ATTACHMENT 5

Public Health
Prevent. Promote. Protect.
Shelby County Health Department

Shelby County Health Department
Air Pollution Control Program

Exceptional Event Demonstration

2023 Canadian Wildfires

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Contents

1. Introduction 19

1.1. Overview 19

Table 1: Location, date, and measured Tier 1 values at Shelby Farms requesting exclusion. 21

Table 2: Location, date, and measured Tier 2 values at Shelby Farms requesting exclusion. 21

Table 3: Location, date, and measured Tier 2 values at Alabama Ave requesting exclusion. 22

Table 4: Monitor values in surrounding areas affected by Canadian wildfire smoke in May 2023. 22

Table 5: Monitor values in surrounding areas affected by Canadian wildfire smoke in June 2023. 22

Table 6: Monitor values in surrounding areas affected by Canadian wildfire smoke in September 2023. 23

Table 7: Monitor values in surrounding areas affected by Canadian wildfire smoke in October 2023. 23

1.2. Clean Air Act Requirements 24

1.3. Exceptional Event Rule Requirements 24

1.4. Action Requested 25

2. Overview of Shelby County Air Quality Monitoring Network 27

2.1. Shelby County Particulate Ambient Air Monitoring Network 27

Figure 1: Spatial view of Shelby County's monitoring network. 27

3. Narrative Conceptual Model 28

3.1. 2023 Canadian Smoke and Wildfires 28

Figure 2: Active wildfires May 16, 2023, according to the Canadian Wildland Fire Information System. 31

Figure 3: Active wildfires May 17, 2023, according to the Canadian Wildland Fire Information System. 32

Figure 4: Active wildfires May 18, 2023, according to the Canadian Wildland Fire Information System. 33

Figure 5: Active wildfires May 19, 2023, according to the Canadian Wildland Fire Information System. 34

Figure 6: Active wildfires May 20, 2023, according to the Canadian Wildland Fire Information System. 35

Figure 7: Active wildfires May 21, 2023, according to the Canadian Wildland Fire Information System. 36

Figure 8: Active wildfires May 30, 2023, according to the Canadian Wildland Fire Information System. 37

Figure 9: Active wildfires May 31, 2023, according to the Canadian Wildland Fire Information System. 38

Figure 10: Active wildfires June 1, 2023, according to the Canadian Wildland Fire Information System. 39

Figure 11: Active wildfires June 2, 2023, according to the Canadian Wildland Fire Information System. 40

Figure 12: Active wildfires June 3, 2023, according to the Canadian Wildland Fire Information System. 41

Figure 13: Active wildfires June 4, 2023, according to the Canadian Wildland Fire Information System. 42

Figure 14: Active wildfires June 21, 2023, according to the Canadian Wildland Fire Information System. 43

Figure 15: Active wildfires June 22, 2023, according to the Canadian Wildland Fire Information System. 44

Figure 16: Active wildfires June 23, 2023, according to the Canadian Wildland Fire Information System. 45

Figure 17: Active wildfires June 24, 2023, according to the Canadian Wildland Fire Information System. 46

Figure 18: Active wildfires June 25, 2023, according to the Canadian Wildland Fire Information System. 47

Figure 19: Active wildfires September 2, 2023, according to the Canadian Wildland Fire Information System. 48

Figure 20: Active wildfires September 3, 2023, according to the Canadian Wildland Fire Information System. 49

Figure 21: Active wildfires September 4, 2023, according to the Canadian Wildland Fire Information System. 50

Figure 22: Active wildfires September 5, 2023, according to the Canadian Wildland Fire Information System. 51

Figure 23: Active wildfires September 6, 2023, according to the Canadian Wildland Fire Information System. 52

Figure 24: Active wildfires September 7, 2023, according to the Canadian Wildland Fire Information System. 53

Figure 25: Active wildfires September 28, 2023, according to the Canadian Wildland Fire Information System. 54

Figure 26: Active wildfires September 29, 2023, according to the Canadian Wildland Fire Information System. 55

Figure 27: Active wildfires September 30, 2023, according to the Canadian Wildland Fire Information System. 56

Figure 28: Active wildfires September 31, 2023, according to the Canadian Wildland Fire Information System. 57

Figure 29: Active wildfires October 1, 2023, according to the Canadian Wildland Fire Information System. .. 58

Figure 30: Active wildfires October 2, 2023, according to the Canadian Wildland Fire Information System. .. 59

Figure 31: Active wildfires October 3, 2023, according to the Canadian Wildland Fire Information System. .. 60

Figure 32: Active wildfires October 4, 2023, according to the Canadian Wildland Fire Information System. .. 61
Figure 34: Surface analysis map for 18Z May 21, 2023. 63
Figure 35: Surface analysis map for 18Z May 22, 2023. 64
Figure 36: Surface analysis map for 18Z May 23, 2023. 65
Figure 37: Surface analysis map for 18Z May 24, 2023. 66
Figure 38: Surface analysis map for 18Z June 4, 2023. 67
Figure 39: Surface analysis map for 18Z June 5, 2023. 68
Figure 40: Surface analysis map for 18Z June 6, 2023. 69
Figure 41: Surface analysis map for 18Z June 7, 2023. 70
Figure 42: Surface analysis map for 18Z June 8, 2023. 71
Figure 43: Surface analysis map for 18Z June 9, 2023. 72
Figure 44: Surface analysis map for 18Z June 10, 2023. 73
Figure 45: Surface analysis map for 18Z June 25, 2023. 74
Figure 46: Surface analysis map for 18Z June 26, 2023. 75
Figure 47: Surface analysis map for 18Z June 27, 2023. 76
Figure 48: Surface analysis map for 18Z June 28, 2023. 77
Figure 49: Surface analysis map for 18Z September 7, 2023. 78
Figure 50: Surface analysis map for 18Z September 8, 2023. 79
Figure 51: Surface analysis map for 18Z October 4, 2023. 80
Figure 52: Surface analysis map for 18Z October 5, 2023. 81
4. Clear Causal Relationship 82
4.1. Canadian Wildfire Smoke Impacting Shelby County Monitors 82
4.1.1. Analysis for May 20 – May 24. 2023 84
Figure 54: AirNow values and HMS smoke polygons on May 20, 2023. (Continued on next page.) 86
(Figure 54 continued) Zoomed-in view. 87
Figure 55: AirNow values and HMS smoke polygons of May 21, 2023. (Continued on next page.) 89
(Figure 55 continued) Zoomed-in view. 90
Figure 56: NOAA HYSPLIT 128-Hour Backward Trajectory for May 21, 2023 92
Figure 57: AirNow values and HMS smoke polygons of May 22, 2023. (Continued on next page.) 93

(Figure 57 continued) Zoomed-in view. 94
Figure 58:GOES-East AerosolWatch Visible Imagery with Smoke/Dust from NOAA-20 on May 22, 2023. 96
Figure 59: NOAA HYSPLIT 128-Hour Backward Trajectory for May 22, 2023 97
Figure 60: AirNow values and HMS smoke polygons of May 24, 2023. (Continued on next page.) 98
(Figure 58 continued) Zoomed-in view. 99
4.1.2. Analysis for June 4 – June 10, 2023 101
Figure 61: AirNow values and HMS smoke polygons of June 4, 2023. (Continued on next page.) 101
(Figure 61 continued) Zoomed-in view. 102
Figure 62: AirNow values and HMS smoke polygons of June 5, 2023. (Continued on next page.) 103
(Figure 62 continued) Zoomed-in view. 104
Figure 63: AirNow values and HMS smoke polygons of June 6, 2023. (Continued on next page.) 105
(Figure 63 continued) Zoomed-in view. 106
Figure 64: AirNow values and HMS smoke polygons of June 7, 2023. (Continued on next page.) 107
(Figure 64 continued) Zoomed-in view. 108
Figure 65: AirNow values and HMS smoke polygons of June 8, 2023. (Continued on next page.) 109
(Figure 65 continued) Zoomed-in view. 110
Figure 66: AirNow values and HMS smoke polygons of June 9, 2023. (Continued on next page.) 111
(Figure 66 continued) Zoomed-in view. 112
Figure 67: AirNow values and HMS smoke polygons of June 10, 2023. (Continued on next page.) 113
(Figure 67 continued) Zoomed-in view. 114
Figure 68: NOAA HYSPLIT 128-Hour Backward Trajectory for June 6, 2023 115
Figure 69: Canadian Wildland Fire Map for May 31, 2023 117
Figure 70: GOES-East AerosolWatch GeoColor Map for May 31, 2023 118
Figure 71: GOES-East AerosolWatch Smoke/Dust AOD GeoColor for May 31, 2023 119
Figure 72: Canadian Wildland Fire Map for June 1, 2023 120
Figure 73: GOES-East AerosolWatch GeoColor Map for June 1, 2023 121
Figure 74: GOES-East AerosolWatch GeoColor Smoke/Dust AOD Map for June 1, 2023 122
Figure 75: WPC Surface Analysis for 18Z June 1, 2023 123
Figure 76: Upper Air Data (850 mb) for 0Z June 2, 2023 124
Figure 77: Canadian Wildland Fire Map for June 2, 2023 125
Figure 78: GOES-East AerosolWatch GeoColor for June 2, 2023 126
Figure 79: GOES-East AerosolWatch GeoColor Smoke/Dust AOD for June 2, 2023 127
Figure 80: WPC Surface Analysis for 18Z June 2, 2023 128
Figure 81: Upper Air Data (850 mb) 0Z June 3, 2023 129
Figure 82: Canadian Wildland Fire Map for June 3, 2023 130
Figure 83: WPC Surface Analysis for 18Z June 3, 2023 132
Figure 84: Upper Air Data (850 mb) for 0Z June 4, 2023 133

Figure 85: GOES-East AerosolWatch GeoColor June 3, 2023 134
Figure 86: GOES-East AerosolWatch GeoColor Smoke/Dust AOD Map for June 3, 2023 136
Figure 87: Canadian Wildland Fire Map for June 4, 2023 137
Figure 88: WPC Surface Analysis for 18Z June 4, 2023 138
Figure 89: Upper Air Data (850 mb) 0Z June 5, 2023 139
Figure 90: GOES-East AerosolWatch GeoColor Map for June 4, 2023 140
Figure 91: GOES-East AerosolWatch GeoColor Smoke/Dust AOD for June 4, 2023 141
Figure 92: Canadian Wildland Fire Map for June 5, 2023 142
Figure 93: WPC Surface Analysis for 18Z June 5, 2023 144
Figure 94: NOAA HYSPLIT 176-Hour Backward Trajectory for June 5, 2023 145
Figure 95: WPC Surface Analysis for 0Z June 6, 2023 146
Figure 96: Upper Air Data (850 mb) for 0Z June 6, 2023 147
Figure 97: WPC Surface Analysis for 12Z June 6, 2023 149
Figure 98: WPC Surface Analysis for 15Z June 6, 2023 150
Figure 99: Upper Air Data (700 mb) for 12Z June 6, 2023 151
Figure 100: Upper Air Data (850 mb) for 12Z June 6, 2023 152
Figure 101: GOES-East AerosolWatch GeoColor Map for June 6, 2023 153
Figure 102: GOES-East Aerosol Watch GeoColor AOD Map for June 6, 2023 154
Table 14: Hourly (0-23 CST) and 24-hr Sample $PM_{2.5}$ ($\mu g/m^3$) Values on June 5, 2023. 155
Table 15: Hourly (0-23 CST) $PM_{2.5}$ ($\mu g/m^3$) Values on June 6, 2023 155
Figure 103: Hourly Surface Weather Observations for June 6, 2023 156
Figure 104: WPC Surface Analysis for 0Z June 7, 2023 157
Figure 105: Upper Air Data (700 mb) for 0Z June 7, 2023 158
Figure 106: Upper Air Data (850 mb) for 0Z June 7, 2023 160
Figure 107: NOAA HYSPLIT 128-Hour Backward Trajectory for June 7, 2023 161
Figure 108: WPC Surface Analysis for 12Z June 7, 2023 162
Figure 109: Upper Air Data (700 mb) for 12Z June 7, 2023 163
Figure 110: Upper Air Data (850 mb) for 12Z June 7, 2023 164
Figure 111: GOES-East AerosolWatch GeoColor Map for June 7, 2023 165
Figure 112: GOES-East AerosolWatch GeoColor AOD Map for June 7, 2023 166
Table 16: Hourly (0-23 CST) Site $PM_{2.5}$ ($\mu g/m^3$Values on June 7, 2023. 167
Figure 113: WPC Surface Analysis for 0Z June 8, 2023 168
Figure 114: Upper Air Data (700 mb) for 0Z June 8, 2023 169
Figure 115: Hourly Surface Weather Observations for June 7, 2023 170
Figure 116: NOAA HYSPLIT 128-Hour Backward Trajectory for June 8, 2023 171
Figure 117: WPC Surface Analysis for 12Z June 8, 2023 173
Figure 118: Upper Air Data (700 mb) for 12Z June 8, 2023 174

Figure 119: Upper Air Data (850 mb) for 12Z June 8, 2023 175
Figure 120: GOES-East AerosolWatch GeoColor Map for June 8, 2023 176
Figure 121: GOES-East AerosolWatch GeoColor Smoke/Dust AOD Map for June 8, 2023 177
Figure 123: WPC Surface Analysis for 0Z June 9, 2023 179
Figure 124: Upper Air Data (700 mb) for 0Z June 9, 2023 180
Figure 125: Upper Air Data (850 mb) for 0Z June 9, 2023 181
Table 17: Hourly (0-23 CST) and 24-hr Sample $PM_{2.5}$ ($\mu g/m^3$) Values on June 8, 2023. 182
Figure 126: NOAA HYSPLIT 128-Hour Backward Trajectory for June 9, 2023 183
Figure 127: WPC Surface Analysis for 12Z June 9, 2023 185
Figure 128: Upper Air Data (700 mb) for 12Z June 9, 2023 186
Figure 129: Upper Air Data (850 mb) for 12Z June 9, 2023 187
Figure 130: GOES-East AerosolWatch GeoColor Map for June 9, 2023 188
Figure 131: GOES-East AerosolWatch GeoColor AOD Map for June 9, 2023 189
Table 18: Hourly (0-23 CST) Site $PM_{2.5}$ ($\mu g/m^3$) Values on June 9, 2023. 189
Figure 133: WPC Surface Analysis for 0Z June 10, 2023 192
Figure 134: Upper Air Data (700 mb) for 0Z June 10, 2023 193
Figure 135: Upper Air Data (850 mb) for 0Z June 10, 2023 194
Figure 136: NOAA HYSPLIT 78-Hour Backward Trajectory for June 10, 2023 195
Figure 137: NOAA HYSPLIT 24-Hour Backward Trajectory for June10, 2023 196
Figure 138: WPC Surface Analysis for 12Z June 10, 2023 197
Figure 139: Upper Air Data (700 mb) for 12Z June 10, 2023 198
Figure 140: WPC Surface Analysis for 15Z June 10, 2023 199
Figure 141: WPC Surface Analysis for 21Z June 10, 2023 200
Figure 142: WPC Surface Analysis for 21Z June 10, 2023 202
Figure 143: GOES-East AerosolWatch GeoColor Map for June 10, 2023 203
Figure 144: GOES-East AerosolWatch GeoColor AOD Map for June 10, 2023 204
Figure 145: Hourly Surface Weather Observations for June 10, 2023 205
Figure 146: WPC Surface Analysis for 0Z June 11, 2023 206
Figure 147: Upper Air Data (700 mb) for 0Z June 11, 2023 207
Figure 148: Upper Air Data (850 mb) for 0Z June 11, 2023 208
4.1.3. Analysis for June 26 – June 28, 2023 209
Figure 149: AirNow values and HMS smoke polygons of June 26, 2023. (Continued on next page.) 209
(Figure 149 continued) Zoomed-in view. 210
Figure 150: AirNow values and HMS smoke polygons of June 27, 2023. (Continued on next page.) 211
(Figure 150 continued) Zoomed-in view. 212
Figure 151: AirNow values and HMS smoke polygons of June 28, 2023. (Continued on next page.) 213
(Figure 151 continued) Zoomed-in view. 214

Figure 152: NOAA HYSPLIT 128-Hour Backward Trajectory for June 26, 2023 215
Figure 153: NOAA HYSPLIT 24-Hour Backward Trajectory for June 26, 2023. 216
Figure 154: WPC Surface Analysis for 06Z June 26, 2023. 217
Figure 155: WPC Surface Analysis for 15Z June 26, 2023. 219
Figure 156: Canadian Wildland Fire Map for June 21, 2023. 221
Figure 157: Canadian Wildland Fire Map for June 23, 2023. 222
Figure 158: GOES-East AerosolWatch GeoColor Map for June 26, 2023. 223
Figure 159: GOES-East Aerosol Watch GeoColor Map with AOD for June 26, 2023. 224
Table 20: Hourly (0-23 CST) Site $PM_{2.5}$ ($\mu g/m^3$) Values on June 26, 2023. 224
Figure 160: Hourly Surface Weather Observations for June 26, 2023. 226
Figure 161: WPC Surface Analysis for 0Z June 27, 2023. 227
Figure 162: NOAA HYSPLIT 128-Hour Backward Trajectory for June 27, 2023. 229
Figure 163: WPC Surface Analysis for 18Z June 27, 2023. 231
Table 21: Hourly (0-23 CST) Site $PM_{2.5}$ (µg/m3) Values on June 27, 2023. 232
Figure 164: GOES-East AerosolWatch Smoke/Dust Map for June 27, 2023. 234
Figure 165: GOES-East AerosolWatch Smoke/Dust AOD Composite Map for June 27, 2023. 235
Figure 166: WPC Surface Analysis for 0Z June 28, 2023. 236
Figure 167: Hourly Surface Weather Observations for June 27, 2023. 237
Figure 168: NOAA HYSPLIT 128-Hour Backward Trajectory for June 28, 2023. 238
Figure 169: WPC Surface Analysis for 15Z June 28, 2023. 240
Table 22: Hourly (0-23 CST) Site $PM_{2.5}$ (µg/m3) Values on June 28, 2023. 241
Figure 170: GOES-East AerosolWatch Smoke/Dust Map for June 28, 2023. 242
Figure 171: GOES-East AerosolWatch Smoke/Dust Composite Map for June 28, 2023. 243
Figure 172: WPC Surface Analysis for 03Z June 29, 2023. 244
Figure 173: Hourly Surface Weather Observations for June 28, 2023. 246
Figure 174: NOAA HYSPLIT 78-Hour Backward Trajectory for June 29, 2023 248
Figure 175: WPC Surface Analysis for 09Z June 29, 2023 250
Figure 177: WPC Surface Analysis for 15Z June 29, 2023 254
Table 23: Hourly (0-23 CST) Site $PM_{2.5}$ ($\mu g/m^3$) Values on June 29, 2023 255
Figure 178: Hourly Surface Weather Observations for June 29, 2023 256
Figure 179: GOES-East AerosolWatch Smoke/Dust Map for June 29, 2023 258
Figure 180: GOES-East AerosolWatch Smoke/Dust Composite Map for June 29, 2023 259
4.1.4. Analysis for September 7-8, 2023 260
Figure 181: AirNow values and HMS smoke polygons of September 7, 2023. (Continued on next page.) 260
(Figure 181 continued) Zoomed-in view. 261
Figure 182: AirNow values and HMS smoke polygons of September 8, 2023. (Continued on next page.) 262
(Figure 182 continued) Zoomed-in view. 263

Figure 183: NOAA HYSPLIT 78-Hour Backward Trajectory for September 7, 2023. 264
Figure 184: NOAA HYSPLIT 24-Hour Backward Trajectory for September 7, 2023. 265
Figure 185: WPC Surface Analysis for 03Z September 7, 2023. 266
Figure 186: WPC Surface Analysis for 06Z September 7, 2023. 267
Table 24: Hourly (0-23 CST) Site $PM_{2.5}$ (µg/m3) Values on September 6, 2023. 268
Table 25: Hourly (0-23 CST) Site $PM_{2.5}$ (µg/m3) Values on September 7, 2023. 268
Figure 187: WPC Surface Analysis for 21Z September 7, 2023. 269
Figure 188: GOES-East AerosolWatch Smoke/Dust Map for September 7, 2023. 270
Figure 189: GOES-East AerosolWatch Smoke/Dust Composite Map for September 7, 2023. 271
Figure 190: Canadian Wildland Fire Map for September 4, 2023. 272
Figure 191: GOES-East AerosolWatch AOD for September 5, 2023. 273
Figure 192: GOES-East AerosolWatch AOD for September 6, 2023. 274
Figure 193: Hourly Surface Weather Observations for September 7, 2023. 275
Figure 194: NOAA HYSPLIT 128-Hour Backward Trajectory for September 8, 2023. 276
Figure 195: WPC Surface Analysis for 15Z September 8, 2023. 277
Figure 196: GOES-East AerosolWatch Smoke/Dust Map for September 8, 2023. 279
Figure 197: GOES-East AerosolWatch Smoke/Dust AOD Composite for September 8, 2023. 280
Figure 198: WPC Surface Analysis for 0Z September 9, 2023. 282
Figure 199: Upper Air Data (500 mb) for 12Z September 8, 2023. 283
Figure 200: Upper Air Data (700 mb) for 12Z September 8, 2023. 284
Figure 201: Upper Air Data (850 mb) for 12Z September 8, 2023. 285
Figure 202: Upper Air Data (500 mb) for 0Z September 9, 2023. 286
Figure 203: Upper Air Data (700 mb) for 0Z September 9, 2023. 287
Figure 204: Upper Air Data (850 mb) for 0Z September 9, 2023. 288
Figure 205: Upper Air Data (500 mb) for 12Z September 9, 2023. 289
Figure 206: Upper Air Data (700 mb) for 12Z September 9, 2023. 290
Figure 207: Upper Air Data (850 mb) for 12Z September 9, 2023. 291
Figure 208: NOAA HYSPLIT 78-Hour Backward Trajectory for September 9, 2023. 292
Figure 209: NOAA HYSPLIT 24-Hour Backward Trajectory for September 9, 2023. 293
Table 27: Hourly (0-23 CST) Site $PM_{2.5}$ (µg/m3) Values on September 9, 2023. 294
4.1.5. Analysis for October 4 – October 5, 2023 296
Figure 211: AirNow values and HMS smoke polygons of October 4, 2023. 296
(Figure 211 continued) Zoomed-in view. 297
Figure 212: AirNow values and HMS smoke polygons of October 5, 2023. 298
(Figure 212 continued) Zoomed-in view. 299
Figure 213: NOAA HYSPLIT 128-Hour Backward Trajectory for October 4, 2023. 300
Figure 214: Canadian Wildland Fire Map for on September 29, 2023. 302

Figure 215: GOES-East AerosolWatch Smoke/AOD Map for September 30, 2023. 303
Figure 216: GOES-East AerosolWatch Smoke/AOD Map for October 1, 2023. 304
Figure 217: GOES-East AerosolWatch Smoke/AOD Colorful Map for October 1, 2023. 305
Figure 218: WPC Surface Analysis for 18Z October 1, 2023. 306
Figure 219: Upper Air Data (700mb) for 0Z October 2, 2023. 307
Figure 220: GOES-East AerosolWatch Satellite Imagery for October 2, 2023. 308
Figure 221: GOES-East AerosolWatch Smoke/Dust AOD for October 2, 2023. 309
Figure 222: WPC Surface Analysis for 18Z October 2, 2023. 310
Figure 223: Upper Air Data (700 mb) for 0Z October 3, 2023. 311
Figure 224: GOES-East AerosolWatch Satellite Imagery for October 3, 2023. 312
Table 28: Hourly (0-23 CST) Site $PM_{2.5}$ ($\mu g/m^3$) Values on October 3, 2023. 313
Figure 225: GOES-East AerosolWatch Smoke/Dust AOD Colorful Map for October 3, 2023. 314
Figure 226: WPC Surface Analysis for 18Z October 3, 2023. 315
Figure 227: Upper Air Data (700 mb) for 0Z October 4, 2023. 316
Figure 228: WPC Surface Analysis for 0Z October 4, 2023. 318
Figure 229: Upper Air Data (850 mb) for 0Z October 4, 2023. 319
Figure 230: GOES-East AerosolWatch Satellite Imagery for October 4, 2023. 320
Figure 231: GOES-East AerosolWatch Smoke/Dust AOD Colorful Map for October 4, 2023. 321
Figure 233: Upper Air Data (850 mb) for 12Z October 4, 2023. 324
Figure 234: WPC Surface Analysis for 0Z October 5 , 2023. 325
Figure 235: Upper Air Data (850 mb) for 0Z October 5, 2023. 326
Table 29: Hourly (0-23 CST) Site $PM_{2.5}$ ($\mu g/m^3$) Values on October 4, 2023. 327
Figure 236: Hourly Surface Weather Observations for October 4, 2023. 328
Figure 237: NOAA HYSPLIT 78-Hour Backward Trajectory for October 5, 2023. 329
Figure 238: GOES-East AerosolWatch Smoke/Dust Map for October 5, 2023. 331
Figure 239: WPC Surface Analysis for 12Z October 5, 2023. 332
Figure 240: Upper Air Data (700 mb) for 0Z October 5, 2023. 333
Figure 241: Upper Air Data (850 mb) for 12Z October 5, 2023. 334
Table 30: Hourly (0-23 CST) Site $PM_{2.5}$ ($\mu g/m^3$) Values on October 5, 2023. 335
Figure 242: WPC Surface Analysis for 18Z October 5, 2023. 336
Figure 243: WPC Surface Analysis for 21Z October 5, 2023. 337
Figure 244: Hourly Surface Weather Observations for October 5, 2023. 338
Figure 245: GOES-East AerosolWatch Smoke/Dust Map for October 5, 2023. 340
Figure 246: WPC Surface Analysis for 0Z October 6, 2023. 341
Figure 247: Upper Air Data (850 mb) for 0Z October 6, 2023. 342
Figure 248: WPC Surface Analysis for 12Z October 6, 2023. 343
Figure 249: Upper Air Data (850 mb) for 12Z October 6, 2023. 344

Figure 250: GOES-East AerosolWatch AOD for October 6, 2023. 345
Table 31: Hourly (0-23 CST) Site $PM_{2.5}$ (µg/m^3) Values on October 6, 2023. 346
4.2. Tier 2 Additional Evidence 347
4.2.1. Changes in Temporal Patterns of $PM_{2.5}$ Relative to Typical Non-Event Data 348
Shelby Farms 348
Figure 251: SF Non-Event Temporal Patterns (Jan 2021-Oct 2023) 350
Figure 252: SF Non-Event $PM_{2.5}$ Temporal Patterns Compared with Fire Event Temporal Patterns 351
Figure 253: Normalized SF Non-Event $_{PM2.5}$ Temporal Patterns Compared with Fire Event Temporal Patterns 352
Figure 254: Wildfire event data at SF for May 20 – 24, 2023, compared with typical, non-event data. 353
Figure 255: Wildfire event data at SF for June 4 – 10, 2023, compared with typical, non-event data. 353
Figure 256: Wildfire event data at SF for June 26 – 28, 2023, compared with typical, non-event data. 354
Figure 257: Wildfire event data at SF for Sep 7-8, 2023, compared with typical, non-event data. 354
Figure 258: Wildfire event data at SF for Oct 4-5, 2023, compared with typical, non-event data. 355
Alabama Ave 356
Figure 259: Weekday $PM_{2.5}$ at AA 2018-2023 357
Figure 260: Monthly $PM_{2.5}$ at AA 2018-2023 357
Figure 261: Wildfire event data at AA for May 21-24, 2023, compared with typical, non-event data. 358
Figure 262: Wildfire event data at AA for Jun 5-8, 2023, compared with typical, non-event data. 358
4.2.2. Smoke Modelling 360
4.2.2.1. May 20 – May 24, 2023 360
Figure 263: UBC BlueSky Maximum $PM_{2.5}$ from Smoke May 19, 2023. 361
Figure 264: UBC BlueSky Maximum $PM_{2.5}$ from Smoke May 20, 2023. 362
Figure 265: UBC BlueSky Maximum $PM_{2.5}$ from Smoke May 21, 2023. 362
Figure 266: UBC BlueSky Maximum $PM_{2.5}$ from Smoke May 22, 2023. 363
Figure 267: UBC BlueSky Maximum $PM_{2.5}$ from Smoke May 23, 2023. 363
Figure 268: UBC BlueSky Maximum PM2.5 from Smoke May 24th 364
4.2.2.2. June 4 – June 10, 2023 364
Figure 269: HRRR Modelling for June 3, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated. 365
Figure 270: HRRR Modelling for June 4, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated. 366
Figure 271: HRRR Modelling for June 4, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated. 367
Figure 272: HRRR Modelling for June 4, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated. 368

Figure 273: HRRR Modelling for June 4, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 369
Figure 274: HRRR Modelling for June 5, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 370
Figure 275: HRRR Modelling for June 5, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 371
Figure 276: HRRR Modelling for June 5, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 372
Figure 277: HRRR Modelling for June 5, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 373
Figure 278: HRRR Modelling for June 6, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 374
Figure 279: HRRR Modelling for June 6, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 375
Figure 280: HRRR Modelling for June 6, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 376
Figure 281: HRRR Modelling for June 6, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 377
Figure 282: HRRR Modelling for June 7, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 378
Figure 283: HRRR Modelling for June 7, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 379
Figure 284: HRRR Modelling for June 7, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 380
Figure 285: HRRR Modelling for June 7, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 381
Figure 286: HRRR Modelling for June 8, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 382
Figure 287: HRRR Modelling for June 8, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 383
Figure 288: HRRR Modelling for June 8, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 384
Figure 289: HRRR Modelling for June 8, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 385
Figure 290: HRRR Modelling for June 9, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 386
Figure 291: HRRR Modelling for June 9, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 387
Figure 292: HRRR Modelling for June 9, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 388
Figure 293: HRRR Modelling for June 9, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 389

Figure 294: HRRR Modelling for June 10, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 390

Figure 295: HRRR Modelling for June 10, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 391

Figure 296: HRRR Modelling for June 10, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 392

Figure 297: HRRR Modelling for June 10, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 393

Figure 298: HRRR Modelling for June 11, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 394

4.2.2.3. June 26 – June 28, 2023 395

Figure 299: HRRR Modelling for June 25, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated. (model initialization not available, 30-hr forecast shown). 396

Figure 301: HRRR Modelling for June 26, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated (model initialization not available, 36-hr forecast shown). 398

Figure 302: HRRR Modelling for June 26, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated (model initialization not available, 42-hr forecast shown). 399

Figure 303: HRRR Modelling for June 26, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated. (model initialization not available, 48-hr forecast shown). 400

Figure 304: HRRR Modelling for June 26, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 401

Figure 306: HRRR Modelling for June 27, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 403

Figure 307: HRRR Modelling for June 27, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 404

Figure 308: HRRR Modelling for June 27, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 405

Figure 309: HRRR Modelling for June 27, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 406

Figure 310: HRRR Modelling for June 28, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 407

Figure 311: HRRR Modelling for June 28, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 408

Figure 312: HRRR Modelling for June 28, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 409

Figure 313: HRRR Modelling for June 28, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 410

Figure 314: HRRR Modelling for June 29, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated.....411

4.2.2.4. September 7 – September 8, 2023..... 412

Figure 315: HRRR Modelling for September 6, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 413

Figure 316: HRRR Modelling for September 7, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 414
Figure 317: HRRR Modelling for September 7, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 415
Figure 318: HRRR Modelling for September 7, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 416
Figure 319: HRRR Modelling for September 7, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 417
Figure 320: HRRR Modelling for September 8, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 418
Figure 321: HRRR Modelling for September 8, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 419
Figure 322: HRRR Modelling for September 8, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 420
Figure 323: HRRR Modelling for September 8, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 421
Figure 324: HRRR Modelling for September 9, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 422
4.2.2.5. October 4 – October 5, 2023 423
Figure 325: HRRR Modelling for October 3, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 424
Figure 326: HRRR Modelling for October 4, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 425
Figure 327: HRRR Modelling for October 4, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 426
Figure 328: HRRR Modelling for October 4, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 427
Figure 329: HRRR Modelling for October 4, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 428
Figure 330: HRRR Modelling for October 5, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 429
Figure 331: HRRR Modelling for October 5, 2023, 06:00 CST at (top) near surface and (bottom) vertically integrated..... 430
Figure 332: HRRR Modelling for October 5, 2023, 12:00 CST at (top) near surface and (bottom) vertically integrated..... 431
Figure 333: HRRR Modelling for October 5, 2023, 18:00 CST at (top) near surface and (bottom) vertically integrated..... 432
Figure 334: HRRR Modelling for October 6, 2023, 00:00 CST at (top) near surface and (bottom) vertically integrated..... 433
4.2.3. Skew-T log-P Diagrams 434
Figure 336: 00Z May 21, 2023, Skew-T log-P Chart for BNA Nashville 435
Figure 337: 12Z May 21, 2023, Skew-T log-P Chart for BNA Nashville 436

Figure 338: 00Z May 22, 2023, Skew-T log-P Chart for BNA Nashville 437
Figure 339: 00Z May 24, 2023, Skew-T log-P Chart for BNA Nashville 438
Figure 340: 12Z May 24, 2023, Skew-T log-P Chart for BNA Nashville 439
Figure 341: 12Z June 4, 2023, Skew-T log-P Chart for BNA Nashville 440
Figure 342: 00Z June 5, 2023, Skew-T log-P Chart for BNA Nashville 441
Figure 343: 12Z June 5, 2023, Skew-T log-P Chart for BNA Nashville 442
Figure 344: 00Z June 6, 2023, Skew-T log-P Chart for BNA Nashville 443
Figure 345: 12Z June 6, 2023, Skew-T log-P Chart for BNA Nashville 444
Figure 346: 00Z June 7, 2023, Skew-T log-P Chart for BNA Nashville 445
Figure 347: 00Z June 8, 2023, Skew-T log-P Chart for BNA Nashville 446
Figure 348: 12Z June 8, 2023, Skew-T log-P Chart for BNA Nashville 447
Figure 349: 00Z June 9, 2023, Skew-T log-P Chart for BNA Nashville 448
Figure 350: 12Z June 9, 2023, Skew-T log-P Chart for BNA Nashville 449
Figure 351: 00Z June 10, 2023, Skew-T log-P Chart for BNA Nashville 450
Figure 352: 12Z June 10, 2023, Skew-T log-P Chart for BNA Nashville 451
Figure 353: 00Z June 26, 2023, Skew-T log-P Chart for BNA Nashville 452
Figure 354: 06Z September 7, 2023, Skew-T log-P Chart for BNA Nashville 453
Figure 355: 00Z September 8, 2023, Skew-T log-P Chart for BNA Nashville 454
Figure 356: 00Z October 4, 2023, Skew-T log-P Chart for BNA Nashville 455
Figure 357: 12Z October 4, 2023, Skew-T log-P Chart for BNA Nashville 456
Figure 358: 00Z October 5, 2023, Skew-T log-P Chart for BNA Nashville 457
Figure 359: 12Z October 5, 2023, Skew-T log-P Chart for BNA Nashville 458
4.2.4. 500 mb Height Analyses 460
Figure 361: 00Z May 21, 2023, 500 mb height analysis of the CONUS 461
Figure 362: 12Z May 21, 2023, 500 mb height analysis of the CONUS 462
Figure 363: 00Z May 22, 2023, 500 mb height analysis of the CONUS 463
Figure 364: 00Z May 24, 2023, 500 mb height analysis of the CONUS 464
Figure 365: 12Z May 24, 2023, 500 mb height analysis of the CONUS 465
Figure 366: 12Z June 4, 2023, 500 mb height analysis of the CONUS 466
Figure 367: 00Z June 5, 2023, 500 mb height analysis of the CONUS 467
Figure 368: 12Z June 5, 2023, 500 mb height analysis of the CONUS 468
Figure 369: 00Z June 6, 2023, 500 mb height analysis of the CONUS 469
Figure 370: 12Z June 6, 2023, 500 mb height analysis of the CONUS 470
Figure 371: 00Z June 7, 2023, 500 mb height analysis of the CONUS 471
Figure 372: 12Z June 8, 2023, 500 mb height analysis of the CONUS 472
Figure 373: 00Z June 9, 2023, 500 mb height analysis of the CONUS 473
Figure 374: 12Z June 9, 2023, 500 mb height analysis of the CONUS 474

Figure 375: 00Z June 10, 2023, 500 mb height analysis of the CONUS 475
Figure 376: 12Z June 10, 2023, 500 mb height analysis of the CONUS 476
Figure 377: 00Z June 11, 2023, 500 mb height analysis of the CONUS 477
Figure 378: 00Z June 26, 2023, 500 mb height analysis of the CONUS 478
Figure 379: 00Z June 26, 2023, 500 mb height analysis of the CONUS 479
Figure 380: 12Z June 26, 2023, 500 mb height analysis of the CONUS 480
Figure 381: 00Z June 27, 2023, 500 mb height analysis of the CONUS 481
Figure 382: 12Z June 27, 2023, 500 mb height analysis of the CONUS 482
Figure 383: 00Z June 28, 2023, 500 mb height analysis of the CONUS 483
Figure 384: 12Z June 28, 2023, 500 mb height analysis of the CONUS 484
Figure 385: 00Z September 7, 2023, 500 mb height analysis of the CONUS 485
Figure 386: 12Z September 7, 2023, 500 mb height analysis of the CONUS 486
Figure 387: 00Z September 8, 2023, 500 mb height analysis of the CONUS 487
Figure 388: 12Z September 8, 2023, 500 mb height analysis of the CONUS 488
Figure 389: 00Z October 4, 2023, 500 mb height analysis of the CONUS 489
Figure 390: 12Z October 4, 2023, 500 mb height analysis of the CONUS 490
Figure 391: 00Z October 5, 2023, 500 mb height analysis of the CONUS 491
Figure 392: 12Z October 5, 2023, 500 mb height analysis of the CONUS 492

5. Not Reasonably Controllable or Not Reasonably Preventable 493

6. Human Activity Unlikely to Recur at a Particular Location or Natural Event 494

7. Public Notification 495

Figure 393: May 25th email, mentioning smoke to public stakeholders. 496

Figure 394: June 9, 2023, email to public stakeholders mentioning high $PM_{2.5}$ concentrations. 497

Figure 395: Code Orange Forecast Advisory Email for June 27, 2023, notifying public stakeholders of increased $PM_{2.5}$. 498

Figure 396: September 7, 2023, $PM_{2.5}$ forecast discussion email, mentioning smoke to public stakeholders. . 499

Figure 397: September 8, 2023, $PM_{2.5}$ forecast discussion email, mentioning smoke to public stakeholders. . 500

Figure 398: September 8, 2023, $PM_{2.5}$ forecast discussion email, mentioning smoke to public stakeholders. . 501

Figure 399: Special Air Quality Weather Statement for September 8, 2023. 502

Figure 400: October 4, 2023 $PM_{2.5}$ Special Air Quality Statement email, mentioning smoke to public stakeholders 503

Figure 401: $PM_{2.5}$ Special Air Quality Statement for October 4, 2023. 504

Figure 402: October 5, 2023 $PM_{2.5}$ Special Air Quality Statement email, mentioning smoke to public stakeholders 505

Figure 403: $PM_{2.5}$ Special Air Quality Statement for October 5, 2023 506

8. References 508

Appendix A: Individual Monitoring Site Tiering Graphs 509

Appendix B: Air Quality System (AQS) Raw Data Report 516

1. Introduction

1.1. Overview

This Exceptional Event Demonstration shows that the Shelby Farms (AQS ID 47-157-0075) and Alabama Ave. (AQS ID 47-157-0024) sites were impacted by wildfire smoke originating from ongoing wildfires in Canada over several months in 2023. This resulted in elevated $PM_{2.5}$ concentrations at these monitors, contributing to an exceedance of the 2024 $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) of 9.0 $\mu g/m^3$. Currently, the Shelby Farms monitor has a preliminary design value for 2022-2024 that is above the new 2024 $PM_{2.5}$ annual NAAQS. However, the Alabama Ave monitor's preliminary 2024 design value is currently below the annual NAAQS level, but its data is incomplete pending the validation of quarter 4, 2024 air quality measurements, which, once finalized, could potentially indicate exceedances of the NAAQS standard. The elevated $PM_{2.5}$ concentrations included in this demonstration are for various Tier 1 and Tier 2 days affected by smoke, ranging from the end of May through early October 2023 at the Shelby Farms and Alabama Ave monitors, resultant from wildfires throughout Canada that began in approximately May 2023.

The tier thresholds, identified using the Environmental Protection Agency's Tiering Tool, are based on the lesser value of either (a) the most recent 5-year month-specific 98th percentile for 24-hour PM2.5 data, or (b) the minimum annual 98th percentile for 24-hour $PM_{2.5}$ data for the most recent 5-year period. In calculating both (a) and (b), all data with any "Request Exclusion" (R) or fire-related "Informational Only" (I) qualifiers are excluded. Tier 1 values are greater than or equal to 1.5 times the tiering threshold. Tier 2 values are greater than or equal to the tiering threshold and less than 1.5 times the tiering threshold.

The Memphis-Shelby County Health Department Air Pollution Control Branch (Shelby County Health Department) requests that the EPA concur with the exclusion of the specified $PM_{2.5}$ concentrations, as detailed in Table 1 through Table 3, from regulatory decisions and attainment of the NAAQS for the Shelby County Health Department. The days and sites for which Shelby County is requesting concurrence were impacted by an event consistent with the EPA's definition of "unusual or naturally occurring events that can affect air quality but are not reasonably controllable using techniques that tribal, state, or local air agencies may implement in order to attain and maintain the [NAAQS]" (USEPA, 2024).

Ambient monitoring locations throughout surrounding areas, operated by other state and local programs, reflect impacts to data as well during this event. An example summary of some of these sites impacted is provided in Table 4 - Table 7 and is done so in order to provide a comprehensive view of the total impact of the event throughout the Memphis area.

Table 1: Location, date, and measured Tier 1 values at Shelby Farms requesting exclusion.

County	AQS Site ID	Site Name	Date	24-hour Average Concentration (µg/m3)	Air Quality Index Category
Shelby	47-157-0075	Shelby Farms	5/22/2023	21.3	Moderate
Shelby	47-157-0075	Shelby Farms	6/6/2023	23.6	Moderate
Shelby	47-157-0075	Shelby Farms	6/7/2023	25.0	Moderate
Shelby	47-157-0075	Shelby Farms	6/8/2023	22.3	Moderate
Shelby	47-157-0075	Shelby Farms	6/9/2023	24.1	Moderate
Shelby	47-157-0075	Shelby Farms	6/27/2023	22.2	Moderate
Shelby	47-157-0075	Shelby Farms	6/28/2023	20.4	Moderate
Shelby	47-157-0075	Shelby Farms	9/7/2023	26.3	Moderate
Shelby	47-157-0075	Shelby Farms	9/8/2023	26.2	Moderate
Shelby	47-157-0075	Shelby Farms	10/4/2023	32.1	Moderate
Shelby	47-157-0075	Shelby Farms	10/5/2023	27.7	Moderate

Table 2: Location, date, and measured Tier 2 values at Shelby Farms requesting exclusion.

County	AQS Site ID	Site Name	Date	24-hour Average Concentration (µg/m3)	Air Quality Index Category
Shelby	47-157-0075	Shelby Farms	5/20/2023	19.6	Moderate
Shelby	47-157-0075	Shelby Farms	5/21/2023	19.4	Moderate
Shelby	47-157-0075	Shelby Farms	5/24/2023	16.5	Moderate
Shelby	47-157-0075	Shelby Farms	6/4/2023	15.2	Moderate
Shelby	47-157-0075	Shelby Farms	6/5/2023	17.1	Moderate
Shelby	47-157-0075	Shelby Farms	6/10/2023	14.3	Moderate
Shelby	47-157-0075	Shelby Farms	6/26/2023	17.9	Moderate

Table 3: Location, date, and measured Tier 2 values at Alabama Ave requesting exclusion.

County	AQS Site ID	Site Name	Date	24-hour Average Concentration (µg/m3)	Air Quality Index Category
Shelby	47-157-0024 (POC-1)	Alabama Ave	5/21/2023	16.0	Moderate
Shelby	47-157-0024 (POC-1)	Alabama Ave	5/24/2023	15.6	Moderate
Shelby	47-157-0024 (POC-1)	Alabama Ave	6/5/2023	16.4	Moderate
Shelby	47-157-0024 (POC-1)	Alabama Ave	6/8/2023	20.3	Moderate

Table 4: Monitor values in surrounding areas affected by Canadian wildfire smoke in May 2023.

County	AQS Site ID	Site Name	Date	24-hour Average Concentration (µg/m3)	Air Quality Index Category
DeSoto (MS)	28-033-0002	Hernando	5/21/2023	25.8	Moderate
DeSoto (MS)	28-033-0002	Hernando	5/22/2023	29.4	Moderate
DeSoto (MS)	28-033-0002	Hernando	5/24/2023	23.0	Moderate

Table 5: Monitor values in surrounding areas affected by Canadian wildfire smoke in June 2023.

County	AQS Site ID	Site Name	Date	24-hour Average Concentration (µg/m3)	Air Quality Index Category
DeSoto (MS)	28-033-0002	Hernando	6/4/2023	20.9	Moderate
DeSoto (MS)	28-033-0002	Hernando	6/5/2023	21.3	Moderate
DeSoto (MS)	28-033-0002	Hernando	6/6/2023	25.0	Moderate
DeSoto (MS)	28-033-0002	Hernando	6/7/2023	32.8	Moderate
DeSoto (MS)	28-033-0002	Hernando	6/8/2023	26.1	Moderate
Crittenden (AR)	05-35-0005	Marion	6/8/2023	19.6	Moderate
DeSoto (MS)	28-033-0002	Hernando	6/9/2023	31.9	Moderate
DeSoto (MS)	28-033-0002	Hernando	6/10/2023	19.1	Moderate
DeSoto (MS)	28-033-0002	Hernando	6/26/2023	22.7	Moderate
DeSoto (MS)	28-033-0002	Hernando	6/27/2023	28.4	Moderate

County	AQS Site ID	Site Name	Date	24-hour Average Concentration (µg/m3)	Air Quality Index Category
DeSoto (MS)	28-033-0002	Hernando	6/28/2023	23.9	Moderate

Table 6: Monitor values in surrounding areas affected by Canadian wildfire smoke in September 2023.

County	AQS Site ID	Site Name	Date	24-hour Average Concentration (µg/m3)	Air Quality Index Category
Dyer	47-045-0004	Dyersburg	9/7/2023	25.4	Moderate
DeSoto (MS)	28-033-0002	Hernando	9/7/2023	26.7	Moderate
Madison	47-113-0010	Jackson	9/8/2023	17.3	Moderate
DeSoto (MS)	28-033-0002	Hernando	9/8/2023	29.1	Moderate

Table 7: Monitor values in surrounding areas affected by Canadian wildfire smoke in October 2023.

County	AQS Site ID	Site Name	Date	24-hour Average Concentration (µg/m3)	Air Quality Index Category
DeSoto (MS)	28-033-0002	Hernando	10/4/2023	38.9	USG
Dyer	47-045-0004	Dyersburg	10/4/2023	22.0	Moderate
DeSoto (MS)	28-033-0002	Hernando	10/5/2023	37.4	USG
Dyer	47-045-0004	Dyersburg	10/5/2023	22.9	Moderate

1.2. Clean Air Act Requirements

The U.S. Environmental Protection Agency's (EPA) 2024 $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS, or standard) has two components: an annual average standard of 9.0 µg/m³, and a 24-hour average standard of 35 µg/m³. The annual $PM_{2.5}$ standard is met when the three-year average of the weighted quarterly averages is less than or equal to 9.0 µg/m³ (40 CFR § 50.20). Promulgation of the 2024 NAAQS has triggered the state recommendation process and states are required to submit their area recommendations by February 7, 2025. As part of this process, Shelby County Health Department is submitting this exceptional event demonstration to exclude certain data from the design value calculations that may be relied upon by the State in making its recommendation.

1.3. Exceptional Event Rule Requirements

EPA's Treatment of Data Influenced by Exceptional Events (Exceptional Event Rule) (81 Fed. Reg. 68,216) details what air agencies demonstrate in order to exclude exceptional event-related concentrations from regulatory determinations. The following are requirements under 40 CFR § 50.14(c)(3)(iv)(A–E):

A. A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s); (See Narrative Conceptual Model of this document).
B. A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation; (See Clear Causal Relationship of this document).
C. Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement in paragraph (c)(3)(iv)(B) of this section. The Administrator shall not require a State to prove a specific percentile point in the distribution of data; (See Clear Causal Relationship of this document).
D. A demonstration that the event was both not reasonably controllable and not reasonably preventable; and (See Not Reasonably Controllable or Not Reasonably Preventable of this document).

E. A demonstration that the event was a human activity that is unlikely to recur at a location or was a natural event. (See Human Activity Unlikely to Recur at a Particular Location or Natural Event of this document).

The Exceptional Events Rule further provides that for wildfire exceptional events, the wildfire must occur predominantly on wildland.

> 40 CFR 50.14(b)(4): Wildfires. The Administrator shall exclude data from use in determinations of exceedances and violations where a State demonstrates to the Administrator's satisfaction that emissions from wildfires caused a specific air pollution concentration in excess of one or more national ambient air quality standard at a particular air quality monitoring location and otherwise satisfies the requirements of this section. Provided the Administrator determines that there is no compelling evidence to the contrary in the record, the Administrator will determine every wildfire occurring predominantly on wildland to have met the requirements identified in paragraph (c)(3)(iv)(D) of this section regarding the not reasonably controllable or preventable criterion.

The definition for "wildland" is provided in 40 CFR § 50.1(o). The term "wildland" issued in this document consistent with this definition.

> 40 CFR 50.1(o): Wildland means an area in which human activity and development are essentially non-existent, except for roads, railroads, power lines, and similar transportation facilities. Structures, if any, are widely scattered.

This demonstration addresses the above requirements in showing that the smoke from the 2023 Canadian wildfires caused the elevated $PM_{2.5}$ concentrations throughout Memphis and Shelby County. Additionally, Shelby County will provide a 30-day public comment period for this exceptional event demonstration.

1.4. Action Requested

This report meets all U.S. Environmental Protection Agency (EPA) documentation standards for Exceptional Events. Pursuant to federal regulations, the Department requests EPA concurrence that the $PM_{2.5}$ concentrations for dates from May 21 – October 5, 2023, shown in Table 1 through

Table 3 were caused by an exceptional event and should be excluded from regulatory decisions for the $PM_{2.5}$ National Ambient Air Quality Standards and any other applicable regulatory purposes (40 CFR §50.14(b)). A copy of the AMP 350 report from EPA's AQS system is included in Appendix B: Air Quality System (AQS) Raw Data Report and shows the data included in this demonstration have the "rf" flag applied.