

Module 6

Using the Custom Domain Option



Module Overview

- Custom Domain vs. County
- Relevant inputs for a custom domain run
- Using the zone and zoneroad inputs to divide activity between areas
- Exercise: run a simple custom domain for a hypothetical five-county area

Custom Domain vs. County

- Two options in Geographic Bounds panel for county scale runs
 - Either option is acceptable for SIP and conformity purposes
 - Use same method for base and projected inventories
 - Also, use same method for SIP and conformity analyses
 - Use interagency consultation
- County
 - Allows access to some default county-level information
 - In Inventory mode, gives results for that specific county
- Custom Domain
 - Allows user to define a multi-county area or partial county as a single modeling domain
 - Individual “zones” can be defined
 - No direct access to default county-level information
 - In Inventory mode, results are for each defined zone

When Should I Use County?

- Use **County** when you want to model
 - A single county, in either inventory or emission rates mode
 - A small number of counties, and you plan to run one for each individually
 - A representative county, (i.e., a county that has the same fuels and I/M program as the other counties)
 - Allows access to MOVES defaults for your representative county
 - Under this approach, use emission rates mode and post-process appropriate rates with vehicle activity data from each county

When Should I Use Custom Domain?

- Use **Custom Domain** when you want to model:
 - Several counties with the same fuels and I/M programs in a single run
 - User can specify activity for each zone within the Custom Domain
 - Output will be produced for each zone (county)

Selecting a Custom Domain

MOVES - 1 - ID 8089990591762503742

File Edit Pre Processing Action Post Processing Tools Settings Help

- ✓ Description
- ✓ Scale
- ✓ Time Spans
- ! Geographic Bounds
- [-] ✓ Vehicles/Equipment
 - ✓ On Road Vehicle Equipment
 - ✓ Road Type
 - ✓ Pollutants And Processes
 - ✓ Manage Input Data Sets
- [-] ✓ Strategies
 - ✓ Rate Of Progress
- [-] ✓ Output
 - ✓ General Output
 - ✓ Output Emissions Detail
 - ✓ Advanced Performance Features

Region:

☐ Nation

☐ State

☐ County

☒ Custom Domain

Generic County

State ID: 99

County ID: 1 1-999, labels the county within a state.

Description:

GPA Fraction: 0.0 Fraction of county within a fuel Geographic Phase-in Area

Bar. Pressure: inHg (avg. for low altitude is 28.9, avg. for high is 24.6)

Vapor Adjust: 0.0 Refueling Vapor Program Adjustment Fraction

Spill Adjust: 0.0 Refueling Spill Program Adjustment Fraction

Domain Input Database

The County domain scale requires a database of detailed data.

Server: localhost

Database: lake_2015_training_in

Refresh

Enter/Edit Data

Geographic Bounds Requirements

Select and Import County-Level Data

Geographic Bounds Inputs

- CountyID (stateID for custom domain is always 99)
 - Usually 1 (FIPs code of 99001)
- Description (optional)
- GPA Fraction (only applies to a few mountain west states in certain years)
- Barometric Pressure (low altitude = 28.9, high altitude = 24.6)
- Stage 2 control program inputs – defaults can be found in countyyear table of MOVES default database
 - Vapor Adjust
 - Spill Adjust

Using “Zones”

- A custom domain can be dividing into one or more “zones” of unique vehicle activity
 - As an example, we’ll model a custom domain with five zones representing individual counties
- VMT, starts, hotelling, and parked (evap) activity can be allocated across user-defined zones
- Meteorological conditions can also vary across zones
- Age distribution, fuels, speed distribution, and I/M program are uniform across all zones

County Data Manager Inputs

- Relevant for Custom Domain
 - Zone
 - Zoneroad
 - ZoneSCC
 - Meteorology
- Plus all other inputs (VMT, fuels, age distribution, etc.)
 - Set up a county level Runspec for one of the counties and export the fuel and I/M tables to get defaults
 - Change the county ID to match the county ID used in the custom domain Runspec
 - Use VMT, source type population, age distribution, average speed distribution, road type distribution that represents the entire domain
 - Zone and Zoneroad tables allocate VMT, population, and road type distribution in different zones

Zone Input

- Used to allocate off-network activity to each zone
- User enters allocation for starts (startallocfactor), hotelling (idleallocfactor), and parking (SHPallocfactor)
 - Must sum to one for all zones

Zone Input

- The above example shows a custom domain with two zones
 - Starts are mostly occurring in zone 2, while hotelling primarily occurs in zone 1
 - Vehicle hours parked are equally divided between zones 1 and 2

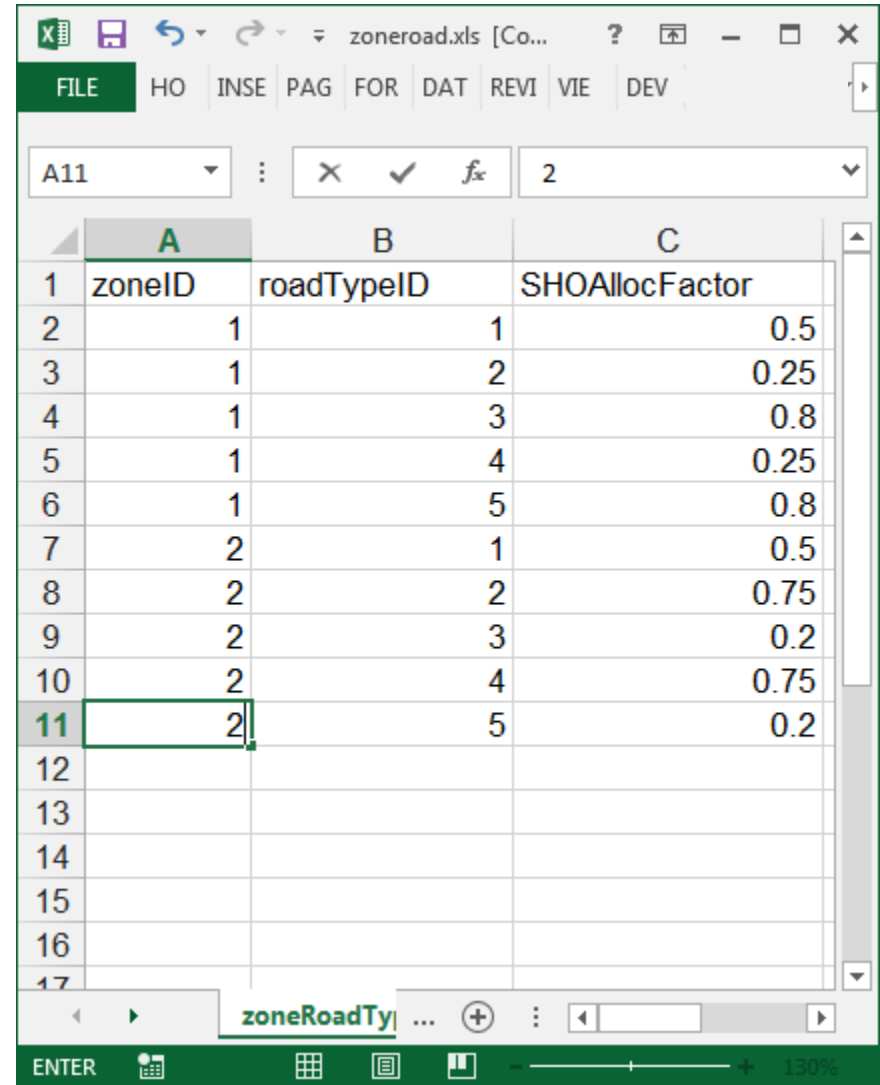
	A	B	C	D	E	F	G	H	I	J	K
1	zoneID	countyID	startAllocFactor	idleAllocFactor	SHPAllocFactor						
2	1	99001	0.1	0.75	0.5						
3	2	99001	0.9	0.25	0.5						
4											
5											
6											
7											

Zoneroad Input

- Takes user-supplied road type distribution for entire domain and adjusts it to reflect differences in each zone
- User enters source hours operating fraction (SHOallocfactor)
- Some zones may have more source hours operating (SHO)
- Also, some zones may have more highway/freeway SHO than arterial SHO
- Must sum to one for each road type

Zoneroad Input

- The example shows two zones with different distributions of SHO
- Freeway/highway SHO is mostly in zone 2 while the majority of arterial SHO occurs in zone 1
- NOTE: RoadtypeID=1 (Off-Network) is a required placeholder in this table however it is still necessary for the SHOAllocFactor to sum to 1 across a given roadtype.



	A	B	C
	zoneID	roadTypeID	SHOAllocFactor
2	1	1	0.5
3	1	2	0.25
4	1	3	0.8
5	1	4	0.25
6	1	5	0.8
7	2	1	0.5
8	2	2	0.75
9	2	3	0.2
10	2	4	0.75
11	2	5	0.2
12			
13			
14			
15			
16			
17			

Using Travel Model Data to Develop Zone and Zoneroad Inputs

- Map model travel analysis zones (TAZs) to the zones used in MOVES run
- Zone input:
 - Sum trip origins for all TAZs within a MOVES zone, and calculate startAllocFactor by zone
 - Sum trip ends for all TAZs within a MOVES zone, and calculate SHPAllocFactor by zone
- Zoneroad input:
 - Map travel model road types to MOVES roadtypes
 - Sum VHT by MOVES roadtype within each MOVES zone, and then calculate SHOAllocFactor for each zone

ZoneSCC

- Used to map MOVES road types to SCC road types
- Only required when selecting SCC output in runspec
- SIP and Regional Conformity analyses do not typically use SCC output and therefore, for most cases, users should skip this input

Meteorology

- Temperature and humidity can vary by zone
- Reference county inventory discussion for guidance on selecting meteorological data sources for MOVES

Meteorology

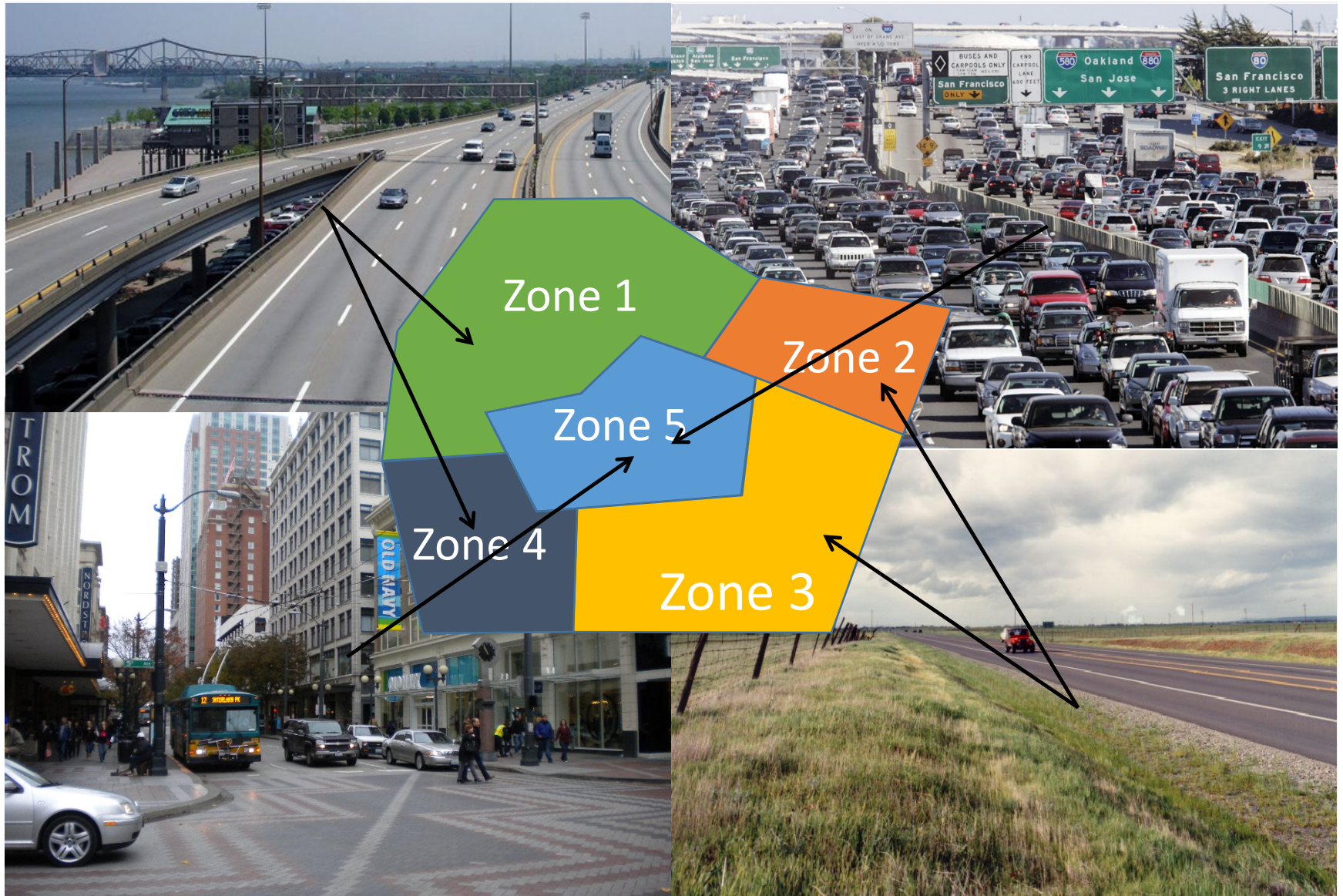
- The example shows two zones with different meteorology
- Only one hour is shown, but typically a 24-hour profile would be entered for each month, and zone being modeled

	A	B	C	D	E	F	G	H	I	J	K	L
1	monthID	zoneID	hourID	temperature	relHumidity							
2	7	1	1	46.3	56.3							
3	7	2	1	66.3	78.4							
4												
5												
6												
7												

Custom Domain Exercise

- Our exercise scenario is a five county non-attainment area – custom domain with five zones
 - Area shares the same age distribution, fuels, I/M, and speed distribution
 - Road type distribution is based on the entire domain
- Four suburban counties (zones 1-4) and one urban county (zone 5)
- Significant number of trips begin and end within zone 5 – many starts, high arterial VMT
- Most freeway activity and extended idling occurs in surrounding rural counties
- Zone 1 has different temperature profile

Exercise Scenario - Geographic Orientation



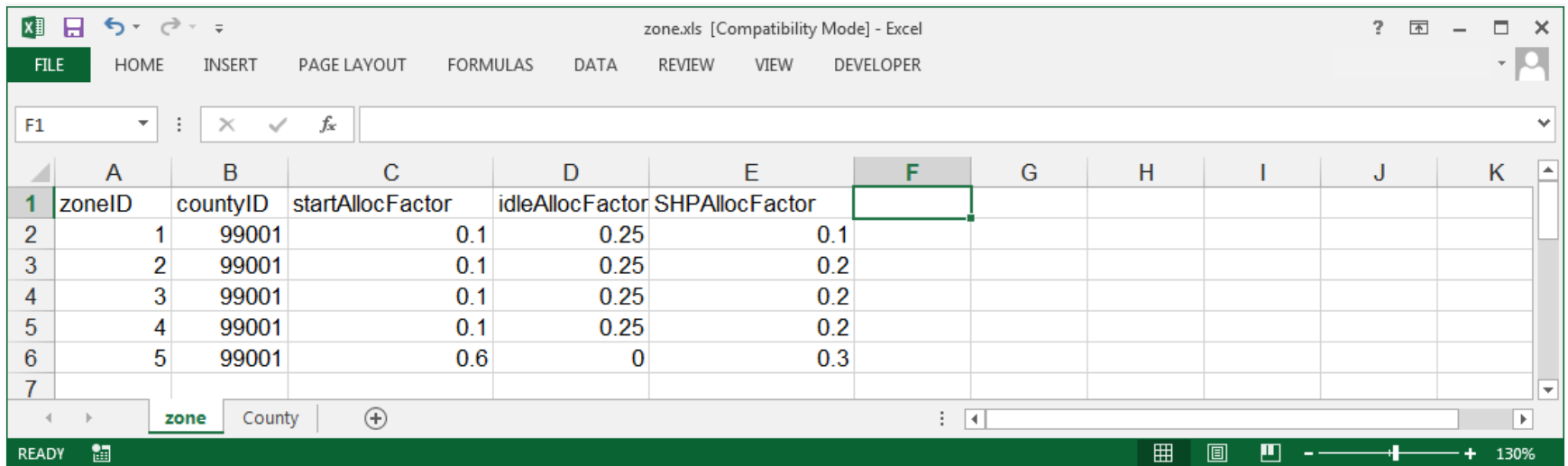
Load RunSpec

- Open Custom.mrs
- Fill out Geographic bounds panel
 - CountyID - 1
 - Description – five county area
 - GPA Fraction – 0.0
 - Barometric Pressure – 28.9
 - Vapor Adjust – 0.0
 - Spill Adjust – 0.0
- Create input database – “custom_domain_in”
- Load pre-populated input files from custom domain folder
 - Except Met data – we will load after we enter Zone and ZoneRoad tables
 - For VMT, select HPMS and Annual radio buttons
- Export Zone and ZoneRoad templates

Populate Zone Input

- Zones 1, 2, 3, and 4
 - Suburban counties with 40% share of starts – split evenly between four zones (startallocfactor)
 - Contain 100% of hotelling – split evenly between four zones (idleallocfactor)
 - Zone 1 contains 10% of parked activity, zone 2, 3, and 4 contain 60% of activity – split evenly between three zones (SHPalloccfactor)
- Zone 5
 - Urban core contains 60% of starts (startallocfactor)
 - Zero % hotelling (idleallocfactor)
 - 30% parked activity (SHPalloccfactor)

Completed Zone Input



The screenshot shows an Excel spreadsheet titled "zone.xls [Compatibility Mode] - Excel". The ribbon includes FILE, HOME, INSERT, PAGE LAYOUT, FORMULAS, DATA, REVIEW, VIEW, and DEVELOPER. The active cell is F1. The spreadsheet contains a table with the following data:

	A	B	C	D	E	F	G	H	I	J	K
1	zoneID	countyID	startAllocFactor	idleAllocFactor	SHPAllocFactor						
2	1	99001	0.1	0.25	0.1						
3	2	99001	0.1	0.25	0.2						
4	3	99001	0.1	0.25	0.2						
5	4	99001	0.1	0.25	0.2						
6	5	99001	0.6	0	0.3						
7											

The bottom status bar shows "READY", a calendar icon, and a zoom level of 130%.

Populate ZoneRoad Input

- RoadTypeID 1 – Off-network (ignored by MOVES)
 - 20% to each zone
- RoadTypeID 2 – Rural Restricted
 - 25% to zones 1,2,3,4 and 0% to zone 5
- RoadTypeID 3 – Rural Unrestricted
 - 25% to zones 1,2,3,4 and 0% to zone 5
- RoadTypeID 4 – Urban Restricted
 - 22.5% to zones 1,2,3,4 and 10% to zone 5
- RoadTypeID 5 – Urban Unrestricted
 - 5% to zones 1,2,3,4 and 80% to zone 5

Completed ZoneRoad Input

zoneroad.xls [Compatibility Mode] - Excel

VanGessel, Benjamin

FILE HOME INSERT PAGE LAYOUT FORMULAS DATA REVIEW VIEW DEVELOPER

D11

	A	B	C	D	E	F	G	H	I	J	K	L
1	zoneID	roadTypeID	SHOAllocFactor									
2	1	1	0.2									
3	2	1	0.2									
4	3	1	0.2									
5	4	1	0.2									
6	5	1	0.2									
7	1	2	0.25									
8	2	2	0.25									
9	3	2	0.25									
10	4	2	0.25									
11	5	2	0									
12	1	3	0.25									
13	2	3	0.25									
14	3	3	0.25									
15	4	3	0.25									
16	5	3	0									
17	1	4	0.225									
18	2	4	0.225									
19	3	4	0.225									
20	4	4	0.225									
21	5	4	0.1									
22	1	5	0.05									
23	2	5	0.05									
24	3	5	0.05									
25	4	5	0.05									
26	5	5	0.8									
27												
28												

zoneRoadType RoadType

READY 120%

Meteorology

- Diurnal Profiles can be varied by zoneID
- For the Custom Domain exercise, zoneID 1 has a temperature profile ~20 degree F cooler than zones 2-5

	A	B	C	D	E	F	G	H
1	monthID	zoneID	hourID	temperatu	relHumidity			
2	7	1	1	46.3	56.3			
3	7	1	2	45	55			
4	7	1	3	43.9	53.9			
5	7	1	4	42.9	52.9			
6	7	1	5	42.1	52.1			
7	7	1	6	41.3	51.3			
8	7	1	7	41.6	51.6			
9	7	1	8	45	55			
10	7	1	9	49.2	59.2			
11	7	1	10	53	63			
12	7	1	11	56.1	66.1			
13	7	1	12	58.6	68.6			
14	7	1	13	60.4	70.4			
15	7	1	14	61.9	71.9			
16	7	1	15	62.9	72.9			
17	7	1	16	63.3	73.3			
18	7	1	17	63.3	73.3			
19	7	1	18	62.6	72.6			
20	7	1	19	61.2	71.2			
21	7	1	20	59	69			
22	7	1	21	55.3	65.3			
23	7	1	22	51.7	61.7			
24	7	1	23	49.6	59.6			
25	7	1	24	47.9	57.9			
26	7	2	1	66.3	78.4			
27	7	2	2	65	78.6			

Close CDM, run MOVES, open output

movesoutput x

1 • `SELECT * FROM custom_domain_out.movesoutput;`

Result Grid | Filter Rows: | Export: | Wrap Cell Content: |

	MOVESRunID	itr	yearID	monthID	dayID	stateID	countyID	zoneID	lin	pollutantID	pr	s	re	fu	fuel	m	sect	hpID	emissionQuant	
▶	1	1	2015	7	5	99	99001	5	NULL	3	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	1120510	NULL
	1	1	2015	7	5	99	99001	4	NULL	3	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	182316	NULL
	1	1	2015	7	5	99	99001	3	NULL	3	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	182316	NULL
	1	1	2015	7	5	99	99001	2	NULL	3	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	182316	NULL
	1	1	2015	7	5	99	99001	1	NULL	3	NULL	NULL	NULL	NULL	NULL	NULL	NULL	NULL	193940	NULL

movesoutput 1 x

Read Only

Questions?

