APPENDIX: INPUTS/OUTPUTS MOVES DESCRIPTION

I.A.1

ANALYSIS SUMMARY

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FROM: Transportation Modeling Program (HMP) – Texas A&M Transportation Institute

SUBJECT: El Paso MPO's RMS 2050 Amendment Emission Inventory – Analysis Notes

EmsCalc Utility Emissions Inventory Output Files, MOVES3 Input and Output Files, Emission Rates Utility Output Files; and AP-42 Emissions Files

The following describes the emissions analysis files TTI provided the EPMPO to support its conformity analyses of the PM_{10} and ozone nonattainment areas in its planning area. For ease of downloading, there is one zip file "elp24mtp_eds_29Mar2024.zip" which contains seven zip files with all the analysis files.

MOVES3-based Emission Rates Files

Emission rates were estimated using TTI's rates-per-activity method. The method uses TTI's utility to assemble all emission rates for specified MOVES pollutant- processes in rates-per-activity form (and to calculate the rate-per-SHP form of evaporative rates which are not directly available from MOVES) for input to the utility emissions calculations. The process accommodates simultaneous preparation of local link-based (on-network) and off-network activity and emission rate inputs needed for the detailed disaggregate external emissions calculations by using MOVES county scale emission rate mode set-ups with a combination of local input data (e.g., fuels, temperatures, age distributions, fuel fractions) and MOVES default input data (e.g., VMT, vehicle populations, various activity factors). Emission rate data files are provided in the form of MySQL database files and tab files.

MOVES Files – TTI performed one set of MOVES runs for PM_{10} and ozone (for VOC, NO_X) areas. Due to their large size (e.g., MOVES output rateperdistance tables each with more than one million records) the emission rate input and output files are provided in electronic format. Included are MOVES3 run specification (MRS) input files and county input databases (CDBs), MOVES output databases and MOVES log files. (The

MOVES default database used "movesdb20221007" is available with the MOVES3.1.0 model for download at: https://www.epa.gov/moves.)

Emission rates were developed using El Paso County data for use in all the TDM region areas. Activity and emissions were analyzed under this task for ozone (VOC and NO_X) for a summer weekday for six years: 2017, 2022, 2027, 2032, 2040, and 2050; for PM_{10}, for a summer and winter weekday for five years: 2022, 2027, 2032, 2040, and 2050. PM_{10}, VOC, and NO_X used the same inputs and were run together. The MOVES input files are provided, consisting of the following county scale emission rates mode MRS (XML) files and MySQL CDBs.

MVS310_ELP24MTP_2017SWKD_ER.MRS
MVS310_ELP24MTP_2022SWKD_ER.MRS
MVS310_ELP24MTP_2022WWKD_ER.MRS
MVS310_ELP24MTP_2027SWKD_ER.MRS
MVS310_ELP24MTP_2027WWKD_ER.MRS
MVS310_ELP24MTP_2032SWKD_ER.MRS
MVS310_ELP24MTP_2032WWKD_ER.MRS
MVS310_ELP24MTP_2040SWKD_ER.MRS
MVS310_ELP24MTP_2040WWKD_ER.MRS
MVS310_ELP24MTP_2050SWKD_ER.MRS
MVS310_ELP24MTP_2050WWKD_ER.MRS

mvs310_elp24mtp_2017sw_er_cdb_in (for summer, baseline VOC and NO_X)
mvs310_elp24mtp_2022sw_er_cdb_in (for summer PM_{10}, VOC, NO_X; and winter PM_{10})
mvs310_elp24mtp_2027sw_er_cdb_in (for summer PM_{10}, VOC, NO_X; and winter PM_{10})
mvs310_elp24mtp_2032sw_er_cdb_in (for summer PM_{10}, VOC, NO_X; and winter PM_{10})
mvs310_elp24mtp_2040sw_er_cdb_in (for summer PM_{10}, VOC, NO_X; and winter PM_{10})
mvs310_elp24mtp_2050sw_er_cdb_in (for summer PM_{10}, VOC, NO_X; and winter PM_{10})

(Provided in "elp24mtp_MRS_11.zip" and "elp24mtp_CDB_6.zip")

Each CDB contains the following input tables[1]: auditlog, avft, avgspeeddistribution, county, countyyear, dayvmtfraction, fuelformulation, fuelsupply, hotellingactivitydistribution, hourvmtfraction, hpmsvtypeyear, imcoverage, monthvmtfraction, onroadretrofit, roadtypedistribution, sourcetypeagedistribution, sourcetypeyear, startsageadjustment, startshourfraction, startsmonthadjust, startsopmodedistribution, startsperdaypervehicle, state, totalidlefraction, year, zone, zonemonthhour, zoneroadtype. (Note that the rates-per-activity link-based inventory

[1] a total of 41 tables are included in each CDB to include these, and other optional (empty) tables added for consistency with the MOVES county data manager CDB tables list.

method uses MOVES default activity inputs in the emission rates development – while the actual locality-specific activity estimates are combined with the emissions rates external to MOVES. Since the activity tables in each CDB contain MOVES defaults specifically for rates-mode runs, these CDBs should not be used for MOVES inventory calculation-type runs.)

Correspondingly there are nine MOVES emission rates output (MySQL) databases (interim output for input to RatesCalc) and nine MOVES (*.txt) log files:

mvs310_elp24mtp_2017swkd_er_out
mvs310_elp24mtp_2022swkd_er_out
mvs310_elp24mtp_2022wwkd_er_out
mvs310_elp24mtp_2027swkd_er_out
mvs310_elp24mtp_2027wwkd_er_out
mvs310_elp24mtp_2032swkd_er_out
mvs310_elp24mtp_2032wwkd_er_out
mvs310_elp24mtp_2040swkd_er_out
mvs310_elp24mtp_2040wwkd_er_out
mvs310_elp24mtp_2050swkd_er_out
mvs310_elp24mtp_2050wwkd_er_out

mvs310_elp24mtp_2017swkd_er_log.txt
mvs310_elp24mtp_2022swkd_er_log.txt
mvs310_elp24mtp_2022wwkd_er_log.txt
mvs310_elp24mtp_2027swkd_er_log.txt
mvs310_elp24mtp_2027wwkd_er_log.txt
mvs310_elp24mtp_2032swkd_er_log.txt
mvs310_elp24mtp_2032wwkd_er_log.txt
mvs310_elp24mtp_2040swkd_er_log.txt
mvs310_elp24mtp_2040wwkd_er_log.txt
mvs310_elp24mtp_2050swkd_er_log.txt
mvs310_elp24mtp_2050wwkd_er_log.txt

(Provided in “elp24mtp_MOVESoutput_11.zip”.)

These 17 tables are in each MOVES output database: activitytype, baserateoutput, baserateunits, bundletracking, movesactivityoutput, moveserror, moveseventlog, movesoutput, movesrun, movestablesused, movesworkersused, rateperdistance, rateperhour, rateperprofile, rateperstart, ratepervehicle, startspervehicle. (VOC, NOx, PM_{10} total exhaust, and PM_{10} brake and tire wear were included in all MOVES output, as well as some other pollutants included as prerequisites or for informational purposes).

RateCalc Utility Files –RatesCalc module calculates parked vehicle evaporative rates "rate-per- SHP" as a conversion of MOVES rate-per-vehicle output. Using data from the MOVES CDB and MOVES database, RatesCalc replicates the MOVES vehicle population and SHP calculation process. Vehicle population-to-SHP ratios are multiplied by the parked vehicle evaporative rates output from the MOVES ratepervehicle and rateperprofile tables yielding rateperSHP. RatesCalc produced nine emission rates databases (input to the emissions calculation utility, EmsCalc).

mvs310_elp24mtp_2017swkd_er_out_calc
mvs310_elp24mtp_2022swkd_er_out_calc
mvs310_elp24mtp_2022wwkd_er_out_calc
mvs310_elp24mtp_2027swkd_er_out_calc
mvs310_elp24mtp_2027wwkd_er_out_calc
mvs310_elp24mtp_2032swkd_er_out_calc
mvs310_elp24mtp_2032wwkd_er_out_calc
mvs310_elp24mtp_2040swkd_er_out_calc
mvs310_elp24mtp_2040wwkd_er_out_calc
mvs310_elp24mtp_2050swkd_er_out_calc
mvs310_elp24mtp_2050wwkd_er_out_calc

(Provided in "elp24mtp_RatesCalcOutFiles.zip".)

These six files are included in each folder: ratescalcrun (lists basic utility execution information), ttiactivity (includes distance, population, SHP and SHO activity), ttirateperdistance (copy of MOVES rateperdistance rates for specified pollutants), ttirateperhour (copy of MOVES rateperhour rates), ttiratepershp (parked vehicle SHP-based rates calculated by RatesCalc), ttirateperstart (copy of MOVES rateperstart rates). Units are included in each rate table.

MOVES3-based Emissions Files

Tab Output: Each MOVES3 emissions calculation utility run produced a TAB file (tab-delimited emissions and activity results text file). These files are relatively large and available only in electronic format. Runs are by county or partial county area, season, and year. The county coding for county and partial county areas is as follows:

- For PM_{10}, VOC, and NOx analyses:
  - 48141 for El Paso County,
  - 35998 (Dona Ana partial county area, excluding Sunland Park area),
  - 35999 (Sunland Park area of Dona Ana partial county area),

  (sum of PM_{10} for 35998 and 35999 = Dona Ana partial county area PM_{10}).

The summer and winter weekday emissions inventory output TAB files (31) included[2], that were needed for reporting (for pollutants indicated), are:

elp24mtp_mvs310_48141_2022sumwkd_ems.TAB (for PM_{10}, VOC, NOx)
elp24mtp_mvs310_48141_2027sumwkd_ems.TAB (for PM_{10}, VOC, NOx)
elp24mtp_mvs310_48141_2032sumwkd_ems.TAB (for PM_{10}, VOC, NOx)
elp24mtp_mvs310_48141_2040sumwkd_ems.TAB (for PM_{10}, VOC, NOx)
elp24mtp_mvs310_48141_2050sumwkd_ems.TAB (for PM_{10}, VOC, NOx)

elp24mtp_mvs310_35998_2022sumwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35998_2027sumwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35998_2032sumwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35998_2040sumwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35998_2050sumwkd_ems.TAB (for PM_{10})

elp24mtp_mvs310_35999_2017sumwkd_ems.TAB (for VOC, NOx)
elp24mtp_mvs310_35999_2022sumwkd_ems.TAB (for PM_{10}, VOC, NOx)
elp24mtp_mvs310_35999_2027sumwkd_ems.TAB (for PM_{10}, VOC, NOx)
elp24mtp_mvs310_35999_2032sumwkd_ems.TAB (for PM_{10}, VOC, NOx)
elp24mtp_mvs310_35999_2040sumwkd_ems.TAB (for PM_{10}, VOC, NOx)
elp24mtp_mvs310_35999_2050sumwkd_ems.TAB (for PM_{10}, VOC, NOx)

elp24mtp_mvs310_48141_2022winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_48141_2027winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_48141_2032winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_48141_2040winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_48141_2050winwkd_ems.TAB (for PM_{10})

elp24mtp_mvs310_35998_2022winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35998_2027winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35998_2032winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35998_2040winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35998_2050winwkd_ems.TAB (for PM_{10})

elp24mtp_mvs310_35999_2022winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35999_2027winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35999_2032winwkd_ems.TAB (for PM_{10})
elp24mtp_mvs310_35999_2040winwkd_ems.TAB (for PM_{10})

[2] 31 is the number of the "required for reporting" tab files, although others were included, such as for 2017 analysis year.

elp24mtp_mvs310_35999_2050winwkd_ems.TAB (for PM_{10})

(Provided in “elp24mtp_tab_ems.zip”.)

TAB files – tab delimited files, for ease of use in spreadsheets, depending on the area and pertinent activity and pollutants, may include summaries of the VMT,

VHT, calculated speed (VMT/VHT), off-network activity (SHP, starts, extended idle hours, and APU hours), and the selected MOVES pollutant-process emissions in units of pounds by roadway type (TDM link road types, MOVES off-network road type, and total) for each fuel type (gasoline and diesel) and source type combination in the VMT mix. The summaries are included for each hour and for the 24-hour period. The pollutants included are: CO, PM_{10} total exhaust, PM_{10} tire wear, PM_{10} brake wear, VOC, and NOx. (MOVES treats PM_{10} exhaust, tire wear and brake wear as three separate pollutants.) The emission processes are: running exhaust, crankcase running exhaust, start exhaust, crankcase start exhaust, extended idling exhaust, crankcase extended idling exhaust, evaporative permeation, evaporative vapor venting, evaporative liquid leaks, tire wear, and brake wear. The pollutant totals for each MOVES pollutant ID are also included.

TabFileTotals Output: Also provided are activity and emissions results (by pollutant and process for each area) that were extracted from the emission TAB-file output for each season and year, summarized at seven different aggregation levels, and output in a separate set of tab-delimited emissions and activity summary files. Using summer weekday as an example (with "*" as a wildcard), the additional summary files for each year are:

*swkd_tabtots.tab	(24-hour totals)
*swkd_tabtots_Hr.tab	(hourly totals)
*swkd_tabtots_ST.tab	(24-hour SUT/fuel type totals)
*swkd_tabtots_RdType.tab	(hourly, road type totals)
*swkd_tabtots_24hourRdTypeST.tab	(24-hour, road type, SUT/fueltype totals)
*swkd_tabtots_RdTypeST.tab	(hourly, road type, SUT/fueltype totals)
*swkd_tabtots_HrST.tab	(hourly, SUT/fuel type totals)

*wwkd_tabtots.tab	(24-hour totals)
*wwkd_tabtots_Hr.tab	(hourly totals)
*wwkd_tabtots_ST.tab	(24-hour SUT/fuel type totals)
*wwkd_tabtots_RdType.tab	(hourly, road type totals)
*wwkd_tabtots_24hourRdTypeST.tab	(24-hour, road type, SUT/fueltype totals)
*wwkd_tabtots_RdTypeST.tab	(hourly, road type, SUT/fueltype totals)
*wwkd_tabtots_HrST.tab	(hourly, SUT/fuel type totals)

(Provided in "elp24mtp_tabtots_ems.zip".)

AP-42 Paved Roads Resuspended Dust PM_{10} Emissions Files

There is one spreadsheet macro containing the resuspended dust from paved roads (i.e., El Paso TDM network and intrazonal links) PM_{10} emissions calculations for each PM_{10} analysis year (5), seasonal weekday (2), and TDM area (3 – El Paso County and Dona Ana partial county area coded in two parts) (a total of 30 spreadsheet files, analogous to the EmsCalc tab-delimited output for PM areas – 15 summer and 15 winter files). The estimates are 24-hour seasonal weekday, based on emission rates estimated using equation (2) in AP-42 section 13.2.1 (EPA, January 2011) and 24-hour VMT output from the EmsCalc utility runs. All of the inputs and calculated results are included in each individual spreadsheet. The sum of the results, by season and year, for Dona Ana excluding Sunland Park (35998) and the Sunland Park area in Dona Ana (35999) is the estimate for all of the Dona Ana partial county area in the TDM.

elp24mtp_mvs310_35998_2022sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2022winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2027sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2027winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2032sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2032winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2040sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2040winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2050sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35998_2050winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2022sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2022winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2027sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2027winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2032sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2032winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2040sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2040winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2050sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_35999_2050winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2022sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2022winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2027sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2027winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2032sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2032winwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2040sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2040winwkd_AP42_ResuspPM10.xlsm

elp24mtp_mvs310_48141_2050sumwkd_AP42_ResuspPM10.xlsm
elp24mtp_mvs310_48141_2050winwkd_AP42_ResuspPM10.xlsm

Also included are two summary spreadsheets, by season, each with the resuspended dust from paved road PM_{10} estimates for all analysis years and areas.

elp24mtp_ResuspPM10_AP42_sumwkd_Summary.xls
elp24mtp_ResuspPM10_AP42_winwkd_Summary.xls

(Provided in "elp24mtp_AP42_PM10.zip".)