kg/day) of VOC will be reduced, however starting in 2018 a negative benefit occurs in which 108 kg/day of VOC are released.

Mr. Poppen discussed emission offsets. He stated that emissions from new stations need to be offset for years 2014 and 2015. Additionally, emissions from all stations need to be offset for years 2016 and 2017. Mr. Poppen indicated that the credit provided by the closure of Penn Racquet Sports Facility is 349 kg/day which is enough to offset the emissions for years 2014 through 2017.

Mr. Poppen reviewed the mobile source emission trends with and without Stage II controls. He provided another demonstration showing that: mobile source emissions will continue to decline in the area even with the removal of Stage II controls. Mr. Poppen indicated that this demonstration utilized the NONROAD model, which calculates VOC emissions from various equipment that are gasoline fueled. He added that the same was done for the onroad model which calculates emissions from road vehicles. Emissions were developed with Stage II controls and without Stage II controls. Mr. Poppen commented that even with removing Stage II, mobile source emissions continue to decrease. This demonstrates that reasonable further progress in attaining the standard will not be impeded with the removal of Stage II. Mr. Poppen presented a graph depicting the downward trend of the mobile source emissions with and without Stage II controls.

Mr. Poppen provided the tentative schedule for the MAG 2013 State Implementation Plan Revision for the Removal of Stage II Vapor Recovery Controls. He indicated that draft revision will likely be available for public review on September 10, 2013. A public hearing is anticipated for October 10, 2013. The SIP revision will be brought to the MAG Air Quality Technical Advisory Committee for recommendation on October 24, 2013. The recommendation would be brought to the MAG Management Committee on November 6, 2013 and then to the MAG Regional Council on December 4, 2013 for adoption. Mr. Poppen indicated that the submission of the revision to ADEQ and EPA is scheduled to occur December 6, 2013.

Michelle Wilson, Arizona Department of Weights and Measures, thanked MAG for their work on the SIP revision. She stated that the Department of Weights and Measures will be holding a public workshop on the decommissioning of Stage II and notification will be sent out prior to the workshop. Ms. Wilson indicated more information is available on their website: www.azdwm.gov.

Chair McNeely asked about the removal of Stage II controls. Mr. Poppen replied that it is a physical removal process. Ms. Wilson responded that the statutes and rules will have to be revised to ensure that the equipment is decommissioned properly. She stated that there will be a process to remove controls and cap vapor lines. Chair McNeely inquired about cost of removal and potential compliance issues. Ms. Wilson replied that this will have to go through the rulemaking process, however there will be an initial cost for removal. She noted that the facilities will be notified in advance that the decommissioning would be happening over a two year period of 2016 and 2017.

Mr. Mattingly inquired about the equipment for new facilities and existing facilities. Mr. Poppen responded that currently only new facilities, beginning in 2014, are proposed to be constructed without the Stage II controls.

7. Analysis of Rising Ozone Concentrations in Maricopa County in 2011-2012

Mr. Poppen reviewed the Environ analysis of rising ozone concentrations in Maricopa County for years 2011 and 2012. He stated that Environ, the MAG Air Quality On-Call Consultant, has conducted an analysis in order to evaluate recent ozone trends and identify the cause of the rising ozone concentrations. He indicated that the slides presented to the Committee are Environ's findings.

Mr. Poppen stated that the purpose of the analysis was to determine causes of rising ozone in Maricopa County for years 2011 and 2012, which are elevated from years 2009 and 2010. Environ was asked to look at both local and regional factors, as well as, long-range transport of ozone. Mr. Poppen discussed the first hypothesis was to look at changes in emissions. This is important because 2011 was the first year that gasoline blended with 10 percent ethanol (E10) was used during the summertime. Mr. Poppen noted that ethanol blended gasoline is associated with the production of aldehydes, in particular acetaldehydes, which can be more reactive in the atmosphere. He commented that Environ also analyzed: local and regional anthropogenic emissions; local biogenic emissions (plant based emissions); and local and regional wildfire activity. Additionally, the following hypotheses were also analyzed: changes in VOC-limited ozone reactions in the urban core and the role of NOx (nitrogen oxides) emissions; changes in local and regional meteorological and climatic conditions; and changes in background ozone concentrations or transport into the region.

Mr. Poppen reported the conclusions to the analysis. He stated that Environ found that Maricopa ozone trends for 2008-2012 were similar to other large metro areas in the southwest United States. This suggests that regional-scale factors are important. One apparent regional-scale factor was that cloudiness was consistent with ozone trends. The Phoenix data reflected that there was an unusually large amount of cloud cover in May-June 2009 which was consistent with lower ozone concentrations. Conversely, there was a small amount of cloud cover in May-June 2011-2012 in which higher ozone concentrations were reported. Mr. Poppen added that 2012 had unusually high temperatures. He stated that another conclusion was that there was more potential wildfire impacts in 2012 as opposed to other years. Mr. Poppen noted that local anthropogenic emissions generally decreased during 2008-2011 among all emission categories. He discussed that vehicle emissions did increase due to the switching of fuels in 2011, however the overall trend in vehicle emissions is down. Another conclusion presented is that there is no evidence of changes in transport patterns.

Ms. Arnst inquired about the decrease in vehicle emissions. Mr. Poppen replied that the overall vehicle emissions trend line is down for years 2008-2012, however there was a little bump up for 2011.

Mr. Poppen discussed a question that was posed to Environ: does the use of E10 fuel, with a particular interest in aldehydes due to their reactivity, in 2011 and 2012 cause an increase to on-road mobile VOC emissions. He indicated that Environ ran the MOVES model for Maricopa County with and without 10 percent ethanol fuel blends. Mr. Poppen presented the affects on emissions from zero ethanol blended gasoline to E10 for years 2011 and 2012. Both VOC and NOx increase due to the switch to E10, while CO decreases. Acetaldehyde has the largest percent increase, up to 45 percent in some cases. However, since the acetaldeyde makes up less than one percent of the VOC emissions total, it is unlikely to have

an impact on ozone concentrations. Other aldehydes shown on the graphs also represent a small percentage of VOC emissions.

Mr. Poppen provided the overall ozone season VOC trend line. He noted the VOC emissions increase in 2011 was due to the fuel change. The overall 2008-2012 downward trend for VOC is due to fleet turnover, where new cleaner cars replace older cars.

Mr. Poppen stated that Environ also examined evaporative emissions from vehicles. He presented data that displays high temperatures can lead to high emissions. To test this phenomenon in our region, Environ analyzed isopentane which is a marker for evaporative emissions. Mr. Poppen reported that there was a lack of correlation between isopentane emissions and temperature, which suggests that there is no evidence of fuel volatility affecting VOC ambient levels. He noted that the sampling was done over a 24 hour duration. Environ suggested sampling from 6-9 a.m. would be more useful for isolating and evaluating on-road mobile emissions.

Mr. Poppen discussed regional emission trends. Environ looked at regional data to determine if the increase in concentrations in 2011-2012 in the region was due to an increase in emissions statewide. Data from EPA's National Emissions Trends Report show decreases or flat lines for major anthropogenic categories from 2008-2012. It does not appear that there is an increase in anthropogenic emissions that would have caused an increase in ozone concentrations on a statewide level. Mr. Poppen stated that the same is seen locally when data from the 2008 Periodic Emissions Inventory is compared to the 2011 Periodic Emissions Inventory prepared by Maricopa County. Anthropogenic emissions of NOx and VOC decreased overall in 2011 relative to 2008.

Mr. Poppen reported on biogenic emissions. MAG biogenic emissions modeling indicates that 2009 was the peak emissions year for biogenics during the 2008-2012 period, which was the lowest year for ozone concentrations within the same time period. Mr. Poppen commented that biogenics and ozone concentrations do not appear to be linked. However, uncertainty in the biogenic modeling does not rule out biogenic emissions altogether as a possible contributor to higher ozone concentrations in 2011-2012. Biogenics are the largest VOC source. Mr. Poppen mentioned that biogenic modeling could be improved by using specific land use data, especially regional land use data.

Ms. Arnst asked if the modeling domain for biogenic modeling was the same as the nonattainment area boundary. Mr. Poppen replied that the modeling domain is larger.

Mr. Poppen stated that Environ did extensive research on fire data. Fire emissions data was used from the National Center for Atmospheric Research (NCAR). NCAR uses satellite fire detections for the fire inventory in which fires are measured using a 1 kilometer resolution. Overall, 2010 had the lowest fire emissions in the western half of the United States, with 2009 being the second lowest. Mr. Poppen presented NOx emissions from large fires in Arizona. He indicated that 2011 and 2012 had large wildfires near the Maricopa area. Mr. Poppen stated that when the scale is changed to show emissions from smaller fires, the differences between the years are less apparent, however 2011 and 2012 are still active fire years.

Mr. Poppen reviewed Environ's fire research on high ozone days. He indicated that Environ reviewed all days where a Maricopa monitor exceeded the 8-hour ozone standard of 75 parts per billion (ppb). For each high ozone day, Environ prepared a HYSPLIT back trajectory to determine if the back trajectories crossed where a fire was occurring to see if the fire could have impacted ozone concentrations on those days. Mr. Poppen provided the May 14, 2012 example of a back trajectory at the time of a peak 1-hour

ozone concentration that had possible fire impacts. Mr. Poppen presented a fire impacts graph by year. Year 2012 had the largest number of potential fire impact days, however 2011 had a relatively low number of fire impact days.

Mr. Poppen reported on ozone trends for the Maricopa urban core and suburban ozone monitors. He indicated that the trend line for both urban and suburban ozone concentrations is decreasing from 2000-2012. The suburban area ozone concentrations are decreasing faster than the urban area concentrations.

Mr. Poppen discussed NOx-limited and VOC-limited monitors. He mentioned that ozone is formed in the presence of both NOx and VOC. A monitor that is NOx-limited means that the amount of NOx is controlling the amount of ozone produced at that monitor. Therefore, NOx reductions assist in lowering ozone concentrations at that monitor. However, NOx reductions at a VOC-limited monitor may not help reduce concentrations and could possibly increase emissions. Mr. Poppen noted that it is important to know if monitors are NOx or VOC-limited with regard to ozone controls. Environ analyzed the urban JLG Supersite monitor for the weekday/weekend effect with regard to ozone data from April-September for years 2008-2012. The weekday/weekend analysis not only displays the ozone and NOx concentrations during the week and weekend, but also gives indication if a monitor is NOx or VOC-limited. Mr. Poppen provided an example that ozone concentrations can determine NOx and VOC-limited monitors. He pointed out that in 2009, despite the lower NOx concentrations on Sunday, the Sunday ozone is higher which suggest this monitor is a VOC-limited monitor. In this particular case, a reduction of NOx emissions will not decrease ozone emissions.

Mr. Poppen summarized the analysis of the JLG Supersite monitor. Overall there is a large reduction in NOx between Wednesdays to Sundays for all years. At this monitor, the ozone response from Wednesdays to Sundays is inconsistent over the years 2008-2012. In response to this inconsistency, Environ analyzed downwind monitors to determine whether ozone response is or is not NOx-limited. Mr. Poppen commented that suburban monitors are commonly NOx-limited, thus NOx reductions will continue to help lower concentrations at these monitors. He noted that urban monitors fluctuate between NOx and VOC-limited monitors, however they usually behave in a uniform fashion. Mr. Poppen gave the example that in 2009 all urban monitors were VOC-limited, but in 2011 they are all NOx-limited. In summary, Mr. Poppen stated that the suburban sites northeast of the urban core are NOx-limited, except in 2009. The Buckeye monitor is unique in that it is always VOC-limited. Mr. Poppen noted that the urban core monitors behave as a block except in 2008. In 2011, the urban core monitors are NOx-limited, however the nonattainment area emissions inventory (an emissions ratio of VOC/NOx = 6.2) suggests them to be VOC-limited. Mr. Poppen commented that this could mean this is a transition period or there is a possibility that the inventory could be underestimating VOC emissions.

Mr. Poppen reported that Environ tested for meteorological influences on ozone in Maricopa County from 2002-2012. He stated that the temperature in 2011 was near normal, however 2012 was a hot year. Year 2012 was the 112th highest year out of the 118 year record for Arizona. Mr. Poppen indicated that data from Phoenix Sky Harbor International Airport were used for the subsequent meteorological analyses. He presented a graph of daily maximum temperatures with ozone concentrations, however there was no correlation. Mr. Poppen noted that the comparison of daily maximum temperatures with light afternoon winds and ozone concentrations yields a strong correlation coefficient of 0.8 for years 2008-2012. However, this strong correlation breaks down in years prior to 2008. Mr. Poppen discussed that perhaps meteorological factors are more important in recent years 2008-2012, as compared to 2002-2008 where more local influences, beyond meteorology, played a larger role.

Mr. Poppen discussed that Environ also analyzed wind reversal as a variable with regard to high temperatures and ozone concentrations. Wind reversal analysis showed winds frequently from the east in the first part of the day and winds from the west in the later portion of the day. Mr. Poppen commented that the correlation was not strong.

Mr. Poppen reviewed high ozone days in the Maricopa area. May, June, and August had the most high ozone days, however July has lower number of days due to the monsoon onset. Mr. Poppen commented that precipitation analysis uncovered no patterns; years 2011 and 2012 were not especially dry. He presented the average cloud cover, in which there is minimum cloudiness in June and a maximum in July and August. Mr. Poppen noted that 2009 was an especially cloudy year, however 2011 and 2012 have had less than usual cloudiness in May through June. He commented that 2009 was unusually cloudy during June which is typically a month with a high frequency of high ozone days.

Mr. Poppen reported on transport patterns. Environ produced three sets of HYSPLIT back trajectory plots for the central Phoenix monitor: high ozone days (> 75 ppb), moderately high ozone (between 65 ppb and 75 ppb), and low ozone (60 ppb). The back trajectories for high ozone days show similar back trajectories of mixed pattern, except for 2009. Mr. Poppen commented that it is difficult to distinguish back trajectories between the moderately high ozone days and low ozone days. Environ concluded that clean days are similar to high ozone days with regard to transport patterns, except that wind speeds are generally higher. The HYSPLIT conclusions suggest that it is not transport changes that cause higher ozone in 2011 and 2012.

Mr. Poppen discussed background ozone. The EPA defines North American background ozone as coming from anthropogenic sources outside North America and all natural sources: biogenic, fires, lightning, and stratospheric intrusion events. Mr. Poppen stated that the estimations for background ozone is 25-50 ppb, however this is variable by year, season, elevation, and latitude/longitude. Evidence suggest that background ozone in the west coast is increasing 3-5 ppb/decade. Mr. Poppen presented data from Mount Bachelor in Oregon that shows approximately a 1 ppb increase in the spring from 2004-2012. Airplane and weather balloon observations also indicate a 0.63 ppb/year increase from 1995-2008. Mr. Poppen stated that background ozone is very difficult to identify for the region. ADEQ forecasters have suggested that stratospheric intrusion events could be a factor with background ozone. Stratospheric intrusion is where ozone from the stratosphere is sucked down and causes increased ozone concentrations during storms. Mr. Poppen also indicated that monsoon clouds can get high enough to bring in ozone from the stratosphere. He commented that it is difficult to get the data for stratospheric intrusions. Mr. Poppen mentioned that there is stronger evidence for the summertime fire influence, however overall it is difficult to identify background ozone in the Maricopa area.

Mr. Poppen presented the 2008-2012 ozone trends in large metro areas in the western United States. All of the metros displayed have the similar reduction of ozone in 2009 relative to 2008, as well as, the increasing trend from 2009-2012. This suggests that regional factors are impacting ozone concentrations. Mr. Poppen displayed the ozone concentrations for major Arizona areas from 2002-2012. The trends are similar after 2007 for most areas. However, there was a drop in ozone concentrations in Flagstaff, Tucson, and Sierra Vista between 2011 and 2012. Conversely, Yuma, Payson, Prescott and Show Low showed increasing ozone between 2011 and 2012.

Mr. Poppen displayed ozone trend graphs for other western states. He indicated that data displayed in gray show areas that are similar to the Phoenix area. Colored lines show divergences as compared to the region, which are mainly comprised of rural areas. Mr. Poppen presented the ozone trends for: New

Mexico, Colorado, Utah, and Nevada. He commented that the ozone trends are no longer similar to the Maricopa area when analyzing the large coastal metro areas in California due to its unique meteorology. The California coastal cities show an overall significant decrease in ozone. However, southeastern California cities display a pattern that is more similar to the Maricopa area. Mr. Poppen summarized the Environ regional ozone trend analysis. He stated that ozone has similar trends at many monitors throughout the southwestern United States for the same time frame. There is variability in ozone concentrations at California monitors in large coastal metro areas as compared to monitors east of the Sierra Nevada mountains.

Environ investigated other meteorological factors that could make conditions conducive to ozone formation. Mr. Poppen commented that Environ analyzed regional high pressure anomalies during high ozone years that would tend to cause sunny skies, hot temperatures, and light winds. He noted that utilizing the National Climate Data Center's climate summaries and the National Center for Environmental Prediction Reanalysis, a June high pressure anomaly with a 500 millibar height was further analyzed. Mr. Poppen presented graphs for high pressure anomalies in June. Years 2008, 2010, and 2012 had high pressure anomaly conditions. Year 2009 was a low ozone concentration year and the pressure tables show this year had lower pressure conditions. This data analysis is only useful for May and June months due to monsoon effects in the months of July and August. Mr. Poppen noted that this analysis in the months of May and June, when most of the ozone exceedances occur, is a good indicator of regional patterns.

Mr. Poppen discussed outgoing longwave radiation. Graphs displaying radiation reflected back to satellites were presented. Mr. Poppen commented that 2009 had little radiation reflection, 2008 and 2010 had higher radiation reflections, and 2011 and 2012 had high levels of radiation reflection. He stated that this is another indicator that regional factors were occurring. However, when analyzing years 2002-2007, not all high ozone years can be explained by longwave radiation. For example, 2004 was a low ozone concentration year, yet there was higher outgoing longwave radiation. Mr. Poppen mentioned that not every year can be explained using meteorology, however in 2008-2012 meteorology does seem to be a large factor. He stated that it is possible in some years, that large scale meteorological factors such as cloudiness are important in creating conditions conducive to ozone formation, but in other years local factors can dominate.

Mr. Poppen reported Environ conclusions based on the initial hypotheses. He indicated that ozone trend data for the Maricopa area in 2008-2012 was similar to other large metro areas in the southwest United States. Local Phoenix data showed: unusually large amount of cloud cover in May-June 2009; small amount of cloud cover in May-June 2011-2012; and unusually high temperatures in 2012. The following conclusions were also made: more potential wildfire impacts occurred in 2012; local anthropogenic NOx and VOC emissions generally decreased during 2008-2011; and there is no evidence of changes in transport patterns.

Mr. Poppen discussed avenues for further research. Mr. Poppen stated that MAG has discussed meteorological factors with the ADEQ meteorologist. The meteorologist talked about the specific meteorological patterns and conditions that allow them to forecast high ozone concentration days. An avenue of future research could be to review high ozone days and concentrate on the conditions of the days. Another option could be to evaluate meteorological data for sites other than Phoenix Sky Harbor Airport.

Mr. Poppen reviewed the recommendations made by Environ. He indicated that shorter duration of canister sampling at the JLG Supersite during 6-9 a.m. would help to determine ambient VOC/NOx ratio and isolate on-road mobile evaporative emission changes. Environ also recommends investigating the role of a possible biogenic hot spot near the North Phoenix monitor, which usually records the highest ozone concentrations. Mr. Poppen stated that the utilization of more detailed land use data could aid in determining biogenic emissions.

Beverly Chenausky, Arizona Department of Transportation, commented that the 2009 low ozone year corresponded to the economic downturn and lower vehicle miles traveled. Mr. Poppen responded that there were many meteorological anomalies in 2009 including high cloud cover and low pressure. He stated that the economic downturn could have been a factor, however the meteorological anomalies were also a factor. Ms. Bauer replied that there was less vehicle miles traveled in every year of the economic downturn, not exclusively 2009. Prior to 2009, a gradual decrease in ozone concentrations was present even with a robust economy. Ms. Bauer indicated that Environ was investigating the change in pattern for 2011 and 2012. She mentioned that air quality can be counterintuitive, this is why MAG enlisted the help of Environ to investigate the higher levels of ozone. Ms. Bauer noted that the presentation displays how tricky it can be to analyze air quality trends. Mr. Poppen added that if 2013 stays on the current course it will be a similar year to 2010 in terms of ozone concentrations and exceedance days. It appears that ozone exceedances will be decreasing in 2013 from 2011 and 2012.

Chair McNeely thanked Mr. Poppen for the presentation.

8. Tentative MAG Air Quality Project Schedule

Ms. Bauer presented the tentative, two year MAG Air Quality Project Schedule. She indicated that there are a few new air quality activities on the schedule. Ms. Bauer commented that the first item, the analysis of air quality measures, is ongoing. She stated that the Carbon Monoxide Maintenance Plan has been completed and was submitted to ADEQ and EPA in April. Due to the low concentrations of carbon monoxide well below the standard and the submission of the second maintenance plan, EPA indicated that the region may not need to prepare another plan for this pollutant. Ms. Bauer mentioned the Congestion Mitigation and Air Quality Improvement (CMAQ) Annual Report and Project Evaluations. She noted that the Committee plays an important role with the CMAQ Annual Report and Project Evaluations.

Ms. Bauer discussed the next project on the list: Conformity on the New MAG Transportation Improvement Program (TIP) and Plan. She commented that conformity will be increasing in complexity. Ms. Bauer noted that the Metropolitan Planning Area (MPA) boundary is an important boundary in that MAG is the Metropolitan Planning Organization (MPO) for transportation and it is linked to the air quality work MAG does as well. MAG analyzes the Transportation Plan and Regional Transportation Plan (RTP) to make sure they do not contribute to violations of the air quality standards. Ms. Bauer indicated that when the 2010 Census information was released, the urbanized area had changed. Based upon the results of the 2010 Census, the MAG MPA boundary was expanded into Pinal County. The MAG Regional Council has welcomed three new MAG member agencies: City of Maricopa, Town of Florence, and Pinal County. Casa Grande reached the threshold to become an MPO for transportation as well, thus the Sun Corridor MPO was formed. Ms. Bauer mentioned that there are two particulate matter nonattainment area boundaries in Pinal County; the expanded MAG MPA boundary now covers a portion of those nonattainment areas. The Sun Corridor MPO also covers a portion of the two particulate matter nonattainment areas. Ms. Bauer noted that there are two particulate matter

nonattainment areas covered by two Metropolitan Planning Organizations. She stated that MAG has been working closely with the Sun Corridor MPO, the Arizona Department of Transportation (ADOT), ADEQ, and the new member agencies on conformity. The next conformity analysis on the MAG TIP and RTP will need to demonstrate conformity against the two nonattainment areas in Pinal County. Ms. Bauer noted that this is new. She commented that MAG will be assisting the Sun Corridor MPO in the preparation of the Initial Pinal County PM-10 and PM-2.5 Conformity Analysis which is listed later in the schedule. She explained that the approach will be to demonstrate conformity for MAG Plans and the Sun Corridor projects for the two nonattainment areas. Ms. Bauer stated that MAG is happy to assist in this and to work cooperatively with ADOT and the Sun Corridor MPO on these issues.

Ms. Bauer reviewed additional schedule items. She indicated that the Contract Management schedule lines up with CMAQ Project Evaluations. Ms. Bauer discussed the Eight-Hour Ozone Plan for the 2008 standard of 0.075 parts per million (ppm); the region has an attainment date of December 31, 2015 with a Marginal Area classification. Ms. Bauer commented that the region will need to be clean over the three year period of 2013-2015, which makes this summer and the next two years crucial in attaining the standard. EPA has proposed that the plan will have a due date of July 20, 2014, however EPA has not yet finalized their guidance. Ms. Bauer noted that this plan should be less dense than previous plans and consist mainly on the Periodic Emissions Inventory and an Emissions Statement as provided by Maricopa County. She stated that MAG will be finalizing their schedule once the EPA schedule is released.

Ms. Bauer indicated that the Evaluation and Implementation of New Moves Model and the General Plan Review are two ongoing air quality activities. She commented that the Greenhouse Gas Reduction Requirements item is listed on the schedule for ongoing monitoring of federal legislation. Ms. Bauer reported that fortunately the region has measures that reduce greenhouse gas emissions; Since there is renewed interest in the subject due to Hurricane Sandy, it is an ongoing activity on the schedule. The PM-10 Exceptional Event section is an ongoing cooperative activity with ADEQ. Ms. Bauer mentioned that the PM-10 Pave Unpaved Road Projects Evaluations and the PM-10 Street Sweeper Project Evaluations keep the region in conformance and continue to implement the measures in the PM-10 Plan. Ms. Bauer reported that the final activity in the schedule is the Stage II Vapor Recovery Removal SIP Revision which is scheduled to be completed by January 2014.

Chair McNeely thanked Ms. Bauer for the overview.

9. Call for Future Agenda Items

Chair McNeely requested suggestions for future agenda items. He indicated that the next meeting of the Committee has been tentatively scheduled for Tuesday, September 24, 2013.

Ms. Arnst inquired if the Congestion Mitigation Score Methodology Study had been presented to this Committee. Ms. Bauer replied that the study has been completed. She noted that this Committee does not usually address congestion issues. She stated that the transportation page on the MAG website would have more information. Ms. Arnst stated that she was interested in the methodology determined for CMAQ funding. Ms. Bauer indicated that she would check with MAG transportation staff on where it is located on the MAG website and report back to Ms. Arnst. She commented that the MAG transportation committees address congestion.

With no further comments, the meeting was adjourned at approximately 2:50 p.m.