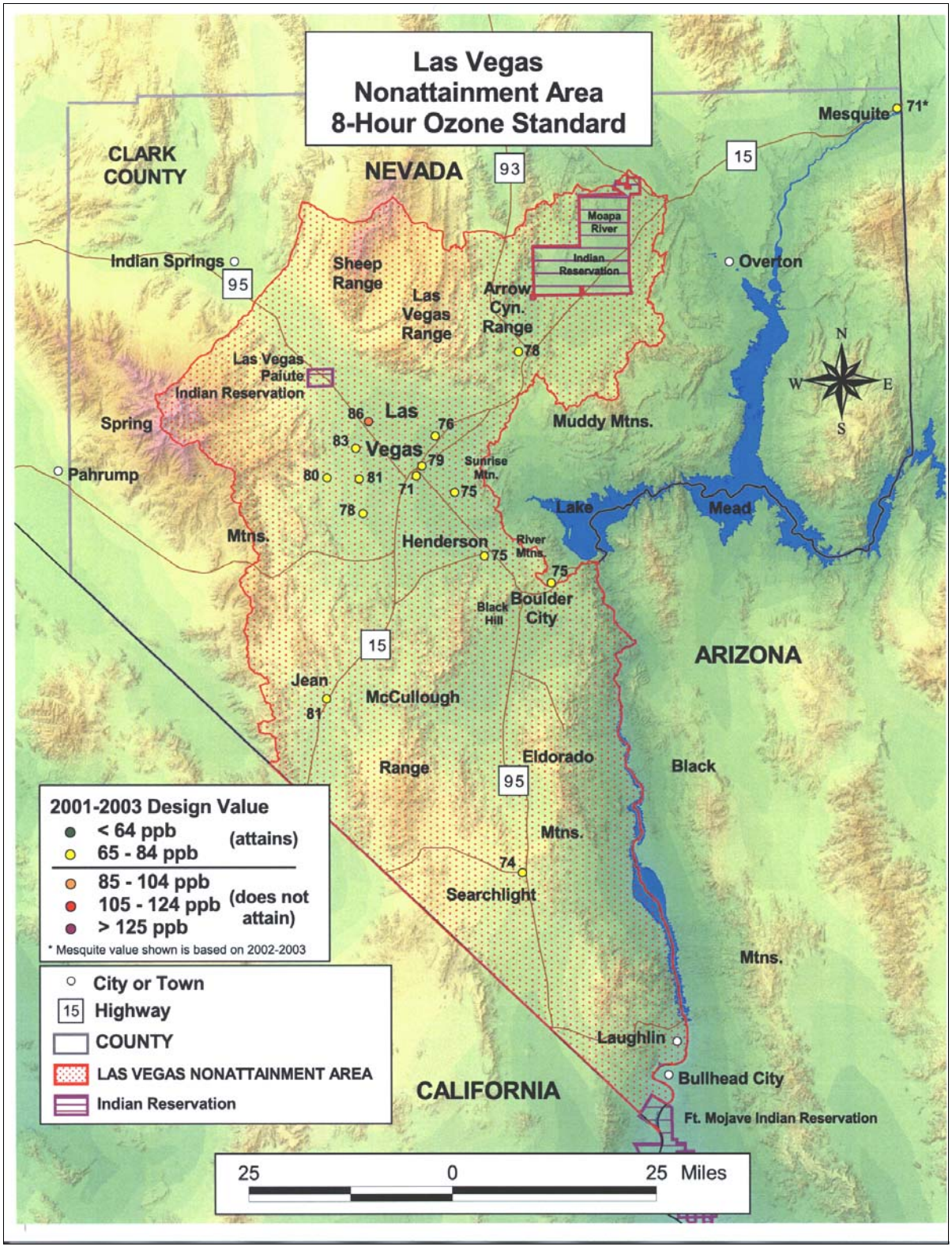
TECHNICAL SUPPORT DOCUMENT

THE LAS VEGAS 8-HOUR OZONE NONATTAINMENT AREA

SEPTEMBER 8, 2004



This document contains EPA's analysis of the appropriate boundaries for the Las Vegas nonattainment area. This analysis evaluates which portions of Clark County should be designated nonattainment and which portions should be designated unclassifiable/attainment. This analysis is based on our evaluation of the 11-factor analyses prepared by the Clark County Department of Air Quality and Environmental Management (DAQEM), "Nevada Air Quality Designations: Boundary Recommendations for the 8-hour Ozone NAAQS for Clark County, Nevada, July 2004" and supplemental material from August 2004. This analysis is also based on 11-factor analyses, "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-hour Ozone National Ambient Air Quality Standard, July 30, 2004", and "11-point Analysis Supplement of the Moapa Band of Paiute Indians, August 19, 2004" submitted by the Moapa Band of Paiutes. For the Clark County, Nevada portion of the Fort Mojave Indian Reservation and the Las Vegas Paiute Indian Reservation, EPA is including its own analyses of these areas.

The recommendations of the area governments have been evaluated to determine if they follow the guidance provided in the EPA's memo of March 28, 2000, "Boundary Guidance on Air Quality Designations for the 8-hour Ozone National Ambient Air Quality Standards (NAAQS)" from John S. Seitz. [This document is located in its entirety at: http://www.epa.gov/ttn/naaqs/ozone/ozonetech/des00328.htm]

In that March 28, 2000 memo, EPA recommends that the presumptive 8-hour ozone nonattainment area be the larger of the 1-hour ozone nonattainment or the Metropolitan Statistical Area (MSA) or the Consolidated Metropolitan Statistical Area (C/MSA).

The March 28, 2000 memo also states:

> A State or Tribe wishing to propose larger or smaller nonattainment area boundaries (including partial counties or portions of areas on tribal lands) than those matching the C/MSA or boundary of the tribal land should address how each of the following factors affect the drawing of nonattainment area boundaries and how the resulting recommendation is consistent with the definition of nonattainment in §107(d)(1) of the [Clean Air] Act...
>
> - Emissions and air quality in adjacent areas (including adjacent C/MSA's)
> - Population density and degree of urbanization including commercial development (significant difference from surrounding zones)
> - Monitoring data representing ozone concentrations in local areas and larger areas (urban or regional scale)
> - Location of emission sources (emissions sources and nearby receptors should generally be included in the same nonattainment area)
> - Traffic and commuting patterns
> - Expected growth (including extent, pattern and rate of growth)
> - Meteorology (weather/transport patterns)
> - Geography/topography (mountain ranges or other air basin boundaries)

- Jurisdictional boundaries (e.g., counties, air districts, existing 1-hour nonattainment areas, Reservation
- Level of control of emissions sources
- Regional emission reductions (e.g. Nox SIP call or other enforceable regional strategies)

EPA's Evaluation of Recommended Area Designations

In the pages following, we have provided an evaluation of these 11 factors as they apply within Clark County. We present our evaluation and comments on this designation beginning with the Las Vegas area nonattainment recommendation by the State of Nevada, EPA's own analysis supporting the nonattainment designation of the Las Vegas Paiute Indian Reservation, the Moapa Band of Paiutes unclassifiable/attainment recommendation and EPA's own analysis supporting the unclassifiable/attainment designation for the Clark County, Nevada portions of the Fort Mojave Tribal lands.

The Presumptive Las Vegas Nonattainment Area

The Presumptive Las Vegas Nonattainment Area is the Las Vegas MSA, which for the 8-hour ozone designations is based on the 1999 Office of Management and Budget (OMB) Metropolitan Areas. The Las Vegas MSA is defined as Clark and Nye Counties in Nevada and Mohave County, Arizona.

In March 2004, both Nevada and Arizona submitted 11-factor analyses to justify unclassifiable/attainment designation for Nye[1] and Mohave[2] counties. These 11-factor analyses demonstrated that both counties were largely rural areas and were separated from the Las Vegas area by topography and distance. At that time, EPA agreed with both Nevada and Arizona, that although an unclassifiable/attainment designation of these counties would produce a Las Vegas nonattainment area that was smaller than the presumptive area, the area recommended was consistent with the definition of nonattainment in §107(d)(1) of the Clean Air Act[3].

Because Nye County, Nevada and Mohave County, Arizona were addressed at that time and because EPA designated these counties as unclassifiable/attainment in April 2004, these counties will not be addressed further in this document. This document will address Clark County and the new recommendations for areas within the county.

[1]Nevada Department of Environmental Protection (NDEP), "Nevada Air Quality Designations And Boundary Recommendations for The 8-hour Ozone National Ambient Air Quality Standards"(4/12/2004).

[2]Arizona Department of Environmental Quality (ADEQ), "Arizona Boundary Recommendations for the 8-hour National Ambient Air Quality Standard: Additional Information To Support Exclusion of Mohave County, Arizona from EPA proposed Las Vegas, Nevada 8-hour Ozone Nonattainment Area"(3/26/2004).

[3]U.S. EPA, Technical Support Document, "Technical justification in support of EPA's final designations," Chapter 3, pages 12 and 190[http://www.epa.gov/ozonedesignations/documents/tsd/ch3.pdf] (2004).

Las Vegas and adjacent areas

For the Las Vegas area, the State of Nevada recommended one 8-hour ozone nonattainment area: Las Vegas and some surrounding areas, which are defined by the State as Nevada Hydrographic Areas 164a, 164b, 165, 166, 167, 212, 213, 214, 216, 217 and 218. The State provided an 11-factor analysis to justify a nonattainment area which is different than the presumptive nonattainment area.

Based on EPA's evaluation of the 11-factor analyses provided by the State of Nevada, EPA agrees with the state that the nonattainment area the State recommended, although smaller than the presumptive nonattainment area and smaller also than Clark County, is consistent with the definition of nonattainment in §107(d)(1) of the Clean Air Act.[4]

[4]Clark County Department of Air Quality and Environmental Management (DAEQM), "Nevada Air Quality Designations: Boundary Recommendations for the 8-Hour Ozone NAAQS for Clark, County, Nevada"(July 2004), page 64, "The recommended area excludes the Las Vegas Paiute Tribal Community and the Moapa Band of the Paiute Tribal Land." The recommendation does not mention the Fort Mojave Indian Reservation. It is our understanding that the state intended to leave the designation recommendations for all Tribal lands within the County to EPA and the Tribes. As such, we have independently assessed the proper designation of these lands and presume that our acceptance of the state's recommendation is consistent with our decisions on the designation of the Tribal areas within the county.

Factor 1:
Emissions and air quality in adjacent areas (including adjacent C/MSA's)

The areas excluded from the State's recommended nonattainment area have few sources and are separated from Las Vegas by topography.

Areas adjacent to the nonattainment area proposed by the State do not violate the 8-hour ozone NAAQS. The border of the nonattainment area is at least the following distances from the violating monitor at Joe Neal (all mileages are approximate):20 miles from upwind areas to the northwest, 42 miles from upwind areas to the southwest, 85 miles from upwind areas to the south, 14 miles from upwind or downwind areas to the east, 42 miles from downwind areas to the northeast.

The State's 11-factor shows that the nonattainment area shows that the stationary sources in the unclassifiable/attainment portions of Clark County account for less than 3 percent of the total NOx emissions inventory and less than 1 percent of the VOC in the County. Further, the excluded areas are in Nevada Hydrographic Area 215, which is separated from Las Vegas by the River Mountains, Black Hill and Sunrise Mountain which inhibits transport to or from this area[5].

EPA believes that the State's recommended nonattainment area includes the sources of emissions that cause or contribute to ozone in Las Vegas as well as both downwind and upwind adjacent areas which are emitters and receptors. EPA also believes that the State's recommended nonattainment area includes all areas with monitored ozone violations.

Factor 2:
Population density and degree of urbanization including commercial development (significant difference from surrounding areas)

The areas the State recommended excluded from the nonattainment area are rural and/or uninhabited. The 11-factor analysis submitted by the State of Nevada shows that the recommended nonattainment area contains the densely populated areas of Las Vegas. All the urbanized areas of Las Vegas are contained in the nonattainment area as well as 98% of Clark County's population. The population density of some of the urban portions of Las Vegas is greater than 1300 persons per square mile[6], is greater than 300 persons per square mile in the

[5]DAQEM p. 34-39

[6]DAQEM p. 6 (value shown on map is greater than 3603 persons per square kilometer, this number was converted to square miles for comparison to other population densities provided by EPA and U.S. Census.)

nonattainment area as a whole and in the area excluded area is less than 10 persons per square mile[7].

Thus, there is a significant difference in population density and degree of urbanization between the nonattainment and unclassifiable/attainment areas. EPA believes that the State's recommended nonattainment area appropriately includes the densely populated portions of the Las Vegas area as well as a large area subject to possible commercial growth owing to the expansion of population and commerce in Las Vegas. EPA also believes that the areas the State recommended be excluded are areas that are mostly uninhabited, with little commercial development, almost no stationary sources and are separated from Las Vegas by mountains, distance and desert and that this is appropriate.

Factor 3:
Monitoring data representing ozone concentrations in local areas and larger areas (urban or regional scale)

The State-recommended nonattainment area includes all violating monitors in the Las Vegas MSA. The MSA has only one violating monitor, referred to as the Joe Neal site, which is located in northwest Las Vegas. The Joe Neal site had a design value of 86 ppb for 2001 to 2003. This is 1 ppb greater than the trigger for a nonattainment designation, 85 ppb. Design values decrease rapidly to the east from the Joe Neal monitor and approximate background levels at Mesquite. The boundary of the nonattainment area contains all the monitors with design values of 80 ppb or more and contains many monitors with values in the 70-80 ppb range[8].

Factor 4:
Location of emissions sources (emissions sources and nearby receptors should generally be included in the same nonattainment area)

The areas excluded from the State's recommended nonattainment area have few sources and are separated from Las Vegas by topography.

Areas adjacent to the nonattainment area proposed by the State do not violate the 8-hour ozone NAAQS. The border of the nonattainment area is at least the following distances from the violating monitor at Joe Neal (all mileages are approximate):20 miles from upwind areas to the northwest, 42 miles from upwind areas to the southwest, 85 miles from upwind areas to the south, 14 miles from upwind or downwind areas to the east, 42 miles from downwind areas to the northeast.

[7]U.S. EPA estimate based on U.S. Census block data 2000 and BIA Indian Reservation boundaries.

[8] See Map page 2.

The State's 11-factor shows that the nonattainment area shows that the stationary sources in the unclassifiable/attainment portions of Clark County account for less than 3 percent of the total NOx emissions inventory and less than 1 percent of the VOC in the County. Further, the excluded areas are in Nevada Hydrographic Area 215, which is separated from Las Vegas by mountains which inhibits transport to or from this area[9].

EPA believes that the State's recommended nonattainment area includes the sources of emissions that cause or contribute to ozone in Las Vegas as well as both downwind and upwind adjacent areas which are emitters and receptors. EPA also believes that the State's recommended nonattainment area includes all areas with monitored ozone violations.

Factor 5:
Traffic and commuting patterns

The 11-factor analysis submitted by the State of Nevada shows that the recommended nonattainment area contains most roadways and traffic in the Las Vegas MSA. The areas the State recommended be excluded from the nonattainment area are mostly rural and have little traffic compared to the urban portions of Las Vegas with nearly all routes outside the recommended nonattainment area having less than 25,000 vehicles per day each, which is far below traffic levels experienced in the urban areas of Las Vegas[10].

Factor 6:
Expected growth (including extent, pattern and rate of growth)

The recommended nonattainment area contains the areas of expected growth and development associated with and impacting Las Vegas Ozone. The 11-factor analysis submitted by the State of Nevada shows that Las Vegas is experiencing significant growth, however the recommended nonattainment area includes most of the population growth (which is centered in the Las Vegas Valley, Nevada Hydrographic Area 212) and the industrial growth, some of which has been in the non-tribal lands of the Apex Valley.

Factor 7:
Meteorology (weather/transport patterns)

The area recommended by the State of Nevada includes nearly all upwind and downwind areas in the State or County's jurisdiction. The 11-factor analysis submitted by the State of Nevada uses wind trajectory models to show transport to and from Las Vegas. The backward wind trajectories submitted for the 8-hour ozone exceedance periods show that Las Vegas is

[9] Clark County Department of Air Quality and Environmental Management (DAQEM), "Nevada Air Quality Designations: Boundary Recommendations for the 8-Hour Ozone NAAQS for Clark, County, Nevada," page 34-39 (July 2004).

[10] DAQEM pages 13 and 39-40

essentially downwind of Southern California. The forward wind trajectories show that predominant downwind areas are to the northeast of Las Vegas[11]. Mesquite, to the northeast of Las Vegas and at the border of Nevada and Arizona, has a 2-year average of fourth highest values of 71 ppb (based on 2002 to 2003 only), which the State recommendation indicates is the approximate regional background level. This monitoring data suggests that transport does not extend far from Las Vegas. EPA data show that areas outside Las Vegas as well as areas outside the nonattainment area are not violating the 8-hour ozone standard. The design values are somewhat lower to the east than in Las Vegas (Craig Road, east of Las Vegas, has a design value of 76 ppb and Apex, northeast of Las Vegas, has a design value of 78 ppb) with a less precipitous decline to the southwest, where Jean has a design value of 81 ppb, Jean's design value is comparatively higher than values at a similar distance in other directions from Las Vegas. This higher value is attributed to transport from Southern California. The recommendation also states that during periods of high ozone in Las Vegas, the predominant pattern is from the southwest to the northeast. The recommended nonattainment area contains the upwind areas contributing to Las Vegas ozone concentrations (this area extends all the way to the California border in the southwest direction). The area also extends to the east to include areas that are downwind during ozone episodes, although these areas have not violated the standard and have somewhat lower design values than Las Vegas's urban areas. The recommended area to the south extends to the southern tip of the County, approximately 80 miles from Las Vegas and includes areas contributing to Las Vegas ozone when the wind is from the south.

The area recommended by the State of Nevada includes nearly all upwind and downwind areas in the State that could contribute to a monitored air quality standard violation, review of this factor indicates that the recommended area is appropriate.

Factor 8:
Geography/topography (mountain ranges or other air basin boundaries)

The recommended nonattainment area includes not only the Las Vegas valley, but also contributing upwind, adjacent basins as well as downwind areas which may experience some local effects, although no adjacent areas experience violations. The 11-factor analysis submitted by the State of Nevada shows that the Las Vegas area is surrounded by mountains separating adjacent hydrographic basins. Although this limits transport to some extent, low lying portions of said mountains can act to channel NOx from one basin to another, however the area affected by this transport is included in the nonattainment area. The report states that the I-15 corridor to the southwest is one such area where transport is significant (this significant transportation corridor is the route between Los Angeles and Las Vegas) and much of this area is included in the nonattainment area[12].

[11]DAQEM pages 42-59

[12]DAQEM page 20

The Las Vegas area's surrounding mountains are: Spring Mountain Range (to the west); Desert, Sheep and Las Vegas Ranges (to the north); Arrow Canyon and Muddy Mountain Ranges (to the east and northeast); Black Mountains, Eldorado Mountains, and McCullough Range (to the south)[13]

Factor 9:
Jurisdictional boundaries (e.g., counties, air districts, existing 1-hour nonattainment areas, Reservations, etc.)

Clark County is, "for all practical purposes...administered by DAQEM" [14]. The urban areas of Las Vegas and surrounding areas of potential growth are within the boundaries of the recommended nonattainment area and with the exception of Federal Land (BLM, USFS, NPS, DOD and others) are within the same jurisdiction.

Factor 10:
Level of control of emission sources

There is presently some control of emissions from stationary and mobile sources in Clark County[15]. The State recommended area includes nearly all emissions sources within the County and sources that may cause or contribute to ozone in Las Vegas. Thus, there are no areas with emissions being excluded from the Las Vegas nonattainment area that are causing or contributing to ozone in the Las Vegas area.

Factor 11:
Regional emission reductions (e.g., NOx SIP call or other enforceable regional strategies)

Nevada's 11-factor analysis states that, "Several emissions reduction activities are being undertaken within Clark County, within the southern California/southern Nevada region, and at the national level that will result in emissions reductions over the coming decade."[16] EPA concludes that there are currently some local emission reductions planned in the future within Clark County but no reliance on such reductions was given in determining the appropriate nonattainment boundary.

---

[13] DAQEM page 10

[14] DAQEM page 61

[15] DAQEM page 61

[16] DAQEM page 61

Las Vegas Paiute Reservation

The Las Vegas Paiute Reservation did not make a recommendation to EPA.

EPA believes that a designation of nonattainment is appropriate because the Reservation is located in the Las Vegas urban area, and the nearest ozone monitor, the Joe Neal site, located approximately 5 miles from the Reservation, violates the 8-hour ozone standard and has a design value of 86 ppb[17]. Therefore, EPA believes that the air quality on the Reservation does not attain the 8-hour ozone standard and is designated nonattainment for that reason[18]

[17] U.S. EPA, Air Quality Subsystem (AQS) database (2001-2003).

[18] See map, page 2.

Moapa River Reservation

For the Moapa River Reservation, the Moapa Band of Paiutes has recommended that its lands be designated unclassifiable/attainment. The Moapa Band of Paiutes has provided an 11-factor analysis[19] and supplemental information[20] to justify their recommended unclassifiable/attainment designation The Moapa River Reservation is within the presumptive Las Vegas nonattainment area.

Based on EPA's evaluation of the 11-factor analysis submitted by the Moapa Band of Paiutes, EPA agrees that this designation, though it results in a nonattainment area that is less than the presumptive nonattainment area, is consistent with the definition of nonattainment in §107(d)(1) of the Clean Air Act.

[19] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard" (July 30, 2004).

[20] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard" (Supplement August 18, 2004).

Factor 1:
Emissions and air quality in adjacent areas (including adjacent C/MSA's)

The analysis provided by the Moapa Tribe states, "Currently, the only sources of VOC and NOx are area and mobile sources. There are no stationary sources at this time on the Reservation. Because all Tribal residences, governmental services and facilities are located in the far northeast corner of the Reservation (near the town of Moapa), mobile and area sources emissions attributable to Tribal activities will occur primarily in the northeast corner of the Reservation."[21]

Air quality has not been measured on the Reservation. The nearest monitors are located in Apex with a design value of 78 ppb and Mesquite with 2-year average of fourth highest values of 71 ppb (based on 2002 to 2003 only). Both values do not exceed the NAAQS.

Currently lacking any significant emissions sources, the Moapa River Reservation does not impact adjacent areas and does not cause violations of the ozone NAAQS in Las Vegas. If sources do locate on the Reservation, because the Reservation is nearly always downwind of Las Vegas during periods of high ozone in Las Vegas new sources on Reservation lands will not cause or contribute to ozone violations in Las Vegas.

The area that includes the Moapa River Reservation has ozone concentrations which meet the standard. This area is downwind of both Las Vegas and industrial areas in the Apex Valley. The only areas upwind of Moapa are in areas of attaining ozone concentrations and areas with few sources (with the exception of I-15, which an unclassifiable/attainment designation on Moapa lands would not affect).

The 11-factor analysis provided by the Moapa Band of Paiutes suggests that due to the prevailing winds, the primary impacts of source development on Moapa land would be to the mostly uninhabited areas to the northeast and confined to Moapa land.

The recommended unclassifiable/attainment area has no stationary sources. The meteorology and current ozone concentrations (in nearby areas) suggest that even with some source development on Moapa lands, this will not cause or contribute to violations in Las Vegas or areas adjacent to the Moapa River Reservation. Further, though the Tribe is pursuing development of emissions sources, based on past history, development is less likely than in adjacent areas in Apex Valley and much less likely than in Las Vegas itself as the Tribe is not economically integrated into the Las Vegas economy[22].

---

[21] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard," page 12 (July 30, 2004).

[22] MBPI multiple pages

Because this area currently lacks stationary sources, lacks ozone violations and because it is a downwind rather than upwind area from Las Vegas, there is little benefit in a nonattainment designation of the Reservation and it may complicate the air planning process for Las Vegas by including the Moapa Band of Paiutes, despite the fact that nearly all emissions sources are outside their jurisdiction.

Factor 2:
Population density and degree of urbanization including commercial development (significant difference from surrounding areas)

On the Moapa River Reservation, the population density is very low, there are no urbanized areas, and there is little commercial development which makes this area significantly different than the Las Vegas area in these respects.

The population of the Moapa River Reservation is approximately 425 and covers an area of roughly 72,000 acres[23]or 111 square miles. Population density is 1.8 persons per square mile, compared to 173 for Clark County[24] and 328 for the Las Vegas nonattainment area[25].

There are no urban areas and population growth has been small. Unemployment is very high. The demographics of the Moapa River Reservation are significantly different than in the nonattainment areas adjacent to the tribal lands and significantly different than the Las Vegas area. The lack of employment and economic interaction with surrounding areas has been reflected in limited commercial development on the Reservation.

Factor 3:
Monitoring data representing ozone concentrations in local areas and larger areas (urban or regional scale)

The nearest monitors are at Craig Rd., Apex and Mesquite with design values of 76 ppb, 78 ppb, and 71 ppb (Mesquite's value is a 2-year average of fourth highest concentrations in 2002 and 2003) respectively[26]. Although the Reservation does not have an ozone monitor, surrounding area monitors attain the ozone NAAQS.

---

[23] MBPI page 9

[24] U.S. Census(2000).

[25] Estimates based on an EPA GIS analysis of U.S. Census 2000 data, Nevada Hydrographic Areas and BIA Reservation Boundaries (2004).

[26] U.S. EPA, Air Quality Subsystem (EPA) database (2001-2003).

Factor 4:
Location of emissions sources (emissions sources and nearby receptors should generally be included in the same nonattainment area)

There are currently no large stationary emissions sources on the Reservation. See the discussion in both Factors 1 and 7 for information on emissions sources, meteorology and receptor areas.

If sources locate on the Reservation, due to the downwind location from Las Vegas and topographic features between Las Vegas and the Reservation, EPA believes that activities on the Reservation will not cause or contribute to monitored ozone violations in Las Vegas.

Because this area currently lacks stationary sources, lacks ozone violations and because it is a downwind rather than upwind area from Las Vegas, there is little benefit in a nonattainment designation of the Reservation. Such a designation could complicate the air planning process for Las Vegas by including the Moapa Band of Paiutes, despite the fact that nearly all emissions sources are outside their jurisdiction.

Factor 5:
Traffic and commuting patterns

Due to the economic deprivation on the Reservation, there is little commuting to and from the Las Vegas area. Thus, the Moapa River Reservation contributes little in the way of vehicle emissions to the Las Vegas area and does not contribute to ozone in Las Vegas in this way.

I-15 is a source of emissions, however, most of the vehicles are not associated with the Reservation and would not be under the jurisdiction of the Tribe with a nonattainment designation[27].

Factor 6:
Expected growth (including extent, pattern and rate of growth)

The population on the Reservation is not expected to grow faster than the natural rate of increase. The potential for growth beyond natural can happen only through in-migration of tribal members who have moved off the Reservation for various reasons.

The population of the Moapa River Reservation is approximately .03% of the Clark County total. Growth is expected to be at a slow rate, however even with growth, the effect of such a small population on Las Vegas ozone is negligible. Although this area is within the Las Vegas MSA, it is not experiencing the population growth or migration of the Las Vegas area.

---

[27] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard," page 14 (July 30, 2004).

The primary source for growth from outside the Reservation are tribal members relocating back to Reservation lands and these numbers are not large enough to have impact on Las Vegas ozone[28].

Factor 7:
Meteorology (weather/transport patterns)

The Moapa Band of Paiutes submitted supplemental information in support of their recommendation that the tribal Reservation be excluded from the Las Vegas ozone nonattainment area. The information included ozone and wind data, including wind rose diagrams and animations. For each hour of 14 three to five day ozone episodes, the animations showed ozone concentration and also an arrow at each available monitoring station. The size of the arrow indicated wind strength, while its direction indicated wind flow direction. While not a spatially complete wind field as would be developed for urban ozone modeling, the animation does give a reasonably clear idea of the potential for pollutant transport between the Reservation and the main Las Vegas urbanized area (LVUA). (It should be noted that regardless of the Reservation's exclusion from the nonattainment area, it should still be included in the modeling domain to assess effects of and on the Reservation.)

The supplemental information makes a convincing case that the Reservation should be excluded from the nonattainment area. There is no ozone data indicating violations on the Reservation. But the meteorological and ozone data also show that current or future Reservation emissions are only a negligible contributor at most to ozone violations in the LVUA.

Data from monitoring sites in the greater Las Vegas area, including the vicinity of the Moapa Paiute Reservation, were evaluated to determine whether emissions from the Reservation could contribute to high ozone levels in the LVUA. The Apex monitor is situated directly between the Reservation and the LVUA, so it is an important indicator of transport between the two. The Nellis AFB, which is to the southwest, is also a transport indicator. The Flood Control District "California Wash 3" monitor (referred to as "CAL" below) and two monitors at the Reid Gardner power plant are along a southwest-northeast line extending from the LVUA, through Apex and the Reservation, and terminating at the Reid Gardner plant.

The meteorological and ozone data were searched for conditions that could indicate a contribution of Reservation emission to LVUA ozone exceedances. Southwest flow during the morning to early afternoon would be of greatest concern. For greatest ozone-producing potential, the flow would occur at multiple monitoring stations in the northeast, for multiple hours before or during high-ozone hours. This would ensure a consistent flow of ozone precursors from the Reservation that could arrive in time to contribute to ozone formation at the exceeding Joe Neal monitor, approximately 20 miles away. Sustained southwest flow late on the preceding day could also be of concern.

[28] MBPI pages 14-15

According to the data, such conditions do not occur. Of the 14 ozone episodes, eight have no hours or at most one hour in which the Apex wind direction was southwest, toward Las Vegas (the 6/14/02, 6/25/02, 8/16/02, 5/30/03, 6/11/03, 7/7/03, 7/19/03, and 5/8/04 episodes). During three other episodes, wind directions at Nellis, CAL, and Reid Gardner stations are either opposite or perpendicular to those at Apex (the 8/9/02, 5/24/03, 6/27/03 episodes). The May 13-16, 2004 episode has a day (5/13) with four consecutive morning hours with southwest flow at Apex, but there were no ozone exceedances on that day. Thus for 12 episodes, there does not appear to be a sustained or coherent flow from the Reservation toward LVUA during ozone exceedances. These data do not provide evidence of a Reservation contribution to LVUA ozone exceedances.

The strongest cases for transport from the Reservation to LVUA appear to be for the August 7-11, 2001 and the June 4-7, 2003 episodes. In the August 2001 episode, the first three days have 2 - 3 hours of late night southwest flow, which is likely not significant for ozone formation. The fourth day (8/11/01) has about four hours of southwest flow in the morning. Wind flow information from the Reid Gardner stations (and CAL, for the many hours) are not available for this episode, so they cannot be used to determine whether the regional flow was consistent. The CAL hours that are available are light, and are not consistent with overall southwest flow. Still, it is conceivable that some early morning emissions from the Reservation could reach the LVUA with such winds. However, on this day there was no 8-hour ozone exceedance.

The June 2003 episode's middle day (6/5/03) there were 4 consecutive hours of southwest Apex flow in the very early morning (1 - 4 a.m.), and intermittent southwest flow hours till 1 p.m. However, prior to this morning period, wind flow at the Reid Gardner was toward the east and northwest, and the Apex flow was toward the north. The timing and the contrasting wind directions imply that emissions from the Reservation would not have reached the LVUA. During the morning period, flow at Reid Gardner was light and toward the southeast or north, so again there was not a consistent and coherent transport flow.

On the last day (6/6/03) of the June 2003, there was reasonably consistent southwest flow in the morning at Apex. However, preceding this there was southwest flow at Reid Gardner around midnight, and light southeast flow at Apex. Therefore, whatever emissions that might have come earlier from the Reservation would have been sent southeast rather than into the LVUA. During the morning wind flow at Reid Gardner was light and variable, but mainly toward the northwest and southeast. As with the 6/5 day of this episode, there was not a coherent transport flow.

In summary, winds do not typically blow southwest from the Reservation toward the Las Vegas urbanized area. For those times when there was southwest flow, it was intermittent and/or inconsistent across stations, or the timing was such that Reservation emissions are unlikely to contribute to ozone exceedances, or it occurred on days when there was no 8-hour ozone exceedance. This is further supported by the general pattern of ozone formation in the Las Vegas area. High ozone concentrations occur to the west-northwest of Las Vegas urbanized area, generally under stagnant or light and variable wind conditions, and not under conditions of

strong transport flow. The evidence available indicates that emissions from the Reservation area are at most a negligible factor in Las Vegas ozone exceedances[29].

Factor 8:
Geography/topography (mountain ranges or other air basin boundaries)

The Las Vegas area is nearly surrounded by mountains, which forms a natural barrier and inhibits transport into and out of the area. The Moapa River Reservation is separated from the Las Vegas area by topography. The Moapa River Reservation is also separated from most adjacent areas by topography and most of the Reservation is a somewhat flat area lying at approximately 500 m in elevation and nearly surrounded by topographic features.

The Moapa River Reservation lies to the northeast of Las Vegas. Between Las Vegas and the Reservation is the Sheep Range (north of Las Vegas and west of the Moapa River Reservation) with many peaks at approximately 2000 m to 2500 m and the highest peak at 3250 m. Also between Las Vegas and the Moapa River Reservation is the north-south running Arrow Canyon Range, with peaks from 884 m to 1244 m. There are also mountains to the south-southwest of the Moapa River Reservation, with peaks between 879 m and 1007 m. To the east of the Reservation are the North Muddy Mountains with peaks of approximately 1000 m and to the south is the Dry Lake Range, with peaks of 980 m and 1007 m.

The Moapa River Reservation lies in two Nevada Hydrographic Basins. The southwest portion of the Reservation is in the Apex Valley hydrographic area (Nevada Area 216). Most of the Reservation is in the Moapa Valley hydrographic area (Nevada Area 218). Most of the population and development on the Reservation is in the Moapa Valley portion.

Transport from Las Vegas mainly occurs through low lying portions of surrounding mountains and produces a localized effect mainly near the areas where the transport is channeled.

The Moapa River Reservation lies downwind of Las Vegas and Apex Valley. The 11-factor analysis says that ozone plumes from the Las Vegas area are sometimes channeled into Apex Valley, but by the time these plumes reach Moapa lands, the plume, which is concentrated somewhat as it enters Apex Valley, is then dispersed owing to lack of topography in that part of

[29] *See* U.S. EPA "Notes on wind/Ozone hourly plots (from Windfield Analysis provided by Moapa Band of Paiutes) for 14 ozone episodes in Las Vegas" in Appendix A of this document.

Apex Valley. Thus, the localized effect that may occur at Apex, would be less significant on Reservation lands[30] [31] [32] [33].

Factor 9:
Jurisdictional boundaries (e.g., counties, air districts, existing 1-hour nonattainment areas, Reservations, etc.)

The Moapa River Reservation is a separate jurisdiction from Clark County and the State of Nevada. Because this area currently lacks stationary sources, lacks ozone violations and because it is a downwind rather than upwind area from Las Vegas, there is little benefit in a nonattainment designation of the Reservation and it may complicate the air planning process for Las Vegas if the area is included. Nearly all emissions sources are outside the jurisdiction of the Moapa Band of Paiutes.

Factor 10:
Level of control of emission sources

As discussed in the Tribe's 11-factor analysis, an unclassifiable/attainment designation of the Moapa River Reservation would still include an increased level of control of emission sources since both BACT and PSD are required.[34]

---

[30] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard," multiple pages (July 30, 2004).

[31] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard" (Supplement, August 18, 2004).

[32] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard" (Supplemental Windfield Files 1 through 5, August 18, 2004).

[33] Trinity Consulting Services, e-mail to Paul Cort at EPA from Arron Heinerikson, "Request for Additional Info" which includes Excel spreadsheet with ozone and wind data, "Ozone and Metadata 2001-2004" and Supplemental Windfield File, "May 13 - 16 2004(08172004).ppt" (August 23, 2004).

[34] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard," page 20 and 21 (July 30, 2004).

Factor 11:
Regional emission reductions (e.g., Nox SIP call or other enforceable regional strategies)

Since there are no stationary sources on the Moapa River Reservation, there is no regional effect from such sources. Although there are area sources, such as agriculture, and mobile sources, the emissions from those sources are small, owing to the lack of population, economic development and economic integration with Las Vegas. The largest source of emissions in the area is the I-15 corridor mobile emissions, of which, only a small fraction is attributable to tribal members. Because of this, EPA believes that this factor is not applicable to the Moapa River Reservation.

Fort Mojave Reservation

The Fort Mojave Reservation is located in Arizona, California and Nevada. A small portion (6 square miles) of the Reservation is located in Clark County, Nevada[35]. The Fort Mojave Tribe did not make a designation recommendation, however EPA, in its trust responsibility to the Tribe is providing an 11-factor analysis to justify an unclassifiable/attainment designation in the Fort Mojave Tribal area located in Clark County, Nevada. EPA believes that this portion of the Reservation should be excluded from the Las Vegas nonattainment area.

Based on EPA's own evaluation of the 11-factors for the Clark County, Nevada portions of the Fort Mojave Reservation, EPA believes that a designation of unclassifiable/attainment is appropriate and is consistent with the definition of nonattainment in §107(d)(1) of the Clean Air Act.

Because this tribal area is so small in area, population and commercial development, is approximately 85 miles from Las Vegas and is separated from Las Vegas by mountain ranges, deserts and great expanses of uninhabited land, it is easy to justify this area's exclusion from the Las Vegas nonattainment area. There is no evidence that for any of the 11-factors, that activities within the Nevada portion of the Fort Mojave Reservation cause or contribute to ozone in Las Vegas.

[35] U.S. Census (2000).

Factor 1:
Emissions and air quality in adjacent areas (including adjacent C/MSA's)

The Fort Mojave Reservation is a small area in Nevada with few emissions and a negligible impact on ozone in its own area and no impact in Las Vegas. Air quality in the area appears to be at background levels. The nearest monitor, in Searchlight, has a design value of 74 ppb, which attains the 8-hour Ozone NAAQS[36].

Factor 2:
Population density and degree of urbanization including commercial development (significant difference from surrounding areas)

The population and degree of urbanization including commercial development are significantly different in the Nevada portion of the Fort Mojave Reservation when compared with the Las Vegas area as well as the nearer Laughlin and Bullhead City areas.

The Clark County, Nevada portion of the Fort Mojave Reservation is a very small area, located approximately 85 miles from Las Vegas from which it is separated by mountains and desert.

The Nevada portion of the Fort Mojave Reservation has a population of 19 persons, with a land area of 6 square miles and a population density of 3 persons per square mile[37]. Based on a review of aerial photography of the area, there appears to be little commercial development except for a resort, casino and golf course.

This area is significantly different in its scale of commercial development from the Las Vegas area and is approximately 100 miles distant from Las Vegas via road.

Factor 3:
Monitoring data representing ozone concentrations in local areas and larger areas (urban or regional scale)

Monitoring data from the nearest station available indicates that this area attains the NAAQS.

The nearest monitor, in Searchlight, has a design value of 74 ppb[38], which attains the 8-hour ozone NAAQS. This design value represents concentrations which are close to background levels for this area. It's unlikely that tribal activities in this area are affecting ozone levels within the Reservation or adjacent to it.

---

[36] U.S. EPA, Air Quality Subsystem (EPA) database (2001-2003).

[37] U.S. Census (2000).

[38] U.S. EPA, Air Quality Subsystem (EPA) database (2001-2003).

Factor 4:
Location of emissions sources (emissions sources and nearby receptors should generally be included in the same nonattainment area)

The Fort Mojave Reservation produces few emissions and is not a location where sources are locating. It is not a receptor area for the Las Vegas area, some 85 miles away, because of its distance, separation by topography and upwind location.

The Fort Mojave Reservation's commercial development includes a resort with a casino and golf course.

Factor 5:
Traffic and commuting patterns

There is no commuting data for the Fort Mojave Reservation, however based on the population, limited commercial development and road networks, traffic and commuting do not cause or contribute to ozone in Las Vegas.

The Nevada portion of the Fort Mojave Reservation has a population of 19 persons, with a land area of 6 square miles and a population density of 3 persons per square mile[39]. Although there is a resort, casino and golf course on the Reservation, this is not an employment center for the Las Vegas area.

Factor 6:
Expected growth (including extent, pattern and rate of growth)

The Nevada portion of the Fort Mojave Reservation is 6 square miles in area. Its location is far from Las Vegas and its population growth is not a result of growth in the Las Vegas area.

Factor 7:
Meteorology (weather/transport patterns)

Meteorology, weather and transport patterns indicate that this area does not cause or contribute to ozone in Las Vegas and/or nearby areas because it is separated from Las Vegas by mountains, and great distances.

The Clark County, Nevada portion of the Fort Mojave Reservation is distant from Las Vegas and separated from it by deserts and mountains.

[39] U.S. Census (2000).

The primary area of transport into Las Vegas is from the southwest, partly from California, and largely along the I-15 corridor[40]. The Reservation lies at approximately 165 m, is approximately 85 miles from Las Vegas, 60 miles from the I-15 corridor and is separated from both by mountains south of Las Vegas. These mountains are the McCullough Range (with peaks of 1670 m and 2305 m), and the Eldorado Mountains (with peaks approximately 1300 m to 1600 m). The area is also separated from Las Vegas by mountains near the Reservation, the Newberry Mountains (with peaks approximately 650 m to 1850 m), and the Black Mountains (approximately 1000 m to 1650 m).

Factor 8:
Geography/topography (mountain ranges or other air basin boundaries)

The Fort Mojave Reservation is separated from Las Vegas by both geography and topography. It is separated from Las Vegas by several mountain ranges and is in a separate air basin. The geography and topography of the area between Las Vegas and the Reservation indicate that the area does not cause or contribute to ozone in Las Vegas.

The Reservation lies at an elevation of approximately 165 m, is approximately 85 miles from Las Vegas, 60 miles from the I-15 corridor and is separated from both by mountains south of Las Vegas. These mountains are the McCullough Range (with peaks of 1670 m and 2305 m), and the Eldorado Mountains (with peaks approximately 1300 m to 1600 m). The area is also separated from Las Vegas by mountains near the Reservation, the Newberry Mountains (with peaks approximately 650 m to 1850 m), and the Black Mountains (approximately 1000 m to 1650 m).

Factor 9:
Jurisdictional boundaries (e.g., counties, air districts, existing 1-hour nonattainment areas, Reservations, etc.)

The Fort Mojave Reservation is a separate jurisdiction from that of Nevada and Clark County.

A nonattainment designation would create two designations within the Fort Mojave Reservation, because the California and Arizona portions are presently designated unclassifiable/attainment. Two different designations would provide no benefit to Las Vegas air quality. As discussed elsewhere in this analysis, the Fort Mojave Reservation does not cause or contribute to ozone in Las Vegas. A nonattainment designation would present disadvantages to the Tribe and to the air quality planning process by adding another agency to the planning process in Las Vegas.

[40] Clark County Department of Air Quality and Environmental Management (DAQEM), "Nevada Air Quality Designations: Boundary Recommendations for the 8-Hour Ozone NAAQS for Clark, County, Nevada," page 60 (July 2004)

Factor 10:
Level of control of emission sources

Emissions in this area do not cause or contribute to ozone in Las Vegas. Thus, the level of control on the Reservation would not impact air quality in Las Vegas.

Factor 11:
Regional emission reductions (e.g., Nox SIP call or other enforceable regional strategies)

With so few sources and topographic features that nearly surround the area, emissions from the Fort Mojave Reservation are not significant enough to produce a regional impact in the Las Vegas or Clark County area.

APPENDIX A

Notes on Ozone and Windfield Analysis
(from Windfield Analysis provided by Moapa Band of Paiutes)
for 14 ozone episodes in Las Vegas

"Apex SSW hours" are hours for which Apex winds were toward south or southwest; tilde ("~") indicates west-southwest, of lesser importance for transport to Las Vegas

CAL = Flood Control District "California Wash 3" monitor
RG = Reid Gardner power plant's monitors

8 episodes have only 0 or 1 hours with Apex wind toward LV
(5 episodes have two hours with Apex wind toward LV)
3 have other winds opposite or perpendicular
1 has no exceedance on day that there are SW Apex winds

August 7 2001 - August 11 2001 (Episode 1).ppt
Apex SSW hours:
8/8 22-23
8/9 21-23 CAL agrees
8/10 ~7, 19-21
8/11 ~7-10 possible contribution?
8/8, 8/9, 8/10 late hours, doubtful contribution to following day
8/11 possible contribution, but likely before main RG emissions could reach LV

June 14 2002 - June 17 2002 (Episode 2).ppt
Apex SSW hours
6/14 7

June 25 2002 - June 29 2002 (Episode 3).ppt
Apex SSW hours: none

August 9 2002 - August 12 2002 (Episode 4).ppt
Apex SSW hours
8/9 ~8, 9, ~10
8/10 ~8, 9, 10 Nellis opposite
8/11 8, ~10 Nellis opposite
8/12 ~8, ~9 NE perpendicular

August 16 2002 - August 19 2002 (Episode 5).ppt
Apex SSW hours: none

May 24 2003 - May 28 2003 (Episode 6).ppt
Apex SSW hours

5/27 8-11 (Nellis opposite or perpendicular)

May 30 2003 - June 2 2003 (Episode 7).ppt
Apex SSW hours: none
high O3

June 4 2003 - June 7 2003 (Episode 8).ppt
6/4 ~9, ~10
6/5 1-4, 6, 7, 12, 13; O3 86.5 at Palo Verde; RG winds SE or N; but possible contribution?
6/6 ~7, 8, ~9, ~10 RG light winds
6/5, 6/6 possible contribution; but winds at RG don't agree

June 11 - June 14 2003 (Episode 9).ppt
Apex SSW hours: none
high O3

June 27 - June 30 2003 (Episode 10).ppt
high O3
Apex SSW hours
6/27 9, 10 (RG & CAL perpendicular); ~12, 15

July 7 2003 - July 10 2003 (Episode 11).ppt
Apex SSW hours
6/14 7

July 19 2003 - July 22 2003 (Episode 12).ppt
Apex SSW hours: none

May 8 2004 - May 11 2004 (Episode 13).ppt
5/11 24 CAL perpendicular

May 13 2004 - May 16 2004 (Episode 14).ppt
5/13 ~6, 7, 8, ~9, 10 but no exceedance; max 62.9 Palo Verde
5/14 8 CAL perpendicular
5/15 8
5/16 8 CAL perpendicular
###

Number of consecutive (or nearly so) hours of SW flow at Apex
(X=another station is opposite or perpendicular; L=late at night)
episode hours
8/7/012L, 3+
6/14/02 1
6/25/02 0

8/9/02 3, 3X
8/16/02 0
5/24/03 4X
5/30/03 0
6/4/03 4+
6/11/03 0
6/27/03 2+X
7/7/03 1
7/19/03 0
5/8/04 1XL
5/13/04 5, 1X [41] [42]

[41] The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard" (Supplement, August 18, 2004).

[42]The Moapa Band of Paiute Indians (MBPI), "Air Quality Designations and Boundary Recommendations for Moapa River Indian Reservation under The 8-Hour Ozone National Ambient Air Quality Standard" (Supplemental Windfield Files, August 18, 2004).