DECLARATION OF THEODORE D. SCHADE

I, Theodore D. Schade, declare:

1. I am the Air Pollution Control Officer for the Great Basin Unified Air Pollution Control District ("Great Basin APCD"). The following facts are of my own personal knowledge and, except as stated otherwise, if called as a witness, I could and would testify competently thereto.

2. This Declaration is made in support of Imperial County and Imperial County Air Pollution Control District ("Imperial County APCD") Response and Opposition to Petition for Unconditional Writ of Supersedeas.

3. Attached as Exhibit C-1 is a copy of my curriculum vitae.

4. I am a registered engineer in the state of California.

5. I have been employed by the Great Basin APCD since 1990. The Great Basin APCD's jurisdiction includes Inyo, Mono and Alpine Counties. Owens and Mono Lakes, two of the Nation's largest sources of particulate air pollution, are located within the Great Basin APCD's jurisdiction.

6. My responsibilities as the Air Pollution Control Officer include planning, designing, implementing and managing the Great Basin APCD's fugitive dust mitigation research projects and dust control measures on Owens and Mono Lakes. I have spent the last 20 years studying dust emissions from the dried beds of Owens and Mono lakes, and developing and implementing plans to reduce those emissions to levels that meet the state and federal air-pollution standards.

7. I am also familiar with the Salton Sea and the air quality impacts associated with the Quantification Settlement Agreement ("QSA") and water transfers to San Diego and Coachella Valley. Since 2000, I have reviewed research involving the Salton Sea, visited the Salton Sea area, participated in seminars and panels about the Salton Sea air quality impacts,

and been consulted by the Salton Sea Authority, U.S. Salton Sea Science Office, various environmental groups, the Imperial County APCD, and CH2MHill (the consultant that prepared the Environmental Impact Report ("EIR") for the water transfer project, "Transfer EIR"), among others. I also reviewed the air quality sections in the Transfer EIR, submitted written testimony to the State Water Resource Control Board ("State Board") on behalf of the Defenders of Wildlife (attached to my declaration as Exhibit C-2), and testified at the hearings on May 14 and 15, 2002 (AR:3:522187, 522447 to 522464; AR:3:522466, 522473 to 522575.) In 2006, I testified before the U.S. House of Representatives Committee on Energy and Commerce regarding air quality issues in the Coachella Valley.

Mono Lake

8. The Mono Basin Planning Area experiences severe episodes of air pollution attributable to windblown erosion of fine particulate matter, known as PM10, from the exposed lake shore of Mono Lake. The Mono Basin Planning Area is designated by the U.S. Environmental Protection Agency ("EPA") as a moderate nonattainment area for PM10, meaning that the area is in violation of the PM10 National Ambient Air Quality Standard ("NAAQS") of 150 microgram per cubic meter ($\mu g/m^3$). The PM10 problem at Mono Lake results from the water elevation of the lake having declined approximately 45 feet between 1941 and 1989, due to water diversions from tributary streams by the City of Los Angeles Department of Water and Power. These pollution episodes produce concentrations of PM10 that violate federal, health-based air quality standards and adversely impact the public trust resources of the Mono Basin. PM10 concentrations have been measured above the shore of Mono Lake that are almost 100 times the PM10 NAAQS (most recently, over 14,000 $\mu g/m^3$ in November 2009).

9. I have been to Mono Lake during dust episodes. Attached to my declaration as Exhibit C-3 are webcam photographs showing a dust

storm at Mono Lake on November 20, 2009. The camera that took the photographs is located in the town of Lee Vining, which was upwind (south) of the north shore of the lake bed and the large island that were emissive on that day. The camera is located between 5 and 12 miles away from the emissive areas. One photo per hour was taken at about 30 minutes past the hour. The PM10 hourly values for from the Mono Shore Tapered Element Oscillating Microbalances ("TEOM") (included in Exhibit C-3) were taken from the station on the north end of the lake (in the dust plume). Attached as Exhibit C-4 are also photographs taken of the dust storm at Mono Lake on November 20, 2009, from a different camera in Lee Vining.

10. In compliance with the federal Clean Air Act, the Great Basin APCD approved a Mono Basin PM10 State Implementation Plan ("SIP") in May 1995 to demonstrate how the Mono Basin Planning Area will decrease its emissions and attain the federal standard.

11. The control strategy of the Mono Basin SIP is based in part on the 1994 State Water Resources Control Board ("State Board") Decision 1631 that amended the water right licenses of the City of Los Angeles. (Attached to my declaration as Exhibit C-5 are excerpts of Decision 1631.) In that Decision, the State Board recognized that air quality is a public trust resource and that protecting air quality should be a determining factor in the water appropriation decision at Mono Lake. Specifically, the Mono Basin SIP requires Los Angeles diversions to be limited so that the water level in Mono Lake will rise to elevation 6,391 feet and eliminating the source of particulate matter from the exposed lake bed areas below the 6,391 foot elevation in order to reach attainment of the NAAQS for PM10 by 2021. If Mono Lake does not reach an elevation of 6,391 feet by September 28, 2014, then Decision 1631 requires the State Board to hold a hearing to consider appropriate revisions to the City of Los Angeles' water right licenses and to determine if the State Board will further limit water diversion activities by

the City of Los Angeles. Attached to this declaration as Exhibit C-6 is an excerpt from the Mono Lake SIP showing how the control measures discussed above are implemented.

12. Mono Lake is currently about nine feet below the target of 6,391 feet above sea level set by the State Board's Decision 1631. The Great Basin APCD estimates there are still about 2,000 acres of emissive lake bed exposed. Even though the elevation of Mono Lake is rising, the area continues to record some of the highest concentrations of dust ever recorded in North America. Between 10 a.m. and 11 a.m. on November 20, 2009, one of the highest hourly concentrations of PM10 ever was measured at Mono Lake at over 60,000 $\mu g/m^3$ – more than 400 times the NAAQS for PM10. This concentration far exceeds levels hazardous to human heath. Until the elevation levels are reached and the controls imposed on the remaining shoreline, the PM10 NAAQS can still be significantly exceeded.

13. Based on my experience with Mono Lake and my understanding of the Salton Sea air quality impact potential, I believe that the establishment of a minimum elevation level for the Salton Sea, such as was done for Mono Lake, is a reasonable and achievable method to control PM10 emissions at the Salton Sea. Because of the amount of time it takes to restore a water body to its prior elevation level, I believe it is not advisable to allow the Salton Sea's elevation to become lower than it current is at about -231 mean sea level ("msl"). Otherwise, the Salton Sea may face the same issue as Mono Lake, where the exposed shoreline remains a source of significant PM10 emissions for years or even decades until the water level sufficiently raises.

Owens Lake

14. Currently, the Owens Lake bed also produces enormous amounts of windblown dust that exceeds the NAAQS for PM10 dozens of times per year and is designated by U.S. EPA as a serious nonattainment

area. Owens Lake is the largest single source of PM10 in the United States. Attached to my declaration as Exhibit C-7 is a table from the 2008 Owens Valley SIP showing that, with one exception, Owens Lake had the highest PM10 concentration in the United States from 1995 through 2006. Although over 25,000 acres of dust controls have been constructed on the lake bed since 2000, Owens Lake continues to record extremely high PM10 levels. The highest PM10 concentration ever recorded into the U.S. EPA's pollution database occurred on May 2, 2001 at Dirty Socks when a 24-hour PM_{10} value of 20,754 µg/m³ was recorded. This 138 times the NAAQS. The District estimates that, prior to implementing dust control measures, Owens Lake emitted between 75,000 to over 100,000 tons of PM10 every year. This is 3.5 million cubic feet of material, or enough to completely cover every NFL football field (32 teams) with two feet of soil every year.

15. Studies of dust transport from Owens Lake show that the standard can be exceeded more than 50 miles away and expose many more people to violations of the PM10 standard than just the residents near Owens Lake. The dust (including PM10 emissions) from Owens Lake affects about 40,000 permanent residents between Ridgecrest and Bishop. It is estimated that five percent of all particulate pollution in North America comes from Owens Lake.

16. The PM10 problem at Owens Lake results from diversions from the Owens River by the City of Los Angeles that began in 1913. By 1926 Owens Lake was essentially dry. The Owens Lake bed covers an area of approximately 110 square miles (70,000 acres) of which approximately 45,000 acres are exposed. The remnant Owens Lake consists of a hypersaline permanent brine pool about 26 square miles (16,500 acres) surrounded by dry playa soils and crusts. Owens Lake is closed hydrological system losing water only through surface evaporation creating

a highly saline condition in the remaining surface waters and soils at the bottom of the Lake basin. This is similar to the situation at the Salton Sea.

17. Both Owens Lake and the Salton Sea contain million of tons of salt. As the waters evaporate, enormous salt deposits are left behind. Although the type and mix of salts at the Salton Sea could be more stable than at Owens, this does not mean that the type of emissive surfaces that form at Owens would not form at the Salton Sea.

18. In compliance with the federal Clean Air Act, the Great Basin APCD approved a 2008 PM10 SIP for Owens Lake that includes an analysis of the PM10 problem in Owens Valley and provides a revised control strategy to bring the area into attainment with the NAAQS for PM10 as soon as practicable. The 2008 SIP incorporates the provisions of the 2006 Settlement Agreement between the Great Basin APCD and the City of Los Angeles Department of Water and Power to implement dust control measures. A copy of the 2006 Settlement Agreement is attached to my declaration as Exhibit C-8.

19. The control strategy of the 2008 SIP for Owens Lake is based in part on the 2006 Settlement Agreement. The mitigation measures that have been found to be feasible and effective at Owens Lake are shallow flooding, managed vegetation, and gravel cover. Attached to my declaration as Exhibit C-9 is an excerpt from the 2008 SIP for Owens Lake that describes these mitigation measures. The proven control measures are known as Best Available Control Measures or BACM.

20. These BACM mitigation measures for Owens Lake were identified after over ten years of extensive research and testing. Candidate measures were tested on the Owens Lake bed and test sites ranged from less than an acre to over 600 acres. In addition to the successfully developed shallow flooding, managed vegetation and gravel BACM measures, tested, but rejected measures included artificial windbreaks such as sand fences,

earthen windbreaks (moat & row), tree rows, sprinklers, tilling, surface compaction and chemical stabilizers.

21. My written testimony in Exhibit C-2 describes the many flaws and shortfalls I previously identified based on my review of the air quality section of the Transfer EIR for the Salton Sea (including the mitigation measure AQ-7 attached to my declaration as Exhibit C-10). There are two issues I would like to highlight in this declaration. First, while I believe the baseline in the Transfer EIR to underestimate the amount of lake bed that will be exposed as a result of the QSA and water transfers to San Diego and Coachella Valley, the document does admit that the project would cause about 50,000 acres (78 square miles) of the seabed sediments to be exposed and a source of PM10 emissions. This is more than the 45,000 acres exposed at Owens Lake. Second, the mitigation measure AQ-7 is oversimplified and insufficiently defined as a control method for PM10 at the Salton Sea. Based on my experience with Owens Lake, I believe that developing an effective PM10 control program at the Salton Sea will similarly involve a substantial research effort to determine the most effective combination of activities that will sufficiently control PM10 and likely experience similar obstacles. Because this is a time consuming and uncertain process, it is critical that researching and developing a mitigation control approach that involves all stakeholders be expeditiously pursued before the Salton Sea further recedes.

22. As an expert in the air-quality problems caused by the diversion of water from saline lakes, I believe there is no question that the diversion of water from the Salton Sea to the City of San Diego and Coachella Valley will cause increase concentrations of particulate air pollution in the Salton Sea Air Basin. Desert winds are common at both lakes and can deposit the sediments large distances from the lakebed. Even if only a fraction of this amount of exposed seabed is emissive and the winds

are less than at Owens Lake, there is still the potential for thousands of dust-blowing acres, which will cause increased PM10 levels. Even if the peak 24-hour concentrations at the Salton Sea are only a fraction as bad as Owens Lake, the levels could still be many times higher than the state and federal health based standards.

23. In accordance with the 2006 Settlement Agreement and 2008 State Implementation Plan ("SIP"), during the years 2000 to 2010 dust control measures were implemented on 39.5 square miles (25,280 acres) of the Owens Lake bed by the City of Los Angeles Department of Water and Power. The City must implement dust control measures on an additional 5.5 square miles (3,520 acres) by the end of 2012.

24. The construction of the first seven phases on Owens Lake, treating the worst 39.5 square miles of dust-emitting soils on the playa, has cost the City of Los Angeles an estimated $600 million to build. In addition, it costs the City approximately $17.5 million per year to operate and maintain the facility and the controls that use about $30 million worth of water per year (90,000 acre-feet at $338 per acre-foot). It is expected to cost the City about $1 billion dollars to comply with the mitigation identified in the 2006 Settlement Agreement and 2008 SIP for Owens Lake. The annualized cost of construction, operation, and water is approximately $78 million per year or $3,000 per acre. (2008 SIP, § 7.14.)

25. Based on my experience implementing mitigation measures at Owens Lake and the potential extent of the problem, I believe that the $36,774,000 (in 2002 dollars) identified as the cost of controls for PM10 at the Salton Sea in the QSA Environmental Cost Sharing, Funding, and Habitat Conservation Plan Development Agreement ("ECSA") (see AR:3:10567) to be wholly underestimated and insufficient to pay for the mitigation necessary at the Salton Sea.

26. In addition to high levels of PM10, Owens Lake dust also contains cadmium, arsenic and other toxic metals. These metals pose a significant risk for additional cancer cases in the areas of greatest dust impact. For example, the lifetime cancer risk at Keeler associated with cadmium and arsenic is estimated at 23 additional cancer cases in a million. Under the Great Basin APCD's adopted air toxics policy, a toxic risk greater than one in a million additional cancer cases is considered significant. Sediment analyses at the Salton Sea also indicate that the sediment and therefore dust emissions there could potentially contain more toxic material than at Owens Dry Lake, including cadmium, copper, molybdenum, nickel, zinc, selenium exist within the Salton Sea sediment.. Therefore, I believe that the type of dust found at the Salton Sea, in addition to the amount of dust, should also be of concern.

27. Visibility and sensitive airsheds are also an issue in the Owens Valley. Under normal conditions, visibility in the Owens Valley generally ranges from 37 to 93 miles. However, during Owens Lake dust storms visibility can be reduced to near zero at the Lake and obscure visibility 150 miles aware from the Lake. The main cause of visibility degradation in the Owens Lake are is the fine particulates in the dust. I would expect that the dust storms at the Salton Sea to similarly degrade visibility around the Salton Sea. There are 11 sensitive airsheds in the region, including wilderness areas, national parks, national forests, a national historic site, and the R-2508 military airspace associated with the China Lake Naval Air Weapons Station. Four of these airsheds are designated as Class I Prevention of significant Deterioration ("PSD") areas which are afforded more stringent protection from visibility degradation and impacts from air quality. The R-2508 military airspace is a sensitive site for visibility impacts from Owens Lake dust storms because good visibility is vital for many military operations. Similarly, located within or near to the

Salton Sea is the Sonny Bono Salton Sea National Wildlife Refuge, Imperial Wildlife Area, Salton Sea state Recreation Area, the Anza Borrego Desert Station Park, the Navel Air Facility in El Centro and the Chocolate Mountain Aerial Gunnery Range to which visibility is also important.

28. I have been at Owens Lake during dust episodes. Attached to my declaration in Exhibit C-11 are photographs taken showing dust storms at Owens Lake. Also included in Exhibit C-11 is a DVD that Great Basin APCD prepared in April 2006 titled "2003 and 2004 Dust Storm Supplemental Control Areas."

29. Because of the high concentrations of PM10 caused by Owens Lake and potential public health impacts, the Great Basin APCD has established a Particulate Pollution Health Advisory Program for the Owens Lake area. The Great Basin APCD will issue air pollution health advisories when dust storms from Owens Dry Lake cause air pollution to exceed selected trigger levels. Great Basin APCD staff take hourly readings of the wind speed, wind direction and particulate pollution levels in Lone Pine, Olancha and Keeler from ambient monitoring stations, on days when high winds are forecast for the Owens Lake area. Health advisory notices are sent to schools in the affected downwind communities and to local radio stations, newspapers, schools, child care facilities, and hospitals. A Stage 1 air pollution health advisory is issued when hourly particulate pollution levels exceed 400 microgram per cubic meter ($\mu g/m^3$). A Stage 1 health advisory will recommend that children, the elderly, and people with heart or lung problems refrain from strenuous outdoor activities in the impacted area. A Stage 2 air pollution health advisory is issued when hourly particulate pollution levels exceed 800 $\mu g/m^3$. A Stage 2 health advisory will recommend that everyone refrain from strenuous outdoor activities in the impacted area. The Owens Lake Air Pollution Health Advisory Program is not intended to replace the need to control the dust problem at Owens Lake,

but rather is intended to help reduce population exposure and adverse health effects until dust control measures are in place. Since 2007, the Great Basin APCD has averaged eight Owens Lake health advisories per year.

30. The Great Basin APCD has established an ambient monitoring system to determine PM10 concentrations local to both Mono Lake and Owens Lake. The ambient monitoring systems provide hourly and daily PM10 concentrations. Ambient PM10 monitoring is essential to establish the baseline and monitor improvements as the dust control measures are implemented. EPA requires ambient monitoring data to determine whether an area is in attainment or not of the NAAQS.

31. Based on my experience, I believe that the operation of an ambient air quality system that accurately characterizes the PM10 concentrations around the Salton Sea is essential to understanding the extent of the PM10 emissions emanating from the exposed Salton Sea shoreline, establishing appropriate mitigation measures and monitor progress. Further, if the Imperial County APCD determines that a health advisory program is warranted similar to the Owens Lake Health Advisory Program, then a real-time ambient monitoring system around the Salton Sea is required.

32. I understand that since the QSA and water transfers have been implemented, about 5,000 acres of Salton Sea bed has become exposed. It is my experience that 5,000 acres of exposed shoreline has the capability of producing significant emissions. I believe there is a immediate need to monitor and address dust emissions from these newly exposed area so that it does not become a significant problem. I would strongly caution against disregarding air-quality impacts at the Salton Sea. The quality of the air we breathe is a serious issue that requires serious attention. Based on the costs to control Owens Lake, the cost to control the existing 5,000 exposed acres at the Salton Sea would be over $90 million for construction, and $3 million per year for operation.

Stay Conditions Proposed by Imperial County and Air Pollution Control District

33. I have been asked to review and comment on the feasibility of three conditions that are being proposed by Imperial County and its Air Pollution Control District.

34. The first condition involves the establishment of a mean sea level standard ("MSL Standard") to prevent further decline in the Salton Sea elevation. Under this condition, an MSL Standard will be established requiring that the elevation of the Sea not fall below -230.5 msl (-230.6 msl thus being in violation). Compliance with the MSL Standard will be determined by the U.S. Geologic Survey ("USGS") measurements at the Westmorland station on the following dates (the "Compliance Dates") of each year: January 1, April 1, July 1, October 1. The Air District would obtain from USGS the msl of the Salton Sea at the Westmorland station, and within 10 days of each Compliance Date file the information with this Court and serve it to all of the parties. The timeframes from January 1 to March 31, from April 1 to June 30, from July 1 to September 31 and from October 1 to December 31 are each considered the "Quarterly Reporting Period."

35. If the data from USGS shows that the Salton Sea elevation as measured at the Westmorland station has fallen below -230.5 msl on any Compliance Date, then during the Quarterly Reporting Period that includes that same Compliance Date, and subsequent Quarterly Reporting Periods in which the sea level remains below -230.5, Colorado River water would not be transferred and instead water would be delivered to the Salton Sea until such time as the data from USGS shows on a succeeding Compliance Date that the Sealton Sea is restored to -230.5 msl. No later than the 30th day following the Compliance Date, Imperial Irrigation District ("IID"), Metropolitan Water District of Southern California ("MWD"), and San Diego County Water Authority ("SDCWA") must file in this Court and

serve to all of the parties a report describing the measures they have implemented and intend to implement to bring the Salton Sea level into compliance with the MSL Standard.

36. The establishment of an MSL Standard is similar in concept to that imposed by the State Board in Decision 1631 and which the Great Basin APCD included in the Mono Basin PM10 SIP as a control measure. Therefore, I have experience with the emission reduction potential, monitoring implementation, and enforcement of similar conditions. Importantly, control measures are not incorporated into a SIP unless they are achievable, enforceable, and reduce emissions. The Great Basin APCD found the elevation requirement for Mono Lake to meet these requirements.

37. I believe the establishment of an MSL Standard as proposed will minimize future PM10 emissions resulting from exposed shoreline by minimizing the amount of shoreline that is exposed in the future. Compliance with the MSL Standard is based on an independent and reliable measurement method. A specific corrective action is identified in the event the MSL Standard is not achieved. Compliance is made transparent by requiring the information to be filed with the Court and served on the parties, and thus allowing parties to enforce the standard if the corrective action is not taken. Therefore, it is my opinion that the proposed condition is feasible and should be imposed to minimize the potential for increased concentrations of PM10 while the appeal is being decided.

38. The second condition involves the completion and operation of the five ambient air quality monitoring stations local to the Salton Sea. Under this condition, IID must ensure the installation of the five ambient air quality monitoring stations described in the Cooperative Agreement between IID and the Air District dated May 10, 2009 ("Cooperative Agreement") is completed and the stations are operating.

39. It is my experience that a monitoring system that accurately monitors PM10 emissions from lakebed sources is essential to assessing seabed emissions, determining contributions of seabed emissions to violations of the NAAQS, and developing the best and most effective control strategy. Therefore, it is my opinion that imposing a condition that requires the completion and operation of the five ambient air quality monitoring stations local to the Salton Sea is appropriate and warranted.

40. The second condition involves a requirement that IID implement Mitigation Measure AQ-7(4)(a) from the Transfer Environmental Impact Report ("EIR") to minimize emissions associated with the recently exposed shoreline. Specifically, Transfer EIR Mitigation Measure AQ-7(4)(a) for the Salton Sea states: "Implementing feasible dust mitigation measures. This includes the potential implementation of new (and as yet unknown or unproven) dust control technologies that may be developed at any time during the term of the Proposed Project." As written, it is my opinion that this mitigation measure is not specific enough to be implemented and requires more definition. Therefore, in my opinion, it is essential that the condition require IID to identify the specific actions that it will take by certain dates to implement AQ-7(4)(a) (the "AQ-7 Plan").

41. In my experiences at Mono Lake and Owens Lake, the Air District must be involved in developing, overseeing and approving local plans so that they reduce PM10 emissions and comply with state and federal Clean Air Act requirements. Thus, in my opinion, I believe it is important for the IID to submit the AQ-7 Plan to the Air District for its approval. It is also my experience that there is a need for on-going monitoring and reporting on progress towards implementing any PM10 plans. Thus, in my opinion, the condition should require that IID file a status report with the Court and serve it on all parties periodically while the stay is in place detailing the actions it is taking to comply with this condition.

42. Great Basin APCD obtains funding from the City of Los Angeles Department of Water and Power for its role in overseeing air quality programs at Mono Lake and Owens Lake. The Air District will need adequate funding for air monitoring stations at the Salton Sea, and also for its role in developing, overseeing and approving local plans, and also evaluating monitoring and reporting of emissions.

I declare under penalty of perjury under the laws of the State of California that the foregoing is true and correct and that this declaration was executed this 24th day of March, 2010, at Bishop, California.

Theodore D. Schade

EXHIBIT C-1

RÉSUMÉ OF

THEODORE D. SCHADE, P.E.
1626 Paiute Circle, Bishop, California 93514
(760) 872-3419 tschade@gbuapcd.org

CURRENT POSITION

Since 1990, Air Pollution Control Officer (2004 - 2010), Senior Projects Manager (2000 - 2004) and Project Manager (1990 - 2000) for the Great Basin Unified Air Pollution Control District in Bishop, California. Responsible for enforcing air pollution control laws in California's Inyo, Mono and Alpine Counties. Also responsible for planning, designing, implementing and managing District fugitive dust mitigation research projects and dust control measures on Owens Dry Lake.

While working for Great Basin, I have been in charge of PM-10 control measure research and development at Owens Lake and helped write the Owens Valley PM-10 State Implementation Plan (SIP) and Environmental Impact Report. I currently oversee the City of Los Angeles' implementation of PM-10 control measures on Owens Lake and monitor their compliance with the SIP requirements. My duties also include research to improve the efficiency of the SIP-approved PM-10 control measures.

WORK HISTORY

GREAT BASIN UNIFIED AIR POLLUTION CONTROL DISTRICT, BISHOP, CALIFORNIA
AIR POLLUTION CONTROL OFFICER, 2004 - 2010, SENIOR PROJECT MANAGER, 2000 - 2004; PROJECTS MANAGER, 1990 - 2000

Responsible for enforcing air pollution control laws in three California counties. Manage an agency of 26 employees. Plan, implement and manage fugitive dust mitigation research projects at Owens Dry Lake. Civil engineering design and construction management of improvements for mitigation projects. Regulatory oversight of large-scale dust mitigation projects.

WILLDAN ASSOCIATES, SAN DIEGO, CALIFORNIA
DIVISION MANAGER, 1986 - 1990

Provided assistance to local government agencies in Orange and San Diego Counties in the areas of public works engineering, municipal planning, land development and public finance.

CITY OF SAN CLEMENTE, SAN CLEMENTE, CALIFORNIA
CITY ENGINEER, 1986; PROJECT ENGINEER, 1980 - 1985

Advanced through city engineering department to become head of city engineering. Performed water, wastewater, public works and land development engineering, planning, design, construction management and administration.

EDUCATION

B.S. CIVIL ENGINEERING – ENVIRONMENTAL ENGINEERING
UNIVERSITY OF NOTRE DAME
Notre Dame, Indiana

M.S. CIVIL ENGINEERING – WATER RESOURCES ENGINEERING
CALIFORNIA STATE UNIVERSITY, LONG BEACH
Long Beach, California

Rev. 3/2010

PROFESSIONAL REGISTRATION

STATE OF CALIFORNIA REGISTERED PROFESSIONAL ENGINEER
Discipline: Civil Engineering
Registration Number: 37164
Registration Date: 1984

PROFESSIONAL AFFILIATION AND TRAINING

AMERICAN SOCIETY OF CIVIL ENGINEERS

AIR AND WASTE MANAGEMENT ASSOCIATION

CALIFORNIA AIR RESOURCES BOARD AIR QUALITY TRAINING PROGRAM – 1992

COMMUNITY SERVICE

INYO COUNTY ANIMAL RESOURCES AND EDUCATION (ICARE) – 1996 to 2010
President and co-founder of local non-profit animal welfare organization providing low-cost spay/neuter services to Inyo County residents and encouraging pet adoptions from the Inyo County Animal Shelter.

MEADOWCREEK MUTUAL WATER COMPANY – 1992 to 2000
Vice-president and treasurer of local water company serving over 250 residences and businesses in the north Bishop area.

BISHOP AREA LAND AND WATER ADVISORY COMMITTEE – 1997 to 1999
Member (1997 and 1998) and Chairman (1999) of local advisory group set up by Inyo County Board of Supervisors to recommend land and water decisions related to County's water agreement with the City of Los Angeles.

ROUND VALLEY SCHOOL SCIENCE FAIR JUDGE – 1992 to 1994

OWENS VALLEY SCHOOLS COUNTY-WIDE SCIENCE FAIR JUDGE – 1994 to 2010

EXHIBIT C-2

California State Water Resources Control Board Hearing Regarding Salton Sea
Testimony of Theodore D. Schade, Great Basin Air Pollution Control District

My name is Theodore D. Schade. I am a registered professional civil engineer and the Senior Project Manager for the Great Basin Air Pollution Control District in Bishop, California. I have spent the last eleven years studying dust emissions from Owens and Mono Lakes and have helped to develop and implement plans to reduce those emissions.

This is the second time I have testified in front of the Water Board regarding water diversions and their potential impact on a California inland salt lake. In 1994, I testified regarding the City of Los Angeles' request to divert water destined for Mono Lake (SWRCB 1994, §6.4). Los Angeles' diversions at Mono Lake since the 1940s had caused previously flooded portions of the Mono Lake bed to become exposed and large dust storms were occurring that caused exceedances of the Federal Ambient Air Quality Standard for particulate matter (PM-10). I was asked to analyze a number of possible engineering solutions that could be applied to these exposed areas to prevent or at least reduce the dust emissions. The conclusion that we came to for the fragile and important Mono Lake ecosystem was that the only feasible solution to the air quality problem was to raise the lake level high enough to resubmerge the emissive lake bed such that the Federal Standard was met. Thankfully, the Water Board made the right decision and required Los Angeles to raise the level of Mono Lake high enough to prevent these dust storms. This "air protecting" lake level is also high enough to protect the wildlife that depends on the lake. Your decision at Mono Lake was based on an extensive air quality modeling effort. Emissive areas of the lake bed were mapped and two air quality models were prepared. The Water Board felt confident that by raising the water level about 16 feet, the Federal PM-10 Standard would be met. The level of Mono Lake has slowly risen over the last eight years and the severity of the dust storms has been reduced. But the PM-10 Standard will not be met until the lake rises to its target level.

But I am not here today to talk about Mono Lake; you made your decision there in 1994. I am here to draw a few parallels between the Salton Sea and another of California's inland saline lakes—the Owens Lake. If these two inland seas are as alike as I believe they may be, the decision to divert water destined for the Salton Sea could have enormous adverse impacts on the air quality of the Imperial and Coachella Valleys. So, please bear with me while I speak about Owens Lake; you will see that so much of what has been learned there is applicable to the questions before you regarding the Salton Sea.

I have been working on the dust problem at Owens Lake since September 1990. I have studied the geology, hydrology, biology, archaeology, history and of course meteorology and air quality of Owens Lake. I would claim that I know as much about Owens Lake as anyone.

In the late 1800s, Owens Lake was one of the largest natural lakes in California. It is a basin lake, which means it has no outflow; its size is determined by the amount of fresh water that flows in every year balanced with the amount of water that evaporates. And because there is no outlet, it is a saline lake; the minerals that dissolve from the rocks of

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the Sierra and White/Inyo Mountains upstream are transported to the lake and then left behind when the fresh water evaporates. With a surface area of more than 110 square miles (GBAPCD 1997, pg. 3-52) and an average depth of 20 to 30 feet, Owens Lake supported two steamships transporting silver ingots from the mines in the Inyo Mountains destined for the growing city and port of Los Angeles (GBAPCD 1997, pg. 3-162). With regard to wildlife, an early settler reports that the lake was once "alive with wild fowl, from the swift flying Teel to the honker goose... Ducks were by the square mile, millions of them. When they rose in flight, the roar of their wings... could be heard on the mountain top at Cerro Gordo, ten miles away..." (Kahrl 1982, pg. 35). Very much like Mono Lake, the wildlife at Owens Lake sustained itself on billions of insects; at about three times the salinity of seawater, the lake was too salty for fish. But, Owens Lake's fate was sealed in 1913 when the City of Los Angeles completed construction of the Los Angeles Aqueduct. This marvel of modern engineering intercepted the Eastern Sierra snowmelt that previously kept Owens Lake full and diverted the water south 223 miles to the growing City of Los Angeles. By the mid-1920s, Owens Lake had all but disappeared; with no significant input of water and evaporation rates of over five feet per year, the lake became a lifeless, hypersaline brine pool that, depending on rainfall, varies in size from zero to about 40 square miles (GBAPCD 1997, 3-52).

With the lake nearly gone, over 60 square miles of saline lake bed was suddenly exposed. As the salt water evaporated, salt deposits were left behind. The mix of salts and fine sediments has created a very dynamic surface. Every year, rainwater dissolves the salt and as the water evaporates, a salt crust is left behind. If the salt crust is formed during warm weather, the salt crystals cement the soil particles together and the surface is very hard and resistant to wind erosion. However, if the crust forms during the cool or cold winter weather, an efflorescent crust is formed that is very soft and subject to wind erosion (St.-Amand 1987). The resulting dust storms of fine salt and soil particles truly have to be seen to be believed—the largest dust storms in the U.S. occur at Owens Lake (Reheis).

Before addressing the levels of air pollution caused by the dried bed of Owens Lake, it is necessary to briefly address the air pollutant known as PM-10, what the standards are and why it is a health risk. The following summary of particulate matter air pollution is taken from the Water Board's Mono Lake decision (Decision No. 1631).

The term "ambient air quality" refers to the atmospheric concentration of a specific compound or material present at a location that may be some distance from the source of the pollutant emissions. During the 1980s, air quality standards for particulate matter were revised to apply only to "inhalable" particles with a size distribution weighted toward particles having aerodynamic diameters of 10 microns or less. This is where the term PM-10 comes from. The PM-10 standard is set to control concentrations of inhalable-sized fine particles less than 10 microns in size, or about one seventh the diameter of human hair. The U.S. Environmental Protection Agency uses health risk studies to establish the PM-10 standard; the standard is based on potential impacts to human health.

PM-10 sized particles are small enough to be inhaled deep into the lower respiratory tract. When breathing through the nose, few particles with an aerodynamic diameter larger than 10 microns reach the lower respiratory tract. People who live in or visit areas exposed to elevated levels of PM-10 are at risk.

Federal standards for PM-10 have been set for two time periods: a 24-hour average and an annual average of 24-hour values. The federal "National Ambient Air Quality Standards" (NAAQS) for PM-10 are:

> 150 micrograms per cubic meter ($\mu g/m^3$) as a 24-hour average; and 50 $\mu g/m^3$ as an annual arithmetic mean.

Exposure to PM-10 levels above the federal standard may cause sensitive individuals to experience varying degrees of breathing difficulties, some of which may linger beyond the exposure period. In some cases, breathing difficulties due to PM-10 exposure may cause asthma attacks or even contribute to an individual's death. Other health effects, such as eye and nasal irritation, may also occur. The most sensitive population includes children, the elderly and people with respiratory problems, heart disease or influenza. (SWRCD 1994, §6.4.2)

The emissive surfaces that form on Owens Lake make it the largest single source of air pollution in the United States. It is the largest source in terms of total tons of air pollutants emitted per year and in terms of the levels of Standard exceedances. According to the Federally-approved attainment plan for the Owens Valley, the Owens Lake bed emits as much as 290,000 tons of PM-10 per year (GBAPCD 1998, pg. 4-2). That is about 580 million pounds of fine particulate matter or enough to fill a football field over 100 feet deep every year. Peak 24-hour PM-10 levels as high as 20,750 $\mu g/m^3$ (138 times the Standard) have been measured at a publicly accessible hot spring near the historic shore of Owens Lake and 3,928 $\mu g/m^3$ (26 times the Standard) in the town of Keeler on the eastern edge of the lake bed. High exceedances also occur frequently. In 1999, for example, of the top ten 24-hour PM-10 levels measured in the entire U.S., nine occurred at Owens Lake—the tenth occurred in the Imperial Valley at Calexico. Similar high exceedances occur at Owens Lake every year (GBAPCD 1998, pg. 3-8 and USEPA).

One of the reasons that Owens Lake is so dusty is that it is one of the youngest dry lakes in the world. Its youth is what makes it different from the scores of other dry lakes found in the western United States. The other dry lakes in the Great Basin have been dry for hundreds to thousands of years; they have had time to naturally stabilize. Owens Lake has been dry for less than a century; it is still in a very dynamic state. Given time, perhaps hundreds of years, Owens Lake would stabilize; we see signs of natural stabilization processes occurring. However, we cannot wait for hundreds of years—the Federal Clean Air Act requires the Owens Lake dust to be controlled by the end of 2006 (GBAPCD 1998, pg. S-1).

But, I am pleased to report that the dust at Owens Lake is in the process of being controlled. In 1998, the City of Los Angeles and the Great Basin Air Pollution Control

District entered into an historic agreement that provides for the dust problem to be solved by the 2006 deadline. Based on over a decade of research and testing, Great Basin developed a plan that allows Los Angeles to install any combination of three control measures on the areas of the exposed lake bed that emit dust. The allowable control measures include: shallow flooding, managed vegetation and gravel blanket. Shallow flooding simply spreads a thin sheet of water over the emissive area. Managed vegetation uses techniques developed by Great Basin to reclaim the saline soils and establish a protective cover of salt-tolerant saltgrass (*Distichlis spicata*) using drip irrigation technology. Gravel blanket is a four-inch thick layer of very coarse gravel that armors the surface and prevents the capillary rise of salt crystals (GBAPCD 1997, Ch. 2 and 1998, Ch. 8).

All three approved dust control measures attempt to mimic natural processes that are occurring on Owens Lake. Natural seeps and springs along the historic lakeshore keep the surface wet and non-emissive in many small areas. If the natural seep waters are fresh enough, they may flush the salts from the soil—this allows saltgrass vegetation to establish naturally. Where very coarse soil particles occur, such as near the inlet of the Owens River, the fine clay and silt soils are blown away and the coarse sand and gravels are left behind which help to armor the surface (GBAPCD 1997, Ch. 2). A number of non-nature mimicking control measures have also been tested over the years, including: sprinklers, sand fences, soil tilling, soil compaction and many chemical stabilizers. These either failed outright or would be unfeasible to implement on the enormous scales needed at Owens Lake (GBAPCD 1997, Ch. 7).

The City of Los Angeles started the first phase of large-scale dust control measure implementation in the fall of 2000. Their initial project was a $75 million, 8,600 acre (13.5 square mile) shallow flood project that they completed in January 2002, just three months ago. Although it is too early to quantify the success of this first effort, Great Basin staff feels that the Phase 1 Shallow Flood Project has cut lake bed emissions by about 30 percent. The peak PM-10 levels that we see in Keeler during this time of year have been much less than typical.

Because Great Basin's agreement with Los Angeles requires 16.5 square miles of the lake bed to be controlled before the end of 2003, Los Angeles has immediately moved on to the second phase of the solution. They are currently constructing an $82 million, 3,500 acre (5 square mile) project that combines drip irrigated saltgrass with shallow flooding. The project will be planted with about 110 million saltgrass plants this spring through summer and the plants will be large enough to control dust to the level necessary to meet the PM-10 Standard in about two years.

Great Basin estimates that the two dust control projects currently underway will reduce dust levels by between 50 to 75 percent. However, with peak levels well above 15,000 $\mu g/m^3$ and the Standard at 150 $\mu g/m^3$, the dust levels must be reduced by 99 percent before the work is done. The total acreage the will need controls before the end of 2006 will not be known until late 2002, but we estimate that it will be between 25 and 35 square miles. Based on a cost of over $8 million per square mile for the first two phases, the entire project should cost between $200 million to $300 million when it is completed in 2006. (LADWP)

The Owens Lake dust control will also have a cost in terms of water. On average, about 320,000 acre-feet per year (ac-ft/yr) of water that naturally flowed into Owens Lake is diverted to Los Angeles (GBAPCD 1997, pg. 7-2). The Environmental Impact Report prepared for the Owens Lake dust control plan estimates that the final project will remove about 51,000 ac-ft/yr of water from the Los Angeles Aqueduct for use on the lake bed (GBAPCD 1997, pg. 4-45). Therefore, to solve the dust problem, Los Angeles will be able to export about 16 percent less water that they could before they were required to implement PM-10 control measures. This water has a monetary value. The USEPA recently developed a value for Los Angeles' Owens Valley water of $323 per ac-ft (USEPA 2002). Therefore, the annual cost of the diverted 51,000 ac-ft/yr is about $16.5 million.

Finally, to conclude the discussion of Owens Lake, we cannot blame the City of Los Angeles for making the Owens Lake disappear. When they decided to sacrifice Owens Lake and the environment in the Owens Valley for the growth of the emerging City of Los Angeles, even President Theodore Roosevelt acknowledged that the concerns of the residents in the Owens Valley were "genuine," but their concerns "must unfortunately be disregarded in view of the infinitely greater interest to be served by putting the water in Los Angeles" (Kahrl 1982, pg. 140). One hundred years ago, even President Roosevelt felt that the environment in a remote, sparsely settled valley was not something to be protected and preserved when it interfered with the continued growth of one of the nation's great cities. However, our priorities as a nation have changed since 1906 when Roosevelt wrote those words. Protection of our environmental resources has become a priority, especially in remote, sparsely settled places. And we could blame Los Angeles if they continued to refuse to fix the problem they have caused. But they finally have not refused; they finally acknowledge that the air pollution from Owens Lake is caused by their water diversions and they have begun a costly and enormous undertaking to solve their problem.

Now to the Salton Sea. I believe much of what has happened at Owens Lake could happen at the Salton Sea, if the Sea's water supply is simply diverted like Owens Lake's. I have been invited down to the Salton Sea three times over the last year and a half by the Salton Sea Authority and the Salton Sea Science Office to specifically look at the sea and its potential to emit dust if its level is lowered. I have also reviewed much of the literature relating to potential dust emissions and have read the sections addressing air quality at the Salton Sea in the Imperial Irrigation District's Water Transfer Project EIR/EIS. What I have seen at the Salton Sea and what I have read in the EIR/EIS concerns me. Although there are a number of differences between the two lake basins, I believe there are enough close similarities for my concern. The EIR/EIS inadequately addresses the potential problems—it devotes less than three pages to the potential air quality impacts—and concludes that there would be potential significant unavoidable environmental impacts, but it provides no real mitigation measures. The EIR/EIS admits that the proposed water transfer would cause about 50,000 acres (78 square miles) of sea bed sediments to be exposed and that this newly exposed area would have the potential for dust suspension. But it goes on to say that the many variables "prevent any reasonable quantitative estimate of emissions and associated impacts from the exposed shoreline." It then goes on to state that a "qualitative assessment" will be provided (IID 2002, pg. 3.7-34). A "qualitative assessment" was inappropriate for the Water Board during your Mono Lake decision; it was also inappropriate for the California Air Resources Board and the USEPA during the development of the air plans for Mono and Owens Lakes. In those cases, extensive research, testing and modeling allowed us to reduce the uncertainties in the many variables that affect dust emissions. With uncertainties reduced, we were able to construct air quality models that closely matched actual conditions. There is absolutely no reason why such an effort cannot take place for the proposed Salton Sea sediment exposure. Even a crude modeling effort would give an indication of the potential magnitude of the problem.

The EIR/EIS states that factors such as moisture, dried algal mats, efflorescent salt crust and the presence of sulfate salts "would inhibit the suspension of dust" (IID 2002, pg. 3.7-34). These are precisely some of the factors that make the dust problem at Owens Lake so bad. High levels of soil moisture transport saline shallow groundwater to the surface where the water evaporates and a puffy, emissive salt crust can form (St.-Amand 1987). Algal mats are often not stable when they dry, crack and curl. Then in addition to salt and soil, the dust contains algae particles. The sodium sulfate salts present form a very unstable surface when they form at temperatures below about 50 °F (St.-Amand 1987, Fig. 7). This means that stable crusts will form during the heat of summer, but puffy, unstable crusts will form during the colder temperatures of winter, when winds typically are stronger and more frequent.

The EIR/EIS also states that the "low frequency of high wind events…would inhibit the suspension of dust." Then in the next paragraph, "On occasion, existing concentrations of PM-10 in the Salton Sea area violate national and state ambient air quality standards" (IID 2002, pg. 3.7-34). These violations are caused by the wind. The Salton Sea area has a serious nonattainment status of both the federal and state PM-10 standards (IID 2002, pg. 3.7-6). And the largest component in the PM-10 emission inventory is "fugitive windblown dust" (IID 2002, pg. 3.7-13). Great Basin's research at Owens Lake has shown that unstable lake bed surfaces typically begin emitting dust at about 17 miles per hour (7.5 meters per second) (GBAPCD 1998, pg. 4-6). The windrose diagrams in the EIR/EIS (Figs. 3.7-6 and 3.7-6) (which according to the Imperial County APCD's consultant are incorrect) (Morris, pers. comm.) both show that there are winds present above the typical threshold wind speed used at Owens Lake. Even if these winds are infrequent, they may well be sufficient to cause dust emissions—local winds certainly cause dust emissions elsewhere in the air basin, as evidenced by the emission inventory. Adding 70 square miles of potentially emissive surface in an area that already experiences violations of the PM-10 Standard due to wind is not a potential significant environmental impact to be "qualitatively" explained away.

The EIR/EIS attempts to compare the Salton Sea to Owens Lake and states, "Fortunately, conditions found to produce dust storms on dry salt lake beds, such as Owens Lake, were not found to be present at the Salton Sea." The document then presents one page of semi-technical discussion arguing why Owens Lake is not like the Salton Sea. Only one reference is provided and much of the information is simply incorrect (IID 2002, pg. 3.7-34 and 35). With regard to soil chemistry, they argue that because the types of salts are different at each lake, Salton Sea will not form the unstable crusts found at Owens Lake. While it may be true that Owens Lake salts tend to form very emissive surfaces, I am not convinced that the salt crusts that will form on Salton Sea sediments will be completely stable. The sodium sulfate salts present at Salton Sea can also form emissive crusts under the correct conditions (the presence of soil moisture and low temperatures). The EIR/EIS states that "the frequency of high wind events at the Salton Sea is less than at Owens Lake." That may be true, but winds strong enough to cause dust emissions must occur at the Salton Sea. The fact that windblown fugitive dust makes up the largest component of the local PM-10 emission inventory means that the wind does blow often enough and strong enough to make the area nonattainment for the PM-10 Standard. Finally, the EIR/EIS attempts an argument that the predicted slower rate of Salton Sea recession "may" allow natural processes to control dust emissions. The development of "relatively stable dunes" and "relatively stable crusts" are vaguely predicted. This is unsubstantiated wishful thinking. Owens Lake has been dry for almost 80 years. Natural processes are acting to stabilize the surface, but we predict they will take on the order of hundreds of years to make a difference. Air pollution laws do not allow such timeframes.

An issue completely ignored in the EIR/EIS air quality discussion is the possibility of air toxics that could be contained in the dust. Elevated levels of PM-10 are considered to be a health risk not because of what the dust is made of, but rather because the very small particles lodge deeply in our lungs. Toxic materials in the dust only add to the health risk. Elevated levels of naturally-occurring arsenic and cadmium in the sediment at Owens Lake increase the lifetime cancer risk from those toxics by 24 per million (GBAPCD 1998, pg. 3-12). Sediment analyses at the Salton Sea indicate that dust emissions there could potentially contain many more toxic materials, including pesticides and uranium (LFR Levine-Fricke 1999).

At the risk of oversimplifying the many complicated factors that contribute to cause lake sediment dust storms, I would like to present a crude "quantitative" analysis of the potential for dust at the Salton Sea. As mentioned above, under the worst case, about 78 square miles (50,000 acres) of lake bed would be exposed if water is diverted from the sea. This is over twice as much potentially emissive area as Owens Lake's 35 square miles (GBAPCD 1998, Ch. 4). Assume that, for all the unsubstantiated reasons presented in the EIR/EIS, an acre of sediment at the Salton Sea is only one-hundredth to one-tenth (1% to 10%) as emissive as an acre at Owens Lake. This means that instead of peak 24-hour concentrations of 15,000 to 20,000 μg/m³ like those at Owens Lake, the Salton Sea area would see concentrations of between 300 and 4,000 μg/m³. These potential concentrations are well above the Federal Standard of 150 μg/m³. No one can say that the water diversions will not cause a serious air quality problem at the Salton Sea without much more study, analysis, research, modeling and testing. And if this work indicates that there could be an air quality problem, a plan to take care of it should be in place before water diversions are allowed.

In conclusion, in my opinion as an expert in the air quality problems caused by the diversion of water from saline lakes, the potential air quality impacts of the proposed water diversions from the Salton Sea present a threat to human health. Yet, the project proponents do not seriously deal with these potential impacts in the EIR/EIS. They tell us that there may be significant impacts, yet they make no attempt to quantify the problem or even suggest solutions to what could become an even bigger problem than Owens Lake. The Water Board should deny the license allowing water diversions until the proponents can prove they will not create an Owens Lake for the 21st century.

References

GBAPCD 1997. Great Basin Unified Air Pollution Control District, "Owens Valley PM-10 Planning Area Demonstration of Attainment State Implementation Plan Final Environmental Impact Report," State Clearinghouse Number 96122077, July 1997.

GBAPCD 1998. Great Basin Unified Air Pollution Control District, "Owens Valley PM-10 Planning Area Demonstration of Attainment State Implementation Plan," November 16, 1998.

IID 2002. Imperial Irrigation District, "Imperial Irrigation District Water Conservation and Transfer Program Draft EIR/EIS," State Clearinghouse Number 99091142, January 18, 2002.

Kahrl 1982. Kahrl, William L., *Water and Power*, University of California Press, Berkeley, California, 1982.

LADWP. Los Angeles Department of Water and Power, Board of Water and Power Commissioners Agendas, various dates 2000 through 2002.

LFR Levine-Fricke 1999. "Synthesis Document of Current Information on the Sediment Physical Characteristics and Contaminants at the Salton Sea, Riverside and Imperial Counties, California," March 3, 1999, prepared for Salton Sea Authority.

Morris, pers. comm..Personal communication with Ralph Morris, Environ Corp. Novato, California, March 29, 2002.

Reheis, in press. Reheis, Marith C., "Dust deposition down wind of Owens (Dry) Lake, 1991-1994: Preliminary findings," Journal of Geophysical Research. Abstracted in "Owens (Dry) Lake, California: A Human-Induced Dust Problem" at: http://geochange.er.usgs.gov/sw/impacts/geology/owens/

St.-Amand 1987. Saint-Amand, P., C. Gaines and D. Saint-Amand, "Owens Lake, an ionic soap opera staged on a natric playa," Geological Society of America Centennial Field Guide—Cordilleran Section, 1987.

SWRCB 1994. State of California State Water Resources Control Board, "Decision 1631 – Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources at Mono Lake and in the Mono Lake Basin," September 28, 1994.

USEPA. United States Environmental Protection Agency, "AIRSData Monitor Values Report– United States Air Quality Monitors for Particulate Matter," Internet electronic database at: www.epa.gov/air/data.

USEPA 2002. United States Environmental Protection Agency, letter from Ms. Janet Parrish to Mr. Jerry Gewe, Assistant General manager-Water, Los Angeles Department of Water and Power regarding the Lower Owens River Project, February 27, 2002

EXHIBIT C-3

PM10 hourly values from the Mono Shore
Tapered Element Oscillating Microbalances (TEOM)

Site	DATE	HourEnd	PM10µg/m^3
901	11/20/2009	100	3
901	11/20/2009	200	4.3
901	11/20/2009	300	51.2
901	11/20/2009	400	489.5
901	11/20/2009	500	279.2
901	11/20/2009	600	28.3
901	11/20/2009	700	68.4
901	11/20/2009	800	48.8
901	11/20/2009	900	3925.9
901	11/20/2009	1000	19782.7
901	11/20/2009	1100	65112.9
901	11/20/2009	1200	48934.9
901	11/20/2009	1300	27119
901	11/20/2009	1400	17544.9
901	11/20/2009	1500	24114.4
901	11/20/2009	1600	37360.8
901	11/20/2009	1700	35977.2
901	11/20/2009	1800	12047
901	11/20/2009	1900	353.6
901	11/20/2009	2000	2958.6
901	11/20/2009	2100	35789.4
901	11/20/2009	2200	7525.2
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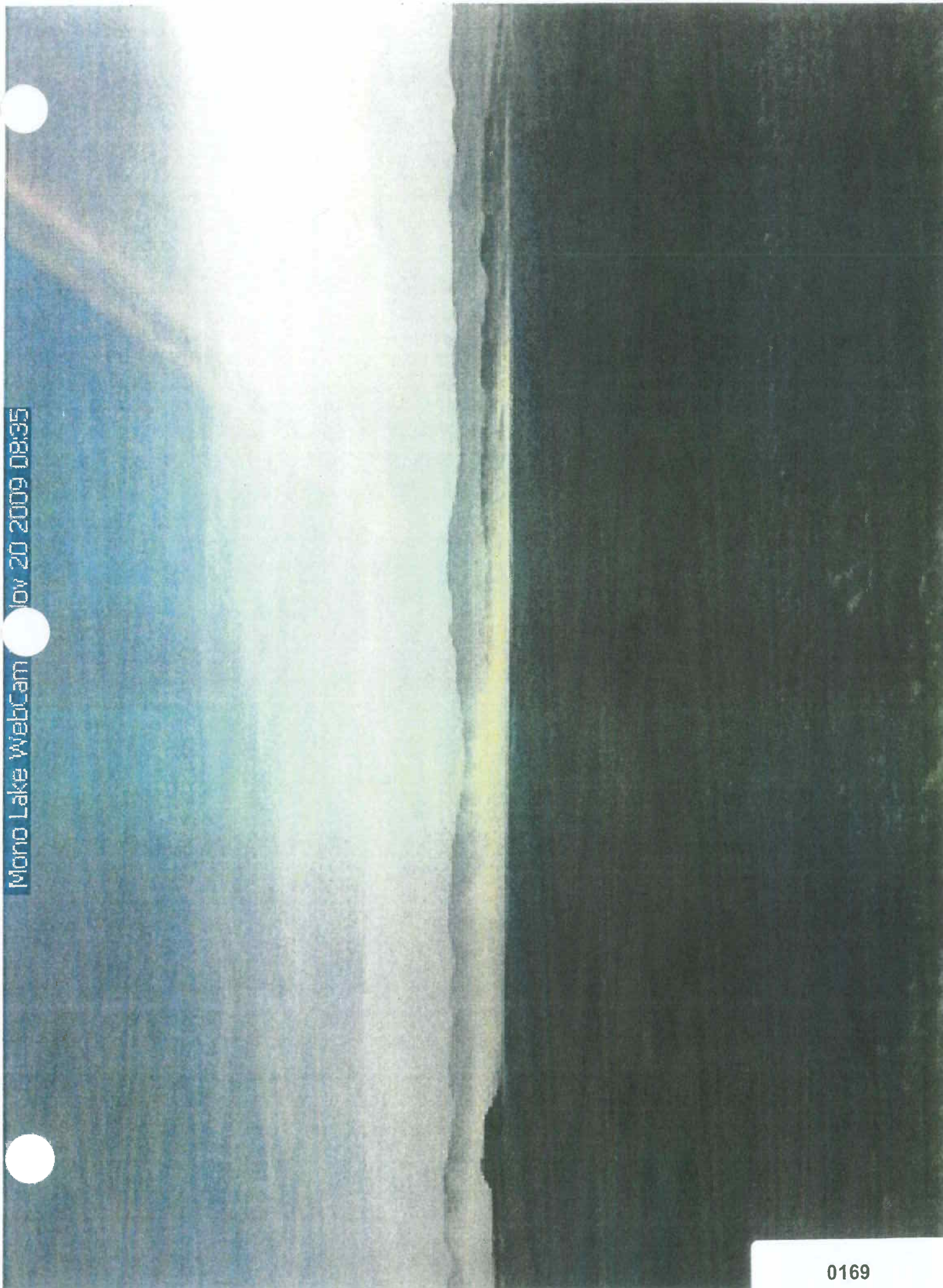
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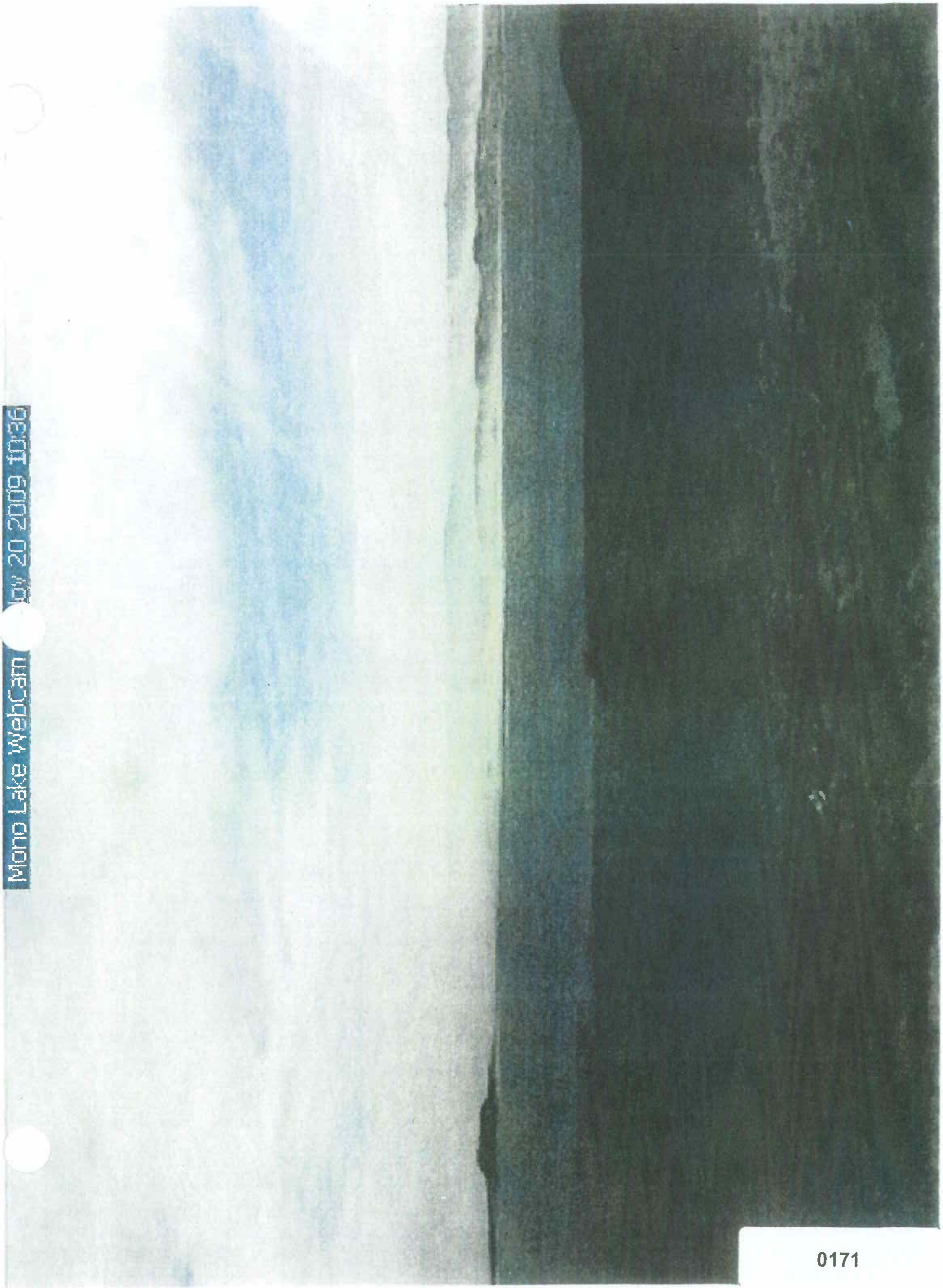
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EXHIBIT C-4


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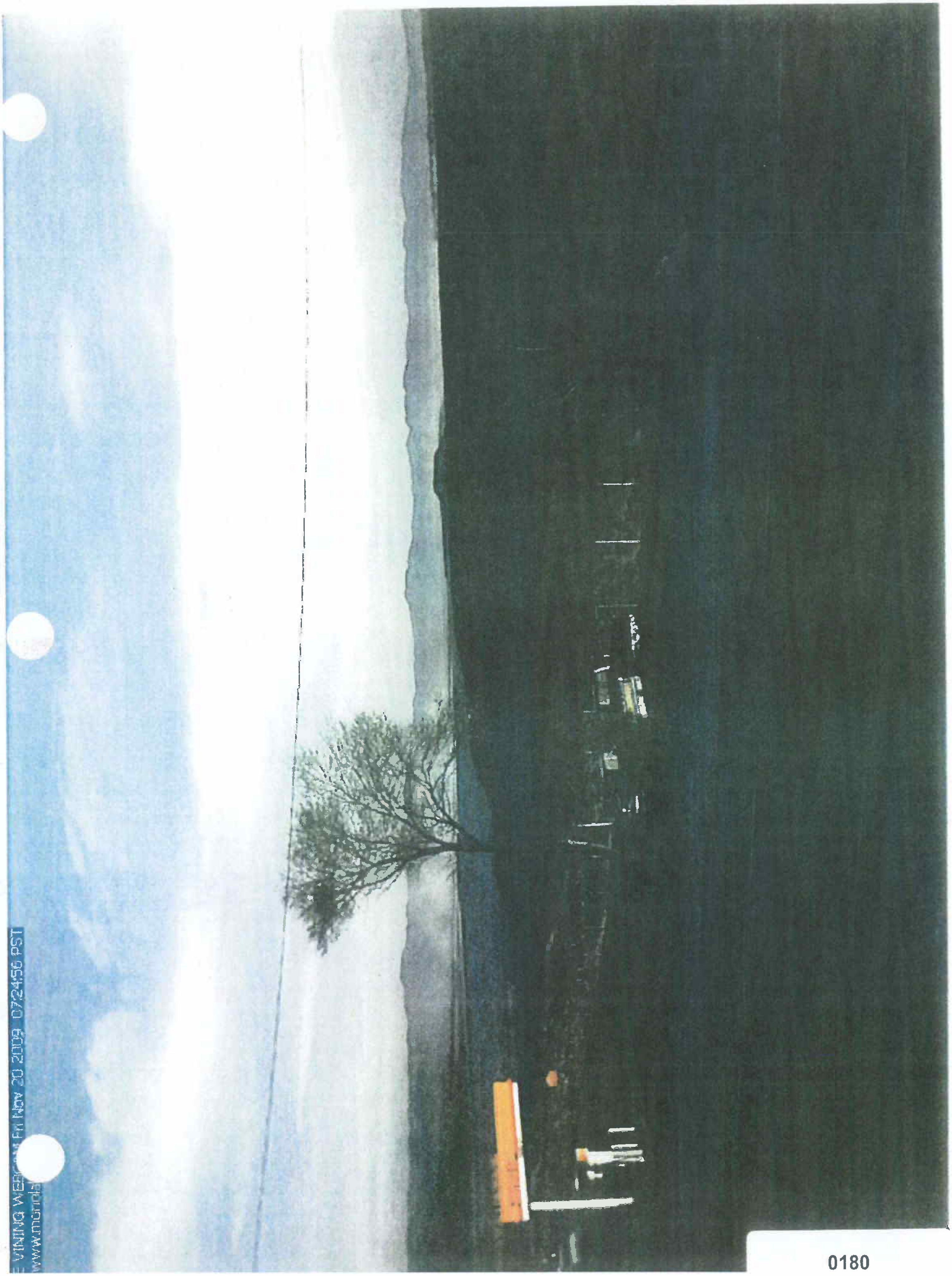
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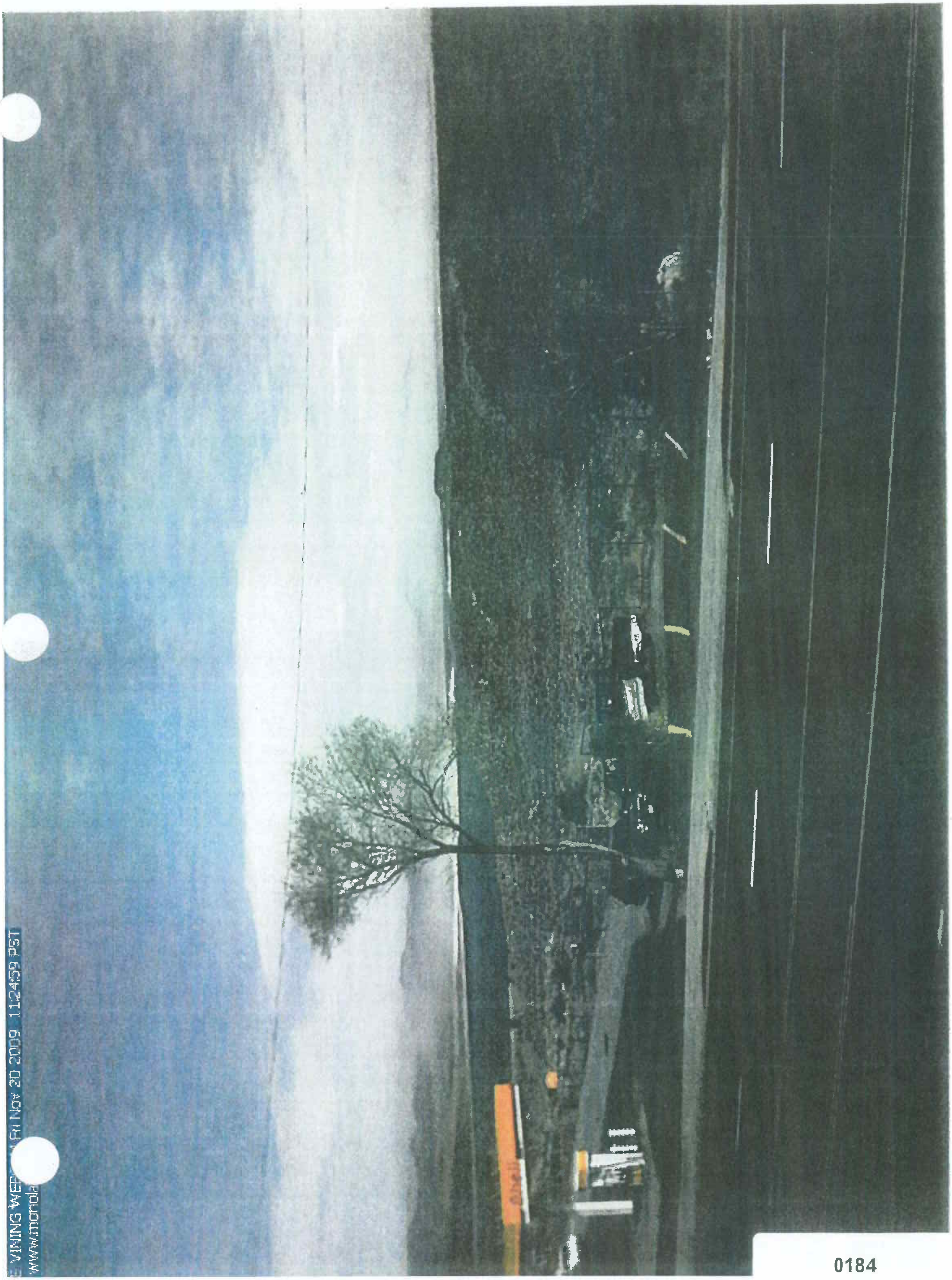
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EXHIBIT C-5

MONO LAKE BASIN
WATER RIGHT DECISION 1631

Decision and Order Amending Water Right Licenses to Establish Fishery Protection Flows in Streams Tributary to Mono Lake and to Protect Public Trust Resources at Mono Lake and in the Mono Lake Basin

(Water Right Licenses 10191 and 10192, Applications 8042 and 8043, City of Los Angeles, Licensee)

September 28, 1994

STATE OF CALIFORNIA
WATER RESOURCES CONTROL BOARD

STATE OF CALIFORNIA
STATE WATER RESOURCES CONTROL BOARD

In the Matter of Amendment of the City of Los Angeles' Water Right Licenses for Diversion of Water From Streams Tributary to Mono Lake (Water Right Licenses 10191 and 10192, Applications 8042 and 8043)	DECISION 1631
	SOURCE: Lee Vining Creek, Walker Creek, Parker Creek, Rush Creek
CITY OF LOS ANGELES, Licensee	COUNTY: Mono

DECISION AND ORDER AMENDING WATER RIGHT LICENSES TO ESTABLISH FISHERY PROTECTION FLOWS IN STREAMS TRIBUTARY TO MONO LAKE AND TO PROTECT PUBLIC TRUST RESOURCES AT MONO LAKE AND IN THE MONO LAKE BASIN

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Draft EIR concludes that no state listed or federally listed or proposed threatened or endangered plants would be affected by any of the alternatives. In addition, no special-status plants in the Mono Basin or Long Valley occur in riparian zones affected by the project. Two plants listed in the California Native Plant Society inventory of rare and endangered plants could be affected by an increase in lake level above 6,400 feet. All special-status plants in the Mono Basin and Long Valley were probably more abundant in 1940 than today, but they have not been adversely affected by changes in streamflow or lake levels. (SWRCB 7, Vol. 1, pp. 3C-48 to 3C-49.)

In summary, the minimum streamflow and lake level criteria established in this decision will benefit Mono Lake brine shrimp and California gulls, may have some beneficial effect on ospreys and bald eagles, and are not expected to have a significant adverse impact on any special status species of animals or plants.

6.4 Mono Basin Air Quality

As noted earlier in this decision, the California Supreme Court ruled that the scenic views of Mono Lake and its shore, and the purity of the air in the Mono Basin are among the values protected by the public trust doctrine. (National Audubon Society v. Superior Court, 33 Cal.3d at 435, 189 Cal.Rptr. at 356.) The declining water level of Mono Lake attributable to LADWP diversions has led to severe periodic dust storms, a deterioration of air quality in the Mono Basin and violation of standards set pursuant to the federal Clean Air Act. As discussed below, the evidence in the record establishes that resolution of the air quality problem will require reduced water diversions from pre-1989 levels in order to allow the water level of Mono Lake to rise and cover much of the exposed lakebed area.

LADWP argues that the Legislature "has not granted the SWRCB authority to enforce state or federal statutes involving air quality." (LADWP Rebuttal Brief, p. 65.) The fact that the Legislature has charged other agencies with primary regulatory authority over air quality, however, does not mean that the SWRCB should ignore existing or potential air quality impacts of water diversions. As noted above, the Audubon decision establishes that air quality is among the values protected by the public trust doctrine. Moreover, all water diversions in California are subject to the constitutional prohibition of unreasonable use or method of diversion of water. (California Constitution, Article X, Section 2.) It should be beyond dispute that, in a situation where diversion of water can lead to violation of a public health based air quality standard, the protection of air quality should be considered in determining the conditions under which the water appropriation is allowed. Statutory restrictions upon the Great Basin Air Pollution Control District's jurisdiction to regulate water diversions cannot logically be interpreted as limiting the SWRCB's established statutory authority over diversion and use of water. (Water Code Sections 174, 1200, et seq.)

6.4.1 *Effect of Reduced Lake Levels on Air Quality*

No ambient air quality monitoring was conducted in the Mono Basin before 1979. Therefore, no quantitative data exist to describe the pre-1941 conditions. The Draft EIR (SWRCB 7, Vol. 2, pp. 3H-8 to 3H-11 and Appendix N, p. N5-7) reviewed the historical accounts of the Mono Basin including an 1889 report titled "*Quaternary History of the Mono Valley, California*" by Israel C. Russell (reprinted from the Eighth Annual Report of the United States Geological Survey, 1889, pp. 267-394). Russell noted that on windy days Mono Lake was streaked with alkaline froth, but his report makes no mention of windblown dust, sand or salt. (SWRCB 7, Vol. 2, pp. 3H10-3H11.)

Aerial photographs from 1930 (lake elevation approximately 6,420) and 1940 (lake elevation approximately 6,417) show very narrow fringes of efflorescent salts along the edges of lagoons near the lakeshore; scattered small patches of salt among some sand dunes; and no efflorescent salt visible on the narrow strip of barren sand bordering the north or east shores of the lake. (SWRCB 7, Vol. 2, p. 3H-9.) The Draft EIR states that the best available evidence suggests that major dust storm events were probably rare under pre-diversion conditions and that any dust storms that did occur would have been dominated by silt, clay, and sand particles with only small quantities of salt particles from interstitial salts and water spray from off the lake. (SWRCB 7, Vol. 2, p. 3H-11.)

As the surface elevation of Mono Lake has fallen from 6,417 feet at the start of LADWP diversions in 1941 to 6,375 feet in spring of 1994, increasingly greater areas of former lakebed and lakebed sediments have been exposed ("relicted") forming a white ring around Mono Lake known as the playa. Under present conditions with large areas of exposed playa, strong winds produce dust storms of varying size and duration that degrade the ambient air quality and scenic views of the Mono Basin. The three most frequent dust emission source areas are the landbridge (the exposed playa between the shoreline and Negit Island), the North Shore and the East Shore. (GBUAPCD A, p. 7.) An additional emission source area is the emerged western portion of Paoha Island. (SWRCB 7, Vol. 2, pp. 3H-20 and 21.)

The Draft EIR describes the term "dust storm" and "sand storm" as episodes of windblown particulate matter that significantly restrict visibility. Dust storms are dominated by particles with diameters smaller than 100 microns; sand storms are dominated by particles with diameters larger than 100 microns. (SWRCB 7, Appendix N, p. N-10.)

The major emission sources of suspended particulate matter in the Mono Basin are produced by wind erosion of efflorescent salt deposits and some exposed soils, and sediments. (RT VI, 201:4-201:12.) Efflorescent salts form as shallow saline ground water rises to the surface of permeable sediments through capillary action and evaporates at the soil surface leaving a highly erodible salt crust. (GBUAPCD 30, pp. 1, 2, 16, and 17, photographs). Efflorescent salt deposits are seldom found on soil-air interfaces where the ground water table is more than ten feet below the ground surface. (GBUAPCD 30, pp. 1 and 11;

SWRCB 7, Vol. 2, p. 3H-21.) The major emission sources at Mono Lake are considered "anthropogenic", a classification which includes emissions influenced directly or indirectly by human activity. (SWRCB 7, Vol. 2, p. 3H-6.)

6.4.2 *The PM-10 Standard and Human Health*

The term "ambient air quality" refers to the atmospheric concentration of a specific compound or material present at a location that may be some distance from the source of the pollutant emissions. (SWRCB 7, Vol. 2, pp. H-1 and H-2.) During the 1980s, air quality standards for particulate matter were revised to apply only to "inhalable" particles with a size distribution weighted toward particles having aerodynamic diameters of 10 microns or less ("PM-10"). (SWRCB 7, Appendix, p. N-3.) The PM-10 standard is set to control concentrations of inhalable sized fine particles less than 10 microns in size, or about one tenth the diameter of human hair. (GBUAPCD A, III, p. 17.) Health risk studies were used to establish the PM-10 standard based on potential impacts to human health. (RT XII, 9:8-9:22 and 52:6-52:13.)

PM-10 sized particles are small enough to be inhaled deep into the lower respiratory tract. When breathing through the nose, few particles with an aerodynamic diameter larger than 10 microns reach the lower respiratory tract. (SWRCB 7, Appendix, p. N-3.) People who live in or visit areas exposed to the dust events at Mono Lake are at risk.

Federal standards for suspended particulate matter (PM-10) have been set for two time periods: a 24-hour average and an annual average of 24-hour values. The federal "National Ambient Air Quality Standards" (NAAQS) for PM-10 are:

> 150 micrograms/cubic meter as a 24-hour average; and
> 50 micrograms/cubic meter as an annual arithmetic mean
> (SWRCB 7, Vol. 2, p. 3H-4; RT XII, 9:23-10:3.)

Dr. M. Joseph Fedoruk, M.D., testified on behalf of LADWP that there was no evidence that, at the existing lake levels, the occasional dust storms will have a significant public health impact in the affected areas. (LADWP 47, Section 6, p. 87.) Dr. Fedoruk suggested it is likely that individuals in the affected area will limit their exposure to PM-10 by taking avertive action, such as going indoors during the occasional dust storms. (LADWP 47, Section 6, p. 88.) After hearing the description of dust problems experienced by a resident on the north shore of Mono Lake (NAS&MLC 1F), however, Dr. Fedoruk agreed that experiences of the type described would constitute a public health problem. (RT XXIII, 41:10-41:20.)

Mr. Duane Ono of the Great Basin Unified Air Pollution Control District (GBAPCD), testified that exposure to PM-10 levels above the federal standard may cause sensitive individuals to experience varying degrees of breathing difficulties, some of which may linger beyond the exposure period. In some cases, breathing difficulties due to PM-10 exposure may cause asthma attacks or even contribute to an individual's death. Other health effects such as eye and nasal irritation may also occur. The most sensitive population includes children, the elderly, and people with respiratory problems, heart disease or influenza. (GBUAPCD A, III, p. 16; RT XXIX, 27:20-27:24.) The U.S. Forest Service is concerned that exposure to dust events poses a potential health risk to visitors to the Mono Basin. (RT XXIX, 20:20-20:25.)

6.4.3 *Existing Air Quality Conditions*

Efflorescent salt deposits at Mono Lake are found along the northern and eastern shores of the lake, generally below the 6,390 foot contour. (SWRCB 7, Vol. 2, Figure 3H-20.) Efflorescent salts which were virtually nonexistent before 1941 cover 4,975 acres or approximately 65 percent of the relicted lands at lake elevation 6,376 feet. Some of the salts are noncrystalline powdery deposits highly susceptible to wind erosion. More often, the salts are crusted but subject to disturbance by windblown sand. (SWRCB 7, Vol. 2, p. 3H-21; GBUAPCD 7, 17, 18, and 19 (photographs).)

Windblown emissions at Mono Lake vary with season due to snow cover, precipitation, and crust formation. Generally the dust episodes occur during the months of April, May, June, November and December when the surface crust of the playa is thin. (GBUAPCD 10, pp. 3 and 5; RT XXIX, 20:9-20:11.) U.S. Forest Service Exhibit 3 is a video of dust events as seen from the Mono Lake Visitor Center in the spring of 1993.

Documented dust events have caused short-term air quality degradation in the Scenic Area which has resulted in exceedences of the Federal standard for PM-10. However, sampling data suggest that in Lee Vining (which is normally upwind of the dust storms), PM-10 concentrations over a 5 year period were extremely low during all the dust storms. (RT XXIX, 103:1-103:12.) Dust events have occurred at a frequency and concentration in violation of the Federal Clean Air Act. (GBUAPCD A, p. 1.) Mr. Ono testified that GBUAPCD monitoring data at the Simis Ranch show a statistical average of about 3.2 exceedences per year for the period 1988 to 1992. (RT XXIX, 53:12-53:19.) The national ambient air quality standard for PM-10 allows one exceedence or less per year without regard to how much the level is above the measured numerical standard of 150 micrograms per cubic meter. (RT XXIX, 29:2-29:15.) While the air quality of the Mono Basin is normally within the standard, there are enough days over the standard during the three-year period to be in violation. (RT XII, 14:3-14:8.)

6.4.4 *Compliance with Federal Clean Air Act Requirements*

Designation as a Nonattainment Area: On July 16, 1993, the U.S. Environmental Protection Agency (U.S. EPA) published a notice of proposed rulemaking revising the PM-10 designation for the Mono Basin in the Federal Register. (Vol. 58, No. 135, pp. 38331-38333.) The U.S. EPA proposed to revise the PM-10 designation for the Mono Basin from "unclassifiable" to "nonattainment" based upon recorded violations of the PM-10 NAAQS which occurred on or after January 1, 1989. (USEPA 1, p. 1.) The Mono Basin was designated as a nonattainment area for PM-10 on December 29, 1993. (RT XXIX, 28:11-28:19.)

The Regulatory Framework: The federal Clean Air Act amendments of 1990 require each state to develop, adopt, and implement a State Implementation Plan (SIP) to achieve, maintain, and enforce federal air quality standards throughout the state. These plans must be submitted to and approved by the U.S. EPA. The NAAQS for PM-10 sets forth regulations for implementing the regulatory standards by requiring the development of a SIP to develop strategies necessary to assure attainment and maintenance of the PM-10 standard. (USEPA 1, p. 1.) Designation as a nonattainment area sets up a series of planning and regulatory deadline requirements for the state and local air pollution control agencies. By operation of law, the Mono Basin is initially classified as a moderate nonattainment area. The State must submit a SIP to U.S. EPA within 18 months that either demonstrates attainment will occur no later than the end of the sixth calendar year following the effective date of redesignation or shows that a demonstration of attainment within that period is impracticable. (RT XII, 5:11-5:22; USEPA 1, p. 3.) Demonstration of practicable attainment may include the use of air quality models. (USEPA 1, p. 3.)

If the State does not demonstrate attainment or demonstrates that attainment is impracticable within six years from the designation date (December 29, 1993), the Mono Basin will be upgraded to the serious nonattainment classification by U.S. EPA. This redesignation provides additional time to attain the standard, while also triggering additional legal and planning requirements. A new SIP is required within 18 months that demonstrates attainment as expeditiously as practicable, but in no case later than ten years after the designation to serious nonattainment area. In a December 16, 1993 letter to GBUAPCD (NAS&MLC 246), U.S. EPA outlined its understanding of the general timelines for the longest period possible for compliance with planning deadlines and attainment deadlines. The letter states that if the Mono Basin fails to attain PM-10 standards by December 31, 2008, a new SIP would be required that provides for a 5 percent reduction of PM-10 emissions per year until the NAAQS is attained. (NAS&MLC 246, p. 2.) If the State fails to provide an adequate SIP, U.S. EPA is required to promulgate its own federal implementation plan to achieve the attainment of the PM-10 standard in the Mono Basin. (RT XII, 6:10-7:7.)

The State has designated the GBUAPCD as the lead agency to develop the SIP for the Mono Basin. Once the plan is completed and approved by the GBUAPCD, it will be forwarded to the California Air Resources Board (ARB) for adoption. Once adopted by ARB, the plan is considered as a SIP which is then forwarded to the U.S. EPA in accordance with Clean Air Act requirements. (RT XXIX, 71:11-71:22.)

The GBUAPCD is currently in the process of developing a SIP to bring the Mono Basin into compliance with the Federal Clean Air Act. (GBUAPCD A, p. 1.) Mr. Ono testified that the SIP being developed by his agency must provide reasonable assurance that the standard would be met with the strategy that is included in the plan. (RT XXIX, 30:1-30:5.)

Air Quality Modeling: In 1991, the GBAPCD contracted with TRC Environmental Corporation (TRC) to perform an air quality model evaluation to assess dispersion modeling techniques for prediction of PM-10 emissions in the Mono Basin. (GBUAPCD 3, p. 1.) TRC evaluated the Industrial Source Complex Short Term (ISCST) model and the Fugitive Dust Model (FDM). The results of the evaluation were that the FDM outperformed the ISCST overall and was found to be technically superior for the prediction of PM-10 concentrations downwind of eroding source areas. In most instances, however, the predictions of the two models were similar. (GBUAPCD 3, p. 18; RT XXIX, 34:5-34:25.) Under GBUAPCD direction, TRC used the Industrial Source Complex-2 model (ISC-2), which was the U.S. EPA approved dispersion model, to model PM-10 emissions. The ISC-2 model is routinely used for regulatory purposes. (GBUAPCD A, II, p. 5) A Mono Lake Air

Quality Modeling Study was conducted to assess the impacts of windblown PM-10 emissions from the Mono Lake playa at different levels of the lake. (GBUAPCD 10, p. 1.)

As part of their work on the Draft EIR, Jones and Stokes Associates also evaluated air quality impacts in the Mono Basin using a computer model as the most practical method for developing quantitative air quality assessments of future conditions. Jones and Stokes Associates selected the Fugitive Dust Model (FDM). Modeling procedures and results are presented in Mono Basin EIR Auxiliary Report No. 28. (SWRCB 13z.)

Based on the investigations done by the GBUAPCD and Jones and Stokes Associates, Mr. Ono testified that an average Mono Lake elevation of 6,392 feet would provide an appropriate level of protection of air quality. Mr. Ono also testified that he believes the 6,390 feet alternative identified in the Draft EIR, will provide the necessary level of assurance to protect air quality. (RT XXIX, 26:2-26:13.) The 6,390 alternative had a projected median lake elevation of 6,391.6 feet. Mr. Ono stated that the lake elevation alternatives 6,383.5 feet and lower (as identified in the Draft EIR) would not satisfy the NAAQS for PM-10 and would not bring the Mono Basin into attainment. (RT XXIX, 26:21-26:25.)

Mr. John Pinsonnault, an air quality consultant to LADWP, acknowledged that during some windstorms there will be exceedence of the Federal standards at Simis Ranch and Warm Springs, as well as other areas to the north and northeast of the lake. (RT XII, 257:2-257:10.) Mr. Pinsonnault also testified that the GBUAPCD monitoring data provide an excellent picture of the air quality at the suggested lake elevations of the LADWP plan. (RT XII, 257:14-257:20.) Mr. Pinsonnault discussed his general concern with the models used by GBUAPCD and JSA (RT XII, 258:1-261:25), but acknowledged that use of models is necessary to estimate concentrations of dust that could exist under certain conditions. (RT XII, 257:21-257:25.) Mr. Pinsonnault provided no data or studies to refute the findings of the GBUAPCD or the Draft EIR.

Mr. Pinsonnault also proposed a theory that as the lake elevation rises there could be increases in the ground water level that could cause even greater quantities of efflorescent salt crust to form at elevations that at the present time do not have salt crust. (RT XII, 264:23-265:7.) Although he was a member of the Technical Advisory Group on air quality issues and modeling for the Draft EIR, Mr. Pinsonnault testified that he had not provided the EIR contractor with any data or examples from the literature relating to issues he raised at the hearing. (RT XXIII, 21:7-21:13 and 22:16-22:19.) Mr. Ono testified that there was no foundation or data to support Mr. Pinsonnault's theory about increased efflorescent salt problems at higher water levels. (RT XXIX, 112:2-112:9.)

Other Potential Air Quality Mitigation Measures: GBUAPCD Exhibit 23 is a memo dated July 8, 1993 titled "Potential Mitigations For Mono Lake And Their Engineering Implications." The memo evaluates various alternatives to reduce or eliminate emission source areas found on the relicted playa at Mono Lake. The options evaluated were vegetation plantings, sand fences, volcanic cinders or other coverings, and chemical applications.

Dr. David P. Groeneveld, a plant ecologist and principal investigator for testing vegetation establishment on the saline Owens Drylake playa, conducted several investigations at Mono Lake for the GBUAPCD including a study titled, "Mono Lakeshore Environments: Vegetation Establishment to Control Airborne Dust." The conclusions of Dr. Groeneveld's vegetation study were:

1. Zones of poor or absent vegetation establishment on the eastern shore are constrained by poor ground water quality and quantity. Without artificial leaching, there will be no way to establish a vegetation cover that is meaningful for dust suppression on these zones;

2. Where vegetation is becoming established naturally due to proximity to seepage zones and springs (e.g., Simon Springs),

artificial planting is not a viable means of accelerating the process; and

3. Artificial plant establishment was successful in an extended fetch zone to the east of Simon Springs and has the potential to significantly reduce blowing dust in this limited area. This zone lies above the 6,393 foot contour. (GBUAPCD 26, pp. 1-2.)

Another study by Dr. Groeneveld, "Seeps and Springs Around Mono Lake That Influence Plant Establishment and Growth," reports that zones which lacked vegetation establishment around the lake (particularly the northeast area) coincided with waters of low calcium content, high salinity and potentially phytotoxic concentrations of boron and arsenic. (GBUAPCD 27, Abstract.) Dr. Groeneveld testified that, without extensive irrigation using pumped freshwater to leach those unvegetated saline zones, there would be no way to enhance vegetation growth to reduce blowing dust. He believes that condition will probably last tens to hundreds of years. (RT XXIX, 41:3-41:7.) There was no evidence provided as to the potential impact to ground water resources of such an intensive irrigation program.

Mr. Theodore Schade, GBUAPCD Project Manager for fugitive dust mitigation studies at Owens and Mono Lake, testified that the GBUAPCD has tested a number of fugitive dust mitigation measures at Owens Lake. The measures tested at Owens Lake included sprinkler irrigation, gravel blankets, artificial sand dunes and chemical sprays. With the exception of the gravel blanket, none of the measures reduced fugitive dust levels enough to be considered successful and appropriate for large scale implementation. (RT XXIX, 42:1-42:25.)

GBUAPCD Exhibit 23 addresses the quantity of material that would be needed to implement a volcanic cinder or gravel cover program on the Mono Lake playa. (GBUAPCD 23, pp. 1-2.) The area between lake elevation 6,383.5 feet and 6,390 feet encompasses a noncontinuous strip approximately 75,000 feet long between 675 and 2,000 feet wide, covering approximately 1,600 acres or 2.5 square miles. An estimated six inches of material (1.3 million cubic yards) would have to be laid over the mitigation area. This equates to approximately 162,000 dump truck loads (200 per day for three years) which would be required to move the material to the site.

Mr. Schade testified that if a successful engineering mitigation measure were identified, there would need to be a significant amount of land disturbance in the construction of the supporting infrastructure. This infrastructure would likely include new roads, pipelines, wells, powerlines, fences, sand fences and barrow sites. The GBUAPCD has not specifically identified any engineering measures that have a reasonable chance of succeeding at Mono Lake. (RT XXIX, 44:2-44:18.)

6.4.5 *Compliance with the Mono Basin National Forest Scenic Area Comprehensive Management Plan (CMP)*

Section 304 of the 1984 California Wilderness Act (PL 98-425) established the Mono Basin National Forest Scenic Area (Scenic Area). The Act required preparation of the Comprehensive Management Plan for the Scenic Area which was approved on March 16, 1990. (USFS 2, p. 1; RT XXVIII, 15:1-25:4.) The plan recommends a lake elevation range of 6,377 feet to 6,390 feet with management near the midpoint of 6,383.5 feet. The plan is intended to provide management direction for a 10 to 15 year period, but recognizes there may be a need for modification based on new information. (RT XXVIII, 15:8-25:25.) Forest Supervisor Dennis Martin testified that the management direction in the CMP needs to be reevaluated due to reclassification of the Mono Basin as a nonattainment area pursuant to the Clean Air Act. (RT XXVIII, 16:5-16:15.) Mr. Martin further testified that the USFS was not aware of any proven or feasible methods of physical mitigation that could be applied to the relicted lands that would be consistent with the intent of the federal legislation which is to preserve the natural scenic beauty of the area. The USFS recommended that the SWRCB should adopt the 6,390 feet alternative to bring the Mono Basin into compliance with the Clean Air Act. (RT XXVIII, 17:9-17:19.)

6.4.6 *Conclusions Regarding Mono Basin Air Quality*

The evidence establishes that the Mono Basin is in violation of the national ambient air quality standard for PM-10 that was established for protection of human health. The major source areas of PM-10 emissions are relicted lakebed sediments encrusted with efflorescent salts. Most of the major source areas were exposed due to the declining water level in Mono Lake caused by LADWP's diversion of water from the tributary streams. The only feasible method of reducing the PM-10 emissions sufficiently to come into compliance with the national ambient air quality standards is to increase the water elevation of Mono Lake and submerge much of the exposed emission source area. The SWRCB recognizes that there is a degree of uncertainty inherent in predicting future air quality conditions based on the type of computer modeling results presented at the hearing. Nonetheless, the computer modeling results presented are the best evidence currently available of what is needed to come into compliance with applicable air quality standards. Increasing the water elevation of Mono Lake to an average level of 6,392 feet would provide a reasonable assurance of establishing compliance with the national ambient air quality standard for PM-10. Improving air quality at Mono Lake by reducing the severity of periodic dust storms in the Mono Basin would also protect the views and scenic resources for which the Mono Basin is widely known.

6.5 Visual and Recreational Resources

6.5.1 *Visual Characteristics of the Mono Basin*

Historical Overview: Many early visitors to the Mono Basin have described their impressions of the lake and the landscape. (SWRCB 13x, pp. 3-5; SWRCB 7, Vol. 2, pp. 3I-1 to 3I-6.) John Muir described the Mono Basin as "A country of wonderful contrasts, hot deserts bordered by snow-laden mountains, cinders and ashes scattered on glacier-polished pavement, frost and fire working together in the making of beauty." (SWRCB 13x, pp. 2-3.) In contrast, Mark Twain wrote in Roughing It: "Mono Lake lies in

Consistent with the reasonableness and public trust doctrines, LADWP's water right licenses should be amended to provide a reasonable assurance of maintaining an average water elevation at or above 6,386 feet in order to comply with the water quality standards for Mono Lake.

In reaching a decision on the criteria governing water diversions under LADWP's licenses, the SWRCB has considered the salinity standard for Mono Lake established in the basin plan, the federal antidegradation policy, and the antidegradation policy established in SWRCB Resolution No. 68-16. The water diversion criteria discussed in Section 6.8 of this decision will result in reducing the salinity of Mono Lake to a level consistent with those standards and policies.

6.7 Conclusions Regarding Desired Lake Level for Protection of Public Trust Resources

The instream flow requirements for restoration and maintenance of fish in the four diverted streams are discussed in Sections 5.0 through 5.5 above. Computer modeling results using the LAAMP model (Version 3.31, SWRCB 49) suggest that establishing the specified instream flows (without any additional water that may be needed to raise the water level of Mono Lake) would: (1) cause the water level of Mono Lake to reach 6,390 feet in roughly 29 to 44 years depending on the assumptions which are made regarding future hydrology; and (2) result in total inflow to Mono Lake sufficient to maintain an eventual lake level of approximately 6,388 feet to 6,390 feet for the 50-year period after a lake level of 6,391 feet is reached, depending upon future hydrology.

As discussed in Sections 6.4 through 6.4.6, the record indicates that compliance with federal air quality standards will require an average water level of approximately 6,392 feet in order to submerge a sufficient portion of the playa to reduce the blowing of PM-10 particles to within applicable limits. In addition, the evidence discussed in Section 6.3.7, indicates that restoration of all or nearly all of the waterfowl habitat which has been lost since 1941 would require a lake level over 6,405 feet. However, some waterfowl habitat would be restored at 6,390 feet and there are opportunities for restoration of additional waterfowl habitat through various mitigation measures identified in the Draft EIR and hearing record.

A lake level of 6,405 feet would not be consistent with the objectives of preserving public access to the most frequently visited tufa sites and continuing to make tufa structures at Mono Lake widely and conveniently accessible to public view. In addition, restricting diversions by LADWP to the extent necessary to reach and maintain a water level above 6,405 feet as recommended by the NAS&MLC would result in even greater restrictions upon the diversion and use of water for municipal and power needs.

In determining the most appropriate water level for protection of public trust resources at Mono Lake, the SWRCB recognizes that there is no single lake elevation that will maximize protection and accessibility to all public trust resources. In addition, variations in hydrology are such that there will continue to be fluctuations in the water level of Mono Lake regardless of what target lake level is selected.

Based on the evidence discussed in previous sections, the SWRCB concludes that maintaining an average water elevation sufficient to result in compliance with federal air quality standards will also provide appropriate protection to public trust resources at Mono Lake. The record indicates that an average water elevation of 6,392 feet would be consistent with protection of a number of important public trust resources including: air quality in the Mono Basin; water quality in Mono Lake; the Mono Lake brine shrimp and brine fly which provide food for migratory birds; secure, long-term nesting habitat for California gulls and other migratory birds; easily accessible recreational opportunities for the large number of visitors to the Mono Lake Tufa State Reserve; and the panoramic and scenic views which attract many people to the Mono Basin.

6.8 Criteria for Regulating Water Diversions in Order to Reach and Maintain Desired Lake Level

Transition Period: To reach and maintain a water elevation sufficient to protect the public trust resources discussed above while allowing water diversions to the City of Los Angeles under appropriate conditions, LADWP's water right licenses should be amended to limit diversions in the following respects until the water level of Mono Lake reaches 6,391 feet:

1. No diversions of water unless fish flow requirements are met: The minimum flows needed to restore and maintain the pre-1941 fisheries to the four affected streams are specified in Sections 5.0 through 5.4.4 above. Diversion of water under LADWP's licenses should be allowed only when the required flows for fishery protection are met. The licenses should also require LADWP to release water for channel maintenance and flushing purposes in accordance with previously addressed requirements.

2. No diversions until a lake level of 6,377 feet is reached: No diversions of water should be allowed under LADWP's water right licenses any time that the water level in Mono Lake is below or is projected to be below 6,377 feet during the runoff year of April 1 through March 31.[14]

3. Diversions allowed at lake levels above 6,377 feet and below 6,380: If the water level of Mono Lake is expected to remain at or above 6,377 feet throughout the runoff year of April 1 through March 31 (based on the May 1 runoff projections and any subsequent projections that LADWP makes), then LADWP would be allowed to divert up to 4,500 acre-feet per year for the purposes of use specified in its licenses.

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[14] *This level is the bare minimum elevation necessary to provide protection to gull habitat on Negit Island, Twain islet, and Java islet. Prohibiting all diversions at lake levels below 6,377 feet also will provide approximately a nine-foot buffer above the lake level of 6,368 feet at which signifcant additional incision and permanent damage to stream channels near Mono Lake would occur. (NAS&MLC 1 AF, pp. 3-4.)*

4. <u>Diversions allowed between lake levels at or above 6,380 feet and below 6,391 feet</u>: At water levels in Mono Lake at or above 6,380 feet and less than 6,391 feet, LADWP would be allowed to divert up to 16,000 acre-feet per year under its licenses.

5. <u>Reconsideration of water diversion criteria if lake level does not reach 6,391 feet in 20 years</u>: In the event that the water level of Mono Lake has not reached 6,391 feet by September 28, 2014, the SWRCB will hold a hearing to consider the condition of Mono Lake and the surrounding area and will determine if further revisions to the licenses are appropriate.

<u>After Transition Period</u>: Once a lake level of 6,391 feet is reached, diversions under LADWP's licenses should be allowed in accordance with the following criteria:

1. <u>No diversions allowed at lake levels below 6,388 feet</u>: Once the water level of Mono Lake has reached an elevation of 6,391 feet, no diversions would be allowed at any time the water level falls below 6,388 feet.

2. <u>Diversions allowed at lake levels between 6,388 feet and 6,391 feet</u>: Once a water level of 6,391 feet has been reached, diversions by LADWP would be limited to 10,000 acre-feet per year any time that the water level is at or above 6,388 feet and below 6,391 feet, provided that fishery protection flows and channel maintenance and flushing flow requirements are met.

3. <u>Diversions allowed at lake levels at or above 6,391 feet</u>: At lake levels at or above 6,391 feet on April 1, LADWP may divert all available water in excess of the amount needed to maintain the required fishery protection flows and the channel maintenance and flushing flows up to the amounts otherwise authorized under LADWP's licenses.

For purposes of the water diversion criteria specified above, the water level of Mono Lake would be measured on April 1 of each year, and the limitations on water diversions would apply for the one year period of April 1 through March 31 of the succeeding year.

The water diversion criteria specified above are based on: (1) the legal requirement to provide fishery protection flows; (2) the need to reach a lake level that is consistent with protection of public trust resources in the Mono Basin in a reasonable amount of time; and (3) the constitutional mandate to maximize the reasonable and beneficial use of water and avoid unnecessary or unreasonable restrictions upon the water diversions serving the municipal needs of Los Angeles. The feasibility of the specified water diversion criteria in view of the effects on Los Angeles' water and power supply is discussed later in this decision.

Computer modeling using Version 3.31 of the LAAMP model indicates that, assuming a repeat of 1940 through 1989 hydrology, the above criteria would result in Mono Lake reaching an elevation of 6,390 feet in approximately 28 years.[15] The water level would be expected to reach 6,392 feet in approximately two more years. Using an assumed future hydrology based on a "rolling average" of the hydrologic years 1940 through 1989 would result in reaching a lake level of 6,390 feet in approximately 18 years. Computer modeling (using 1940 through 1989 hydrology) indicates that the above diversion criteria would result in maintaining an average lake level of approximately 6,392.6 feet during the next fifty year period after an elevation of 6,391 feet is reached. The water level should remain above 6,390 feet approximately 90 percent of the time.

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[15] *This conclusion does not take into account the additional provision under the previously specified criteria that if an elevation of 6,391 feet is not reached in 20 years, the SWRCB will hold a hearing to consider the condition of the lake and the surrounding area, and will determine if any further revisions to LADWP's licenses are appropriate.*

In projecting the expected effects of the diversion criteria specified above on the future water level in Mono Lake, the SWRCB is keenly aware of the limitations of computer modeling hydrologic systems and the probability that future hydrologic conditions may differ significantly from historical conditions. If there were a series of extremely wet years, for example, Mono Lake could reach an elevation of 6,391 feet in much less than 20 years. Similarly, an extended series of very dry years could lengthen the period before 6,391 feet is reached. Under the circumstances, there is limited value in attempting to fine tune computer model projections of inherently uncertain conditions many years in the future. If future conditions vary substantially from the conditions assumed in reaching this decision, the SWRCB could adjust the water diversion criteria in an appropriate manner under the exercise of its continuing authority over water rights.

7.0 BENEFICIAL USES SERVED BY WATER DIVERSIONS

7.1 Use of Mono Basin Water for Municipal Purposes

As discussed previously, the Court of Appeal decisions in the Cal Trout cases establish that water needed to protect fish in the four diverted streams is not available for diversion by LADWP. In determining the extent to which additional restrictions should be placed on LADWP's water right licenses for protection of other public trust resources, the SWRCB is compelled to consider the feasibility of those restrictions in view of the other beneficial uses made of the water diverted. The primary beneficial use of water exported from the Mono Basin is to serve the municipal needs of the City of Los Angeles. Sections 7.1.1 through 7.1.4 address present water use and water supplies for Los Angeles, the expected water supply impacts of this decision, and the expected impacts of this decision on the water quality in Los Angeles.

7.1.1 *Present Water Use and Water Supplies for the City of Los Angeles*

Water use in Los Angeles varies on a seasonal and yearly basis in response to climatological conditions. Demand is higher in

Pending completion of that plan, it is not feasible for the SWRCB to establish operations criteria for Grant Lake. The need to establish the fishery protection flows and water diversion criteria to protect other public trust resources are overriding considerations which justify adoption of this decision despite potential adverse impacts on recreation at Crowley Lake and Grant Lake.

9.0 SUMMARY AND CONCLUSIONS

The City of Los Angeles' water diversions from the Mono Basin were authorized over fifty years ago when protection of environmental and public trust resources was viewed very differently than today. Los Angeles' export of water from the Mono Basin has provided a large amount of high quality water for municipal uses, but it has also caused extensive environmental damage. In 1983, the California Supreme Court ruled that the State Water Resources Control Board has the authority to reexamine past water allocation decisions and the responsibility to protect public trust resources where feasible.[23] Later decisions by the California Court of Appeal emphasized the legal priority attached to providing instream flows for fishery protection.

Based on examination of the public trust resources of the Mono Basin, consideration of the flows needed for protection of fish, and consideration of the impacts of this decision on the water available for municipal use and power production, the SWRCB concludes that the water right licenses of the City of Los Angeles should be amended in several respects as discussed in detail in previous sections of this decision. The necessary license amendments include establishment of minimum instream flows for protection of fish in the streams from which LADWP diverts water, as well as periodic higher flows for channel

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[23] *The order which follows amends LADWP's water right licenses to include the SWRCB's standard permit and license term regarding continuing authority.*

maintenance and flushing purposes similar to what occurred under natural conditions.

This decision also amends Los Angeles' water right licenses to include specified water diversion criteria which are intended to gradually restore the average water elevation of Mono Lake to approximately 6,392 feet above mean sea level in order to protect public trust resources at Mono Lake. Among other things, the increased water level will protect nesting habitat for California gulls and other migratory birds, maintain the long-term productivity of Mono Lake brine shrimp and brine fly populations, maintain public accessibility to the most widely visited tufa sites in the Mono Lake Tufa State Reserve, enhance the scenic aspects of the Mono Basin, lead to compliance with water quality standards, and reduce blowing dust in order to comply with federal air quality standards.

The water diversion criteria will significantly reduce the quantity of water which Los Angeles can divert from the Mono Basin as compared to pre-1989 conditions. Since 1989, however, a preliminary injunction has prevented Los Angeles from diverting water from the Mono Basin any time that the water level of Mono Lake is below 6,377 feet. This decision continues the prohibition on diversion at lake levels below 6,377 feet, and specifies criteria under which Los Angeles can divert water as the lake level rises. The rate at which the water level of Mono Lake rises will depend in large part upon future hydrology. Although the license amendments restrict diversions from the Mono Basin, the evidence shows that there are other sources of water reasonably available to Los Angeles and that the amendments to Los Angeles' licenses are feasible.

Finally, this decision requires specified actions aimed at expediting the recovery of resources which were degraded due to many years of little or no flow in the four diverted streams. The decision requires Los Angeles to consult with the Department of Fish and Game and other designated parties, and to develop plans for stream and waterfowl habitat restoration. The specific restoration work that will be required will be determined following the State Water Resources Control Board's review of the restoration plans.

In summary, we believe that this decision and the process by which it has been reached satisfy the California Supreme Court's objective of taking "a new and objective look at the water resources of the Mono Basin." (National Audubon Society v. Superior Court, 33 Cal.3d at 452, 189 Cal.Rptr. at 369.) The requirements set forth in the order which follows are in accord with the Court's mandate to protect public trust resources where feasible and the mandate of the California Constitution to maximize the reasonable and beneficial use of California's limited water resources.

ORDER

IT IS HEREBY ORDERED that Water Right Licenses 10191 and 10192 are amended to include the following conditions:

1. For protection of fish in the specified streams, Licensee shall bypass flows below Licensee's points of diversion equal to the flows specified below or the streamflow at the point of diversion, whichever is less. However, if necessary to meet the dry year flow requirements on Rush Creek, Licensee shall release water from storage at Grant Lake Reservoir under the conditions specified below. The flows provided under this requirement shall remain in the stream channel and shall not be diverted for any other use.

   a. Lee Vining Creek

      Dry Year Flow Requirements

April 1 through September 30	37 cfs
October 1 through March 31	25 cfs

Normal Year Flow Requirements

April 1 through September 30	54 cfs
October 1 through March 31	40 cfs

Wet Year Flow Requirements

April 1 through September 30	54 cfs
October 1 through March 31	40 cfs

b. Walker Creek

Flow Requirements for All Types of Water Years

April 1 through September 30	6.0 cfs
October 1 through March 31	4.5 cfs

c. Parker Creek

Flow Requirements for All Types of Water Years

April 1 through September 30	9.0 cfs
October 1 through March 31	6.0 cfs

d. Rush Creek

Dry Year Flow Requirements

April 1 through September 30	31 cfs
October 1 through March 31	36 cfs

Normal Year Flow Requirements

April 1 through September 30	47 cfs
October 1 through March 31	44 cfs

Wet year Flow Requirements

April 1 through September 30	68 cfs
October 1 through March 31	52 cfs

The dry year flow requirements in Rush Creek shall be maintained, if necessary, by release of stored water from Grant Lake until Grant Lake reaches a volume of 11,500 acre-feet. If Grant Lake storage falls below 11,500 acre-feet, the instream flow requirement shall be the lesser of the inflow to Grant Lake from Rush Creek or the specified dry year flow requirement.

For normal and wet hydrologic years, the instream flow requirements shall be the requirements specified above or the inflow to Grant Lake from Rush Creek, whichever is less. If during normal and wet hydrologic years the inflow to Grant Lake from Rush Creek is less than the dry year flow requirements, then Licensee shall release stored water to maintain the dry year flow requirements until Grant Lake storage falls to 11,500 acre-feet or less.

2. Licensee shall provide channel maintenance and flushing flows for each stream from which water is diverted in accordance with the flows specified below. In the event that the flows at the Licensee's points of diversion on Lee Vining Creek, Walker Creek and Parker Creek are insufficient to provide the channel maintenance and flushing flow requirements, Licensee shall bypass the highest flows which are expected to be present at its points of diversion for the length of time specified in the tables below, and shall notify as soon as reasonably possible the Chief of the Division of Water Rights of the reason that the normally applicable channel maintenance and flushing flow requirements could not be met. In addition, at times when Licensee is responsible for the change in flow in any of the streams from which water is diverted, Licensee shall adjust the rate of change of flow so as not to exceed the "ramping rate" specified below for each stream. Licensee is not required to compensate for fluctuations in the flow reaching Licensee's point of diversion. The specified ramping rates shall be determined based on the percentage of change in flow from the average flow over the preceding 24 hours.

a. Lee Vining Creek

CHANNEL MAINTENANCE & FLUSHING FLOW REQUIREMENTS LEE VINING CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	160 CFS FOR A MINIMUM OF 3 CONSECUTIVE DAYS DURING MAY, JUNE OR JULY
WET YEAR	160 CFS FOR 30 CONSECUTIVE DAYS DURING MAY, JUNE OR JULY
RAMPING RATE - NOT TO EXCEED 20% CHANGE DURING ASCENDING FLOW AND 15% DURING DESCENDING FLOWS PER 24 HOURS	

b. Walker Creek

CHANNEL MAINTENANCE AND FLUSHING FLOWS FOR LOWER WALKER CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	15 TO 30 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
WET YEAR	15 TO 30 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
RAMPING RATE - NOT TO EXCEED 10% CHANGE IN STREAMFLOW PER 24 HOURS	

c. Parker Creek

CHANNEL MAINTENANCE & FLUSHING FLOWS FOR LOWER PARKER CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	25 TO 40 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
WET YEAR	25 TO 40 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
RAMPING RATE - NOT TO EXCEED A 10% CHANGE IN STREAMFLOW PER 24 HOURS	

d. Rush Creek

CHANNEL MAINTENANCE & FLUSHING FLOW REQUIREMENTS RUSH CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
DRY-NORMAL YEAR	NO REQUIREMENT
NORMAL YEAR	200 CFS FOR 5 DAYS
WET-NORMAL YEAR	300 CFS FOR 2 CONSECUTIVE DAYS RAMP DOWN TO 200 CFS, MAINTAIN 200 CFS FOR 10 DAYS
WET YEAR	300 CFS FOR 2 CONSECUTIVE DAYS RAMP DOWN TO 200 CFS, MAINTAIN 200 CFS FOR 10 DAYS
RAMPING RATE - NOT TO EXCEED A 10% CHANGE IN STREAMFLOW PER 24 HOURS	

Runoff year definition:		
	Dry	80-100% exceedence (68.5% of average runoff)
	Dry-Normal	60-80% exceedence (between 68.5% and 82.5% of average runoff)
	Normal	40-60% exceedence (between 82-5% and 107% of average runoff)
	Wet-Normal	20-40% exceedence (between 107% and 136.5% of average runoff)
	Wet	0-20% exceedence (greater than 136.5% of average runoff)

The ramping requirement applies to changes in flow made by LADWP. LADWP is not required to compensate for natural fluctuations in flow.

3. For purposes of determining: (1) applicable instream flows for protection of fish on Lee Vining Creek and Rush Creek; and (2) channel maintenance and flushing flow requirements on Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek, the hydrologic year type classification shall be determined using projected unimpaired runoff for the runoff year April 1 through March 31 as estimated using the LADWP Runoff Forecast Model for the Mono Basin. The unimpaired runoff is the sum of forecasts for the Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek sub-basins.

Preliminary determinations of the runoff classification shall be made by Licensee in February, March, and April with the final determination made on or about May 1. The preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming median precipitation for the remainder of the runoff year. Instream flow requirements prior to the final determination in May shall be based on the most recent runoff projection. Following issuance of final determination in May, that hydrologic year classification shall remain in effect until the preliminary runoff determination made in April of the next year. The hydrologic year type classification shall be as follows:

Wet Hydrologic Conditions:	Projected runoff greater than 136.5% of average
Normal Hydrologic Conditions:	Projected runoff between 68.5% and 136.5% of average (inclusive)
Dry Hydrologic Conditions:	Runoff less than 68.5% of average

4. For purposes of determining the channel maintenance and flushing flow requirements on Rush Creek, the hydrologic year-type determination shall be in accordance with the criteria specified in part "d" of the preceding condition. Licensee shall maintain continuous instantaneous measuring devices at each point of diversion which are satisfactory to the Chief of the Division of Water Rights and which measure the streamflow above the diversion facility and the flow immediately below the diversion facility. Licensee shall maintain detailed records from which the flow above and below the diversion facility, and the quantity of water diverted can be readily determined. Licensee shall report to the Chief of the Division of Water Rights within 72 hours any event when the flows required by this order are not met. As soon as reasonably possible, Licensee shall provide an explanation of why the required flows were not met.

5. Livestock grazing on Licensee's property within the riparian corridors of Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek, downstream of points of diversion authorized under this license, is prohibited for a minimum of ten years.

Grazing after that time shall be subject to approval of the SWRCB or its Executive Director of a plan prepared by Licensee following consultation with the Department of Fish and Game and U.S. Forest Service.

6. In addition to the instream flow requirements for fishery protection, channel maintenance and flushing purposes, diversion of water under this license is subject to the limitations specified below. For purposes of determining the applicable water diversion criteria, the water level of Mono Lake shall be measured on April 1 of each year and the limitation on water diversions shall apply for the one year period of April 1 through March 31 of the succeeding year, except as otherwise specified below. The water level shall be measured at the LADWP gage near Lee Vining Creek or such other gage as is approved by the Chief of the Division of Water Rights.

a. Water diversion criteria applicable until the water level of Mono Lake reaches 6,391 feet:

(1) Licensee shall not export any water from the Mono Basin any time that the water level in Mono Lake is below 6,377 feet above mean sea level, or any time that the water level of Mono Lake is projected to fall below 6,377 feet at any time during the runoff year of April 1 through March 31.

(2) If the water level of Mono Lake is expected to remain at or above 6,377 feet throughout the runoff year of April 1 through March 31 of the succeeding year based on Licensee's final May 1 runoff projections and any subsequent runoff projections, then Licensee may divert up to 4,500 acre-feet of water per year under the terms of this license.

(3) If the water level of Mono Lake is at or above 6,380 feet and below 6,391 feet, then Licensee may divert

up to 16,000 acre-feet of water per year under the terms of this license.

(4) In the event that the water level of Mono Lake has not reached an elevation of 6,391 feet by September 28, 2014, the SWRCB will hold a hearing to consider the condition of the lake and the surrounding area, and will determine if any further revisions to this license are appropriate.

b. Water diversion criteria applicable after the water level of Mono Lake reaches 6,391 feet:

(1) Once the water level of Mono Lake has reached an elevation of 6,391 feet, no diversions shall be allowed any time that the water level falls below 6,388 feet.

(2) Once a water level of 6,391 feet has been reached and the lake level has fallen below 6,391, diversions by Licensee shall be limited to 10,000 acre-feet per year provided that the water level is at or above 6,388 feet and less than 6,391 feet.

(3) When the water level of Mono Lake is at or above 6,391 feet on April 1, Licensee may divert all available water in excess of the amount needed to maintain the required fishery protection flows and the channel maintenance and flushing flows, up to the amounts otherwise authorized under this license.

7. Licensee's combined rate of diversion through the Mono Craters Tunnel under all bases of right shall be regulated so that the sum of discharge from East Portal and the natural flow in the Owens River at East Portal do not exceed 250 cfs as measured directly downstream of the East Portal discharge. Licensee shall make releases to the upper Owens River at a relatively stable rate consistent with operational

limitations and water availability. This standard shall be incorporated into the Grant Lake operations and management plan to be submitted as part of Licensee's stream restoration plan.

8. Licensee shall prepare and submit to the SWRCB for approval a stream and stream channel restoration plan and a waterfowl habitat restoration plan, the objectives of which shall be to restore, preserve, and protect the streams and fisheries in Rush Creek, Lee Vining Creek, Walker Creek, and Parker Creek, and to help mitigate for the loss of waterfowl habitat due to the diversion of water under this license. The plans shall include consideration of measures to promote the restoration of the affected streams and lake-fringing waterfowl habitat which are functionally linked to the streamflows and lake levels specified in this order. The restoration plans shall include elements for improving instream habitat for maintaining fish in good condition. These plans are subject to technical and financial feasibility, reasonableness, and adequacy of the measures proposed to achieve the stated objectives. The restoration plans shall identify the specific projects to be undertaken, the implementation schedule, the estimated costs, the method of financing, and estimated water requirements. The plans shall be prepared in accordance with the requirements specified below:

a. The stream restoration plan shall make recommendations on stream and stream channel restoration including, but not limited to, the following elements:

(1) Instream habitat restoration measures for Rush Creek;

(2) Rewatering of additional channels of Rush Creek and Lee Vining Creek;

(3) Riparian vegetation restoration for Rush Creek and Lee Vining Creek;

(4) A sediment bypass facility at Licensee's diversion structure on Lee Vining Creek;

(5) Flood flow contingency measures;

(6) Limitations on streamcourse vehicular access;

(7) Construction of a fish and sediment bypass system around Licensee's diversion facilities on Walker Creek and Parker Creek;

(8) Spawning gravel replacement programs downstream of Licensee's points of diversion on Rush Creek, Lee Vining Creek, Walker Creek and Parker Creek;

(9) Livestock grazing exclusions in the riparian areas below Licensee's point of diversion on all diverted streams after the period specified in Term 5 of this order;

(10) Feasibility evaluation of installing and maintaining fish screens at all points of diversion from the streams, including irrigation diversions on LADWP property.

(11) Grant Lake operations and management plan.

b. The stream restoration and protection requirements established in this order do not replace any requirements established by the Superior Court for El Dorado County in the context of granting interim relief in the consolidated Mono Lake Water Rights Cases (El Dorado County, Superior Court Coordinated Proceeding Nos. 2284 and 2288). Licensee shall continue to completion any and all work required pursuant to court order, including implementation of any restoration plans approved by the court, unless and until the court order is dissolved and the Licensee obtains approval of the SWRCB. In evaluating additional stream restoration work to be included in the restoration plan required under the terms of this order, Licensee shall consider the restoration work undertaken pursuant to the direction of the Superior Court. In addition, the Licensee shall consider information which has been developed by the Restoration Technical Committee and its consultants pursuant to direction from the Superior Court, including but not limited to planning documents finalized and approved by January 1, 1995.

c. The waterfowl habitat restoration plan shall make recommendations on waterfowl habitat restoration measures and shall describe how any restored waterfowl areas will be managed on an ongoing basis. The plans shall focus on restoration measures in lake-fringing wetland areas.

d. The stream restoration plan and the waterfowl habitat restoration plan shall be subject to the following requirements:

(1) The restoration plans shall be consistent with the management regulations and statutes governing the Mono Basin National Forest Scenic Area and the Mono Lake State Tufa Reserve.

(2) The restoration plans shall identify the specific projects to be undertaken, the implementation schedule, the estimated costs, the method of financing, and estimated water requirements.

(3) The restoration plans shall include an inventory of existing conditions including a status report on all restoration work undertaken pursuant to direction of the El Dorado County Superior Court.

(4) The restoration plans shall include a method for monitoring the results and progress of proposed

restoration projects. The monitoring proposal shall identify how results of restoration activities will be distinguished from naturally occurring changes and shall propose criteria for determining when monitoring may be terminated.

(5) Licensee shall be responsible for compliance with all applicable state and federal statutes governing environmental review of projects proposed in the restoration plans. In developing the restoration plans, Licensee shall emphasize measures that have minimal potential for adverse environmental effects. The time schedule specified in the restoration plans shall include procedures for compliance with the California Environmental Quality Act (Public Resources Code Section 21000, et seq.) and for obtaining all necessary permits or governmental agency approvals.

e. Licensee shall prepare or contract for the development of the plans identified in this order. SWRCB staff will provide guidance in that development. In developing the required restoration plans, Licensee shall seek active input from the following parties: California Department of Fish and Game, California State Lands Commission, California Department of Parks and Recreation, the United States Forest Service, the National Audubon Society, the Mono Lake Committee, and California Trout, Inc. It is not the intent of the SWRCB that LADWP shall have any obligation to reimburse other parties for costs they may incure in the restoration planning process, except as otherwise required by law.

f. The restoration plans shall be developed in accordance with the following schedule:

(1) Based on review of information received from the agencies and parties designated in paragraph 8e of

this order, Licensee shall prepare a draft scope of work for the restoration plans which addresses each of the plan elements specified above. The draft scope of work shall identify a time schedule within which to prepare and implement the various elements of the restoration plans. The draft scope of work shall be submitted to the Chief of the Division of Water Rights by February 1, 1995.

(2) By August 1, 1995, Licensee shall complete draft restoration plans which Licensee shall then make available to the parties designated in paragraph 8e for a 60-day review and comment period.

(3) Following any revisions to the draft plans made in response to comments from the designated agencies and parties, Licensee shall prepare final proposed restoration plans to be submitted to the SWRCB for approval by November 30, 1995. The final proposed restoration plans shall also be made available to the parties designated in paragraph 8e above who may submit comments on the proposed plans to the SWRCB by December 31, 1995.

(4) The SWRCB will review the final proposed restoration plans based primarily on the following factors:

(a) adequacy of the measures proposed to achieve restoration of the fisheries, streams, stream channels, waterfowl habitat and other public trust resources;

(b) technical and financial feasibility; and

(c) reasonableness.

(5) Following review of the final proposed restoration plans, the SWRCB will determine if the plans are

acceptable and will notify the Licensee of its determination. If the SWRCB determines that a plan, plans, or portions thereof, are not acceptable, then Licensee shall submit a revised plan or plans in accordance with direction from the SWRCB.

(6) If an environmental impact report is required for any measures proposed in the restoration plans or if revisions to the plans are necessary in order to qualify for a mitigated negative declaration, then the restoration plan or plans involved should be resubmitted for SWRCB approval following completion of the environmental impact report or negative declaration.

(7) Following the SWRCB's review of any appropriate environmental documentation and approval of the restoration plans, or portions thereof, Licensee shall implement the specified restoration measures in accordance with the time schedule set by the SWRCB. Licensee shall submit semi-annual progress reports to the Chief of the Division of Water Rights on the work undertaken pursuant to the plans. The progress reports shall include monitoring information on the status and effectiveness of previously undertaken restoration measures, and identification of appropriate revisions in any cases where restoration has not been effective.

(8) The SWRCB shall have continuing authority to require modification of restoration activities as appropriate and to modify streamflow requirements as necessary to implement restoration activities. Modification of streamflow requirements may reduce the amount of water available for export.

9. Licensee shall complete a cultural resources investigation of all areas to be impacted by the rewatering of the Mono

tributaries, including all areas subject to restoration and/or increased recreational use. The investigation shall consist of a literature and records search, a survey, the formal recordation of all cultural resources identified, the preparation of a written report documenting all research and findings, and the identification of appropriate mitigation measures in accordance with Appendix K of the CEQA Guidelines. This investigation shall also include appropriate consultation with the Mono Basin Native American community to address their concerns. Appropriate mitigation measures shall be proposed in the cultural resources report to address any identified impacts to contemporary traditional use of the Mono Basin area by Native Americans. The report shall be submitted by August 1, 1995 to the Chief of the Division of Water Rights for review and approval.

10. Licensee shall complete a Cultural Resources Treatment Plan (CRTP) based on the findings and recommendations in the written report on the cultural resources investigations, the consultation with the Native American community, and the comments received from the review of the cultural resources document by the SWRCB. The CRTP shall include provisions for the appropriate treatment of all identified cultural resources. The CRTP shall provide for access to resources and locations deemed important to their traditional lifeways by the Native American community. The CRTP shall include provisions for unanticipated discoveries that could be encountered during project activities authorized subsequent to the completion of the cultural resources document. The CRTP shall delineate the guidelines for archeological excavations and require the preparation of research designs prior to the initiation of any data recovery programs. The CRTP shall also provide for a monitoring program to ensure the effectiveness of treatment measures and to gauge the impacts of the increased recreational use of the Mono Lake tributaries. The CRTP shall outline mitigation options to be implemented if the monitoring indicates that impacts are occurring as a result of project-related activities. The

CRTP shall be submitted to the Chief of the Division of Water Rights for review and approval in conjunction with the draft stream restoration and waterfowl restoration plans and no later than November 30, 1995.

11. Upon request, Licensee shall make copies of any and all documents (research designs, interim reports, draft reports, final reports, flow data, etc.) relating to provisions of this order available to the Chief of the Division of Water Rights or his designee.

12. Pursuant to California Water Code Sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this license, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the SWRCB may be exercised by imposing specific requirements over and above those contained in this license with a view to eliminating waste of water and to meeting the reasonable water requirements of licensee without unreasonable draft on the source. Licensee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing, maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this license and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the SWRCB also may be exercised by imposing further limitations on the diversion and use of water by the Licensee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest; and is necessary to preserve or restore the uses protected by the public trust.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full and correct copy of a decision duly and regularly adopted at a meeting of the State Water Resources Control Board held on September 28, 1994.

AYE: John Caffrey
James M. Stubchaer
Marc Del Piero
Mary Jane Forster
John W. Brown

NO: None.

ABSENT: None.

ABSTAIN: None.

Maureen Marché

Maureen Marché
Administrative Assistant to the Board

EXHIBIT C-6

SECTION 7 - SELECTED CONTROL MEASURE AND FEDERAL PM-10 STANDARD ATTAINMENT DEMONSTRATION

INTRODUCTION
MONO LAKE BASIN WATER DECISION 1631
SUMMARY OF AIR QUALITY IMPACT
DEMONSTRATION OF ATTAINMENT
CLEAN AIR ACT COMPLIANCE

7.1 Introduction

It is clear that the predominant source of PM-10 emissions in the Mono Basin Planning Area is windblown dust, resulting from the erosion of efflorescent salt deposits and sediments from the exposed lake shore of Mono Lake. 4,975 acres of relicted lake bed are now unprotected from the wind--a consequence of water diversions that have lowered the lake level 45 feet since 1941.

The control measure to reduce air pollution from PM-10 emissions in Mono Basin was adopted by the State Water Resources Control Board (SWRCB) on September 28, 1994. The control measure specifies a gradual increase in the water elevation of Mono Lake which will submerge much of the exposed emissive source area--the only feasible method to sufficiently reduce emissions to comply with the federal PM-10 Standard. The SWRCB promulgated its findings in the *Mono Lake Basin Water Right Decision 1631: Amending Water Right Licenses 10191 and 10192, City of Los Angeles, Licensee*. Pertinent sections of the adopted decision are summarized in Table 7-1. The complete Order and Certification is included in Appendix 6.

The decision of the SWRCB establishes water diversion criteria that shall apply over approximately 20 years to ensure that the water level of Mono Lake is restored to at least 6,391 feet and is sustained at or above that elevation (Figure 7-1). Under normal runoff hydrology, an estimated 26 years is required for Mono Lake to rise to this designated elevation. Extremely wet runoff years could result in the lake reaching 6,391 feet in as little as nine years, whereas it may take as long as 38 years under drought conditions (Figure 7-2). As a contingency, the SWRCB has the authority to further limit diversion of water by the Licensee to enforce the decision and its objective of protecting public trust resources. Submerging the exposed lake shore to 6,391 feet or higher will effectively eliminate emissions from lower source elevations characterized by net deflation. Emissions from the 6,391 to 6,400 foot contours will be curtailed through stabilization--a result of declining deposition of particulate matter and expanding natural vegetation cover. As will be demonstrated later in this section, predicted attainment of the PM-10 Standard will be accomplished in the Mono Basin Planning Area.

PROJECTED APRIL 1 MONO LAKE SURFACE ELEVATION*

USING D-1631 OPERATIONAL RULES

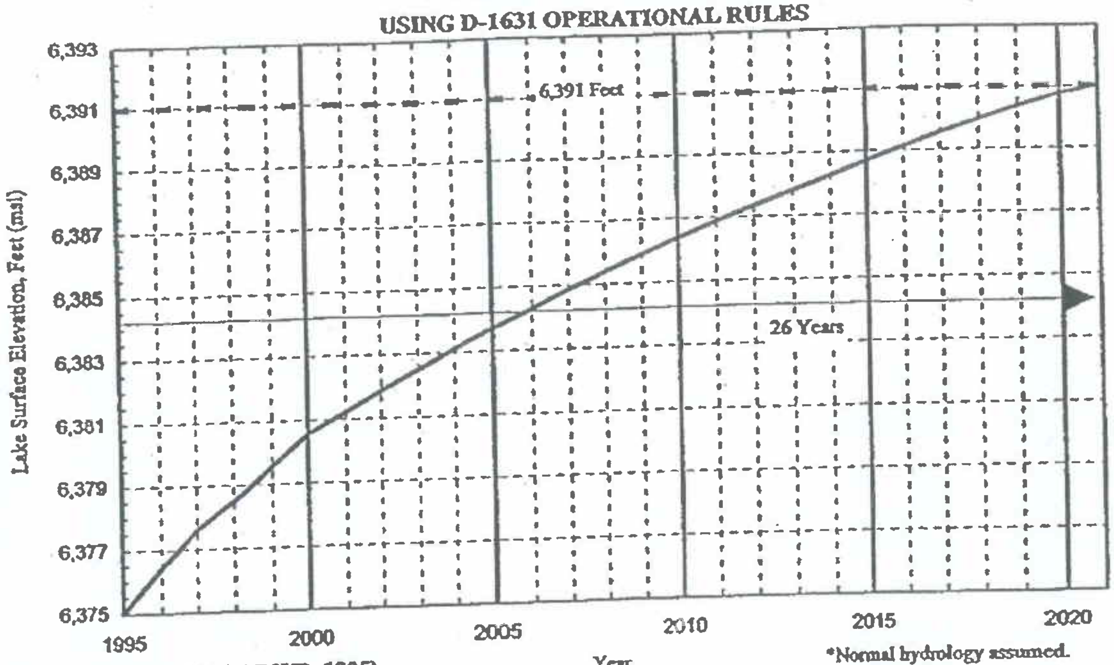


Figure 7-1 (Source: LADWP, 1995)

TRANSITION PERIOD SCENARIOS FOR MONO LAKE ELEVATION TO REACH 6,391 FEET

USING D-1631 OPERATIONAL RULES

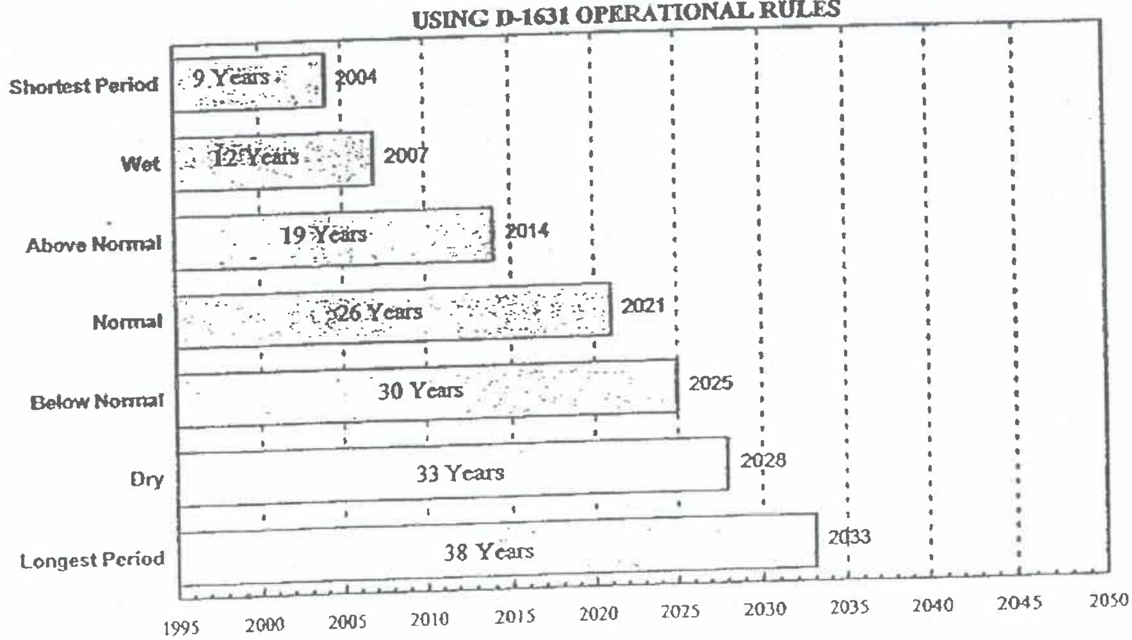


Figure 7-2 (Source: LADWP, 1995)

Assumptions Used to Develop Charts in Figures 7-1 and 7-2

Figure 7-1 Chart: Projected April 1 Mono Lake Surface Elevation

Chart values were calculated using the Los Angeles Aqueduct Simulation Model (LAASM) by using normal Mono Basin hydrology for 26 consecutive years. The simulation used a starting lake elevation of 6,375 feet (msl). Given 26 successive years of normal hydrologic conditions, the lake surface elevation would likely transition from the 1995 elevation of 6,375 feet to the 6,391 foot elevation as shown in the chart.

Figure 7-2 Chart: Transition Period Scenarios for Mono Lake Elevation to Reach 6,391 Feet

The range of transition period scenarios depicted in this chart was developed using the Mono Basin 1940-1993 hydrologic record as a database. A total of 54 independent simulations were made with each simulation using 54 years of hydrologic data. To vary the hydrologic sequence of each simulation, the database was systematically cycled through year-by-year. To facilitate this cycling process, two sets of the 1940-1993 hydrology were used. The second data set was appended to the end of the first data set. The following explanation should help clarify the process used.

The 45 successive simulations were completed as follows. The first simulation used one data set only; it began with 1940 and ended with 1993. However, the second simulation and all subsequent simulations required both data sets. The second simulation used the 1941-1993 data from the first set with 1940 from the second data set completing the 54 year cycle. Moving the starting point up one year with each iteration, 52 more simulation runs were conducted. The 54th and final simulation began with the last year of the first set, 1993, and cycled through 1992 of the second data set. Each simulation used 6,375 feet (msl) as the starting lake surface elevation. After all 54 simulations were completed, the calculated transition periods (years to reach a lake surface elevation of 6,391 feet from a starting point of 6,375 feet) from each simulation were tabulated.

Analyzing the frequency distribution of the tabulated data described above, a reasonable range was determined for the length of the transition period. It was determined that under a wet hydrologic scenario, the transition period may be as short as 12 years and under a dry hydrologic scenario, the transition may take as long as 33 years. In this context, the "Wet" scenario is defined as an upper hydrologic limit that is exceeded (conditions are wetter) only 10 percent of the time. Likewise, the "Dry" scenario is defined as a lower hydrologic limit that is exceeded (conditions are drier) only 10 percent of the time. Under extreme hydrologic conditions (wet or dry), the range is larger (9 years to 38 years). Three other probable scenarios between the "Wet" and "Dry" scenarios were also identified. These are "Above Normal," "Below Normal," and "Normal." These scenarios were also defined by looking at the frequency distribution of the 54 successive simulations. (Source: LADWP)

7.2 *Mono Lake Basin Water Decision 1631*

The Mono Lake decision requires specified actions for the recovery of resources degraded by years of water diversion from tributary streams normally flowing into the lake. The amendment of water right licenses includes the establishment of minimum in-stream flows, as well as periodic higher flows for channel maintenance and flushing. Further, the implementation of defined water diversion criteria will progressively increase the water elevation, thereby protecting aquatic and terrestrial ecosystems, enhancing scenic resources, and improving ambient air quality.

The process for review of Mono Basin water rights involved extensive evidentiary hearings. For that portion on air quality, the SWRCB considered computer modeling results predicting future air quality conditions at differing lake levels. These computer models, along with corroborating expert testimony, provided the SWRCB with the best evidence available for evaluating expected conditions under alternative proposals. The air quality improvement predicted as a result of increasing the water elevation to 6,391 feet or above was a determining factor in the final decision.

"[T]his decision and the process by which it has been reached satisfy the California Supreme Court's objective of taking `a new and objective look at the water resources of the Mono Basin.' (National Audubon Society v. Superior Court, 33 Cal.3d at 452, 189 Cal. Rptr. at 369.) The requirements set forth in the order . . . are in accord with the Court's mandate to protect public trust resources where feasible and the mandate of the California Constitution to maximize the reasonable and beneficial use of California's limited water resources."[34]

Table 7-1

MONO BASIN WATER RIGHT LICENSE AMENDMENTS

MINIMUM IN-STREAM FLOWS

- Establishes specific flow requirements (in cfs) for Lee Vining, Walker, Parker, and Rush Creeks for dry, normal, and wet years.
- Requires that specified flows remain in the stream channel and not be diverted.
- Requires release of water from Grant Lake storage, if necessary, to maintain dry year flow requirements in Rush Creek.

CHANNEL MAINTENANCE AND FLUSHING

- Establishes specific channel maintenance and flushing flow requirements for Lee Vining, Walker, Parker, and Rush Creeks for dry, normal, and wet years.
- Requires that change in flow not exceed specified "ramping rates."

HYDROLOGIC YEAR-TYPE CLASSIFICATION

- Establishes guidelines for determination of hydrologic year-type for April 1-March 31 period, including classification of projected runoff into dry, normal, and wet (LADWP Runoff Forecast Model).

MEASUREMENT OF STREAM FLOW

- Establishes procedures for measurement of stream flow above and below diversion facilities and for maintenance of records.

WATER DIVERSION CRITERIA

- Establishes procedure for measuring the water level of Mono Lake in order to set diversion limits for each April 1-March 31 period.
- Establishes acre-foot diversion limits for varying water levels until lake reaches 6,391 feet.
- Requires reconsideration of license amendments if water level has not reached elevation of 6,391 feet by September 28, 2014.
- Establishes acre-foot *diversion* limits once water level of Mono Lake attains 6,391 feet.

AUTHORITY

- Recites continuing authority of the State Water Resources Control Board over licenses, pursuant to California Water Code Sections 100 and 275 and common law public trust doctrine.

MONO LAKE BASIN WATER RIGHT DECISION 1631

PERTINENT SECTIONS OF ORDER AND CERTIFICATION

ORDER

IT IS HEREBY ORDERED that Water Right Licenses 10191 and 10192 are amended to include the following conditions:

1. For protection of fish in the specified streams, Licensee shall bypass flows below Licensee's points of diversion equal to the flows specified below or the streamflow at the point of diversion, whichever is less. However, if necessary to meet the dry year flow requirements on Rush Creek, Licensee shall release water from storage at Grant Lake Reservoir under the conditions specified below. The flows provided under this requirement shall remain in the stream channel and shall not be diverted for any other use.

    a. Lee Vining Creek

Dry Year Flow Requirements	
April 1 through September 30	37 cfs
October 1 through March 31	25 cfs

Normal Year Flow Requirements

April 1 through September 30	54 cfs
October 1 through March 31	40 cfs

Wet Year Flow Requirements

April 1 through September 30	54 cfs
October 1 through March 31	40 cfs

b. Walker Creek

Flow Requirements for All Types of Water Years

April 1 through September 30	6.0 cfs
October 1 through March 31	4.5 cfs

c. Parker Creek

Flow Requirements for All Types of Water Years

April 1 through September 30	9.0 cfs
October 1 through March 31	6.0 cfs

d. Rush Creek

Dry Year Flow Requirements

April 1 through September 30	31 cfs
October 1 through March 31	36 cfs

Normal Year Flow Requirements

April 1 through September 30	47 cfs
October 1 through March 31	44 cfs

Wet year Flow Requirements

April 1 through September 30	68 cfs
October 1 through March 31	52 cfs

The dry year flow requirements in Rush Creek shall be maintained, if necessary, by release of stored water from Grant Lake until Grant Lake reaches a volume of 11,500 acre-feet. If Grant Lake storage falls below 11,500 acre-feet, the instream flow requirement shall be the lesser of the inflow to Grant Lake from Rush Creek or the specified dry year flow requirement.

For normal and wet hydrologic years, the instream flow requirements shall be the requirements specified above or the inflow to Grant Lake from Rush Creek, whichever is less. If during normal and wet hydrologic years the inflow to Grant Lake from Rush Creek is less than the dry year flow requirements, then Licensee shall release stored water to maintain the dry year flow requirements until Grant Lake storage falls to 11,500 acre-feet or less.

2. Licensee shall provide channel maintenance and flushing flows for each stream from which water is diverted in accordance with the flows specified below. In the event that the flows at the Licensee's points of diversion on Lee Vining Creek, Walker Creek and Parker Creek are insufficient to provide the channel maintenance and flushing flow requirements, Licensee shall bypass the highest flows which are expected to be present at its points of diversion for the length of time specified in the tables below, and shall notify as soon as reasonably possible the Chief of the Division of Water Rights of the reason that the normally applicable channel maintenance and flushing flow requirements could not be met. In addition, at times when Licensee is responsible for the change in flow in any of the streams from which water is diverted, Licensee shall adjust the rate of change of flow so as not to exceed the "ramping rate" specified below for each stream. Licensee is not required to compensate for fluctuations in the flow reaching Licensee's point of diversion. The specified ramping rates shall be determined based on the percentage of change in flow from the average flow over the preceding 24 hours.

a. Lee Vining Creek

CHANNEL MAINTENANCE & FLUSHING FLOW REQUIREMENTS LEE VINING CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	160 CFS FOR A MINIMUM OF 3 CONSECUTIVE DAYS DURING MAY, JUNE OR JULY.
WET YEAR	160 CFS FOR 30 CONSECUTIVE DAYS DURING MAY, JUNE OR JULY
RAMPING RATE - NOT TO EXCEED 20% CHANGE DURING ASCENDING FLOW AND 15% DURING DESCENDING FLOWS PER 24 HOURS	

b. Walker Creek

CHANNEL MAINTENANCE AND FLUSHING FLOWS FOR LOWER WALKER CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	15 TO 30 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
WET YEAR	15 TO 30 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
RAMPING RATE - NOT TO EXCEED 10% CHANGE IN STREAMFLOW PER 24 HOURS	

c. Parker Creek

CHANNEL MAINTENANCE & FLUSHING FLOWS FOR LOWER PARKER CREEK

HYDROLOGIC CONDITION	REQUIREMENT
DRY YEAR	NO REQUIREMENT
NORMAL YEAR	25 TO 40 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
WET YEAR	25 TO 40 CFS FOR 1 TO 4 CONSECUTIVE DAYS BETWEEN MAY 1 AND JULY 31
RAMPING RATE - NOT TO EXCEED A 10% CHANGE IN STREAMFLOW PER 24 HOURS	

d. Rush Creek

CHANNEL MAINTENANCE & FLUSHING FLOW REQUIREMENTS RUSH CREEK

HYDROLOGIC CONDITION	[illegible] REQUIREMENT
DRY YEAR	NO REQUIREMENT
DRY-NORMAL YEAR	NO REQUIREMENT
NORMAL YEAR	200 CFS FOR 5 DAYS
WET-NORMAL YEAR	300 CFS FOR 2 CONSECUTIVE DAYS RAMP DOWN TO 200 CFS. MAINTAIN 200 CFS FOR 10 DAYS
WET YEAR	300 CFS FOR 2 CONSECUTIVE DAYS RAMP DOWN TO 200 CFS. MAINTAIN 200 CFS FOR 10 DAYS
RAMPING RATE - NOT TO EXCEED A 10% CHANGE IN STREAMFLOW PER 24 HOURS	

Runoff year definition:
Dry 80-100% exceedence (68.5% of average runoff)
Dry-Normal 60-80% exceedence (between 68.5% and 82.5% of average runoff)
Normal 40-60% exceedence (between 82.5% and 107% of average runoff)
Wet-Normal 20-40% exceedence (between 107% and 136.5% of average runoff)
Wet 0-20% exceedence (greater than 136.5% of average runoff)

The ramping requirement applies to changes in flow made by LADWP. LADWP is not required to compensate for natural fluctuations in flow.

3. For purposes of determining: (1) applicable instream flows for protection of fish on Lee Vining Creek and Rush Creek; and (2) channel maintenance and flushing flow requirements on Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek, the hydrologic year type classification shall be determined using projected unimpaired runoff for the runoff year April 1 through March 31 as estimated using the LADWP Runoff Forecast Model for the Mono Basin. The unimpaired runoff is the sum of forecasts for the Lee Vining Creek, Walker Creek, Parker Creek, and Rush Creek sub-basins.

Preliminary determinations of the runoff classification shall be made by Licensee in February, March, and April with the final determination made on or about May 1. The preliminary determinations shall be based on hydrologic conditions to date plus forecasts of future runoff assuming median precipitation for the remainder of the runoff year. Instream flow requirements prior to the final determination in May shall be based on the most recent runoff projection. Following issuance of final determination in May, that hydrologic year classification shall remain in effect until the preliminary runoff determination made in April of the next year. The hydrologic year type classification shall be as follows:

Wet Hydrologic Conditions:	Projected runoff greater than 136.5% of average
Normal Hydrologic Conditions:	Projected runoff between 68.5% and 136.5% of average (inclusive)
Dry Hydrologic Conditions:	Runoff less than 68.5% of average

For purposes of determining the channel maintenance and flushing flow requirements on Rush Creek, the hydrologic year-type determination shall be in accordance with the criteria specified in part "d" of the preceding condition.

4. Licensee shall maintain continuous instantaneous measuring devices at each point of diversion which are satisfactory to the Chief of the Division of Water Rights and which measure the streamflow above the diversion facility and the flow immediately below the diversion facility. Licensee shall maintain detailed records from which the flow above and below the diversion facility, and the quantity of water diverted can be readily determined. Licensee shall report to the Chief of the Division of Water Rights within 72 hours any event when the flows required by this order are not met. As soon as reasonably possible, Licensee shall provide an explanation of why the required flows were not met.

6. In addition to the instream flow requirements for fishery protection, channel maintenance and flushing purposes, diversion of water under this license is subject to the limitations specified below. For purposes of determining the applicable water diversion criteria, the water level of Mono Lake shall be measured on April 1 of each year and the limitation on water diversions shall apply for the one year period of April 1 through March 31 of the succeeding year, except as otherwise specified below. The water level shall be measured at the LADWP gage near Lee Vining Creek or such other gage as is approved by the Chief of the Division of Water Rights.

a. Water diversion criteria applicable until the water level of Mono Lake reaches 6,391 feet:

(1) Licensee shall not export any water from the Mono Basin any time that the water level in Mono Lake is below 6,377 feet above mean sea level, or any time that the water level of Mono Lake is projected to fall below 6,377 feet at any time during the runoff year of April 1 through March 31.

(2) If the water level of Mono Lake is expected to remain at or above 6,377 feet throughout the runoff year of April 1 through March 31 of the succeeding year based on Licensee's final May 1 runoff projections and any subsequent runoff projections, then Licensee may divert up to 4,500 acre-feet of water per year under the terms of this license.

(3) If the water level of Mono Lake is at or above 6,380 feet and below 6,391 feet, then Licensee may divert

up to 16,000 acre-feet of water per year under the terms of this license.

(4) In the event that the water level of Mono Lake has not reached an elevation of 6,391 feet by September 28, 2014, the SWRCB will hold a hearing to consider the condition of the lake and the surrounding area, and will determine if any further revisions to this license are appropriate.

b. Water diversion criteria applicable after the water level of Mono Lake reaches 6,391 feet:

(1) Once the water level of Mono Lake has reached an elevation of 6,391 feet, no diversions shall be allowed any time that the water level falls below 6,388 feet.

(2) Once a water level of 6,391 feet has been reached and the lake level has fallen below 6,391, diversions by Licensee shall be limited to 10,000 acre-feet per year provided that the water level is at or above 6,388 feet and less than 6,391 feet.

(3) When the water level of Mono Lake is at or above 6,391 feet on April 1, Licensee may divert all available water in excess of the amount needed to maintain the required fishery protection flows and the channel maintenance and flushing flows, up to the amounts otherwise authorized under this license.

12. Pursuant to California Water Code Sections 100 and 275 and the common law public trust doctrine, all rights and privileges under this license, including method of diversion, method of use, and quantity of water diverted, are subject to the continuing authority of the State Water Resources Control Board in accordance with law and in the interest of the public welfare to protect public trust uses and to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of said water.

The continuing authority of the SWRCB may be exercised by imposing specific requirements over and above those contained in this license with a view to eliminating waste of water and to meeting the reasonable water requirements of licensee without unreasonable draft on the source. Licensee may be required to implement a water conservation plan, features of which may include but not necessarily be limited to (1) reusing or reclaiming the water allocated; (2) using water reclaimed by another entity instead of all or part of the water allocated; (3) restricting diversions so as to eliminate agricultural tailwater or to reduce return flow; (4) suppressing evaporation losses from water surfaces; (5) controlling phreatophytic growth; and (6) installing; maintaining, and operating efficient water measuring devices to assure compliance with the quantity limitations of this license and to determine accurately water use as against reasonable water requirements for the authorized project. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such specific requirements are physically and financially feasible and are appropriate to the particular situation.

The continuing authority of the SWRCB also may be exercised by imposing further limitations on the diversion and use of water by the Licensee in order to protect public trust uses. No action will be taken pursuant to this paragraph unless the SWRCB determines, after notice to affected parties and opportunity for hearing, that such action is consistent with California Constitution Article X, Section 2; is consistent with the public interest; and is necessary to preserve or restore the uses protected by the public trust.

CERTIFICATION

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full and correct copy of a decision duly and regularly adopted at a meeting of the State Water Resources Control Board held on September 28, 1994.

AYE: John Caffrey
James M. Stubchaer
Marc Del Piero
Mary Jane Forster
John W. Brown

NO: None.

ABSENT: None.

ABSTAIN: None.

Maureen Marché

Maureen Marché
Administrative Assistant to the Board

7.3 Summary of Air Quality Impact

The dispersion modeling results presented in Section 5 indicate that receptor site 45 (on the 6,417 foot topographic contour) experiences the highest predicted 24-hour PM-10 concentrations. This section will describe important technical adjustments to the dispersion modeling results that produce a demonstration of attainment of the 150 $\mu g/m^3$ PM-10 Standard at receptor site 45 with a lake elevation of 6,391 feet, and a lower source boundary at 6,392 feet.

Modeled Impact. The sixth highest concentration for the May 8, 1991 design day at a source elevation of 6,393' is 356 $\mu g/m^3$ (Table 5-2, Dispersion Modeling). As noted in Section 5, the lower limits of a modeled source area will be somewhat higher in elevation than the actual lake level due to a one vertical foot stable band which has been observed to form above the water line. Specifically, a modeled source elevation of 6,393' will correspond to an actual lake level at about 6,392'.

Implementation of the water diversion criteria specified in the SWRCB decision will gradually restore the average water elevation of Mono Lake to approximately 6,391 feet above mean sea level.[35] Figure 7-3 below depicts changes in modeled PM-10 concentrations at receptor site 45 as a function of increasing water elevation.

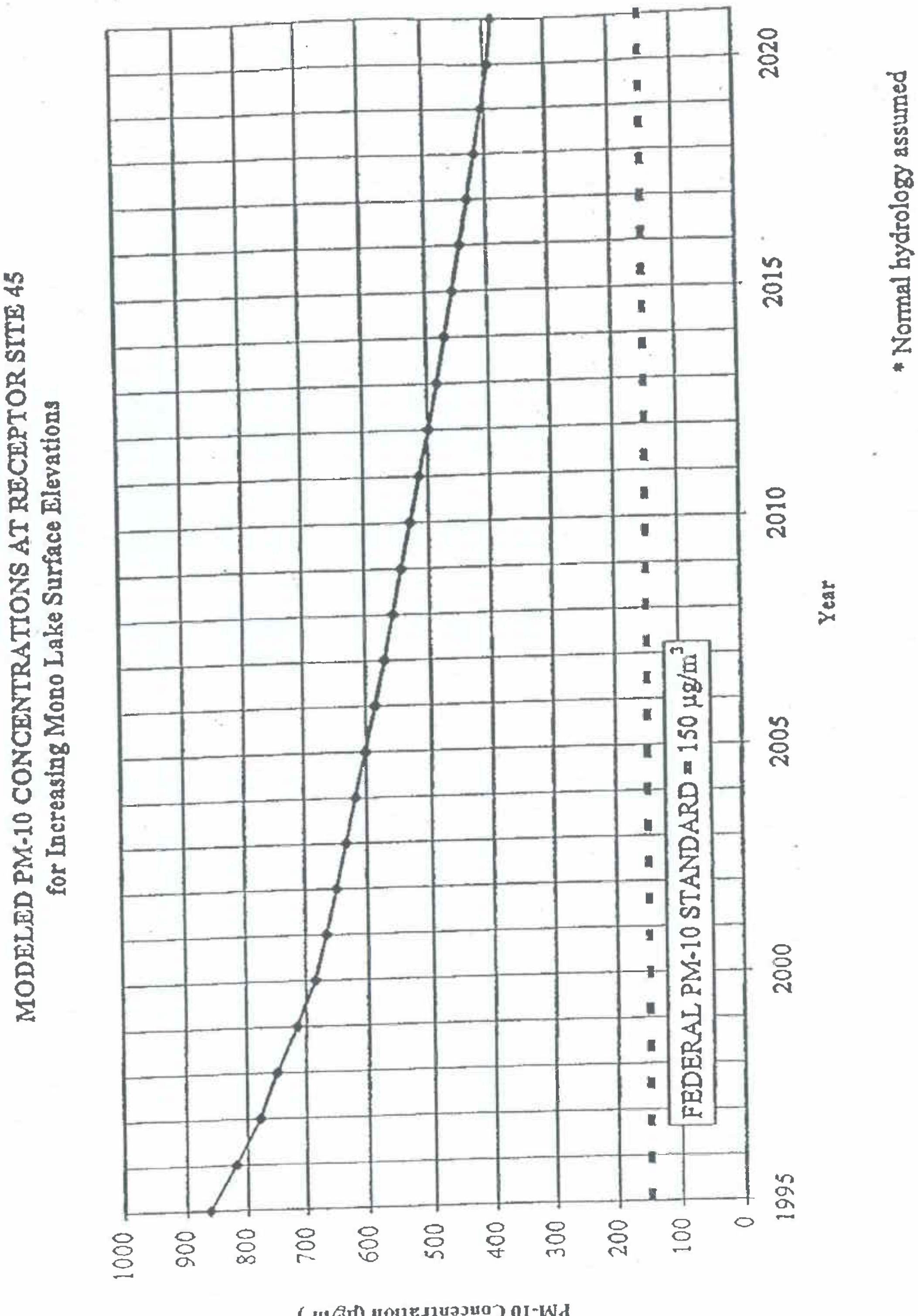

MODELED PM-10 CONCENTRATIONS AT RECEPTOR SITE 45
for Increasing Mono Lake Surface Elevations
PM-10 Concentration (µg/m³)
1000
900
800
700
600
500
400
300
200
100
0
Year
1995
2000
2005
2010
2015
2020
FEDERAL PM-10 STANDARD = 150 µg/m³
* Normal hydrology assumed

Figure 7-3

Adjusted Impact. The dispersion modeling study assumed that the source areas are spatially homogeneous and vary temporally solely as a function of wind speed. In fact, the higher lake shore areas closer to the prediversion water line have different surface characteristics--and less susceptibility to erosion--than lower areas of the relicted lake bed. Soil observations and sand transport measurements at 10 Mile Road on the North Shore of Mono Lake indicate that the exposed lake shore above 6,390' is a net deposition area, while the zone below that elevation is a net deflation area. (The substrate above 6,390' is comprised of coarser material, not readily suspended at the 16 mph threshold.) This means that as the water elevation increases over time, submerging source areas below the 6,390' contour, the supply of suspended or entrained particulate matter being deposited above the 6,390' contour will decrease.

Additionally, there is evidence of expansion of natural vegetation cover above the 6,390' elevation, especially in the Warm Springs and Simon Springs areas. Vegetation is an effective surface stabilizer, inhibiting wind erosion by catching and retaining particles and increasing resistance to organized flow.

The change in modeled air quality impact due to decreasing deposition from lower-to-higher exposed lake shore areas can be calculated. Modeled PM-10 emissions decrease proportionally with the decrease in size of net deflation source areas. Table 7 in Appendix 5 shows the area size of all lower source elevations (e.g., the exposed source area above each respective water elevation).

The following equation is used to derive the adjusted PM-10 concentration at receptor site 45 as the water elevation increases and submerges areas below 6,391'. It assumes a reduction of 63.4% to attain the Standard:

Adjusted PM-10 (source level) = Modeled PM-10 (source level) - (237 μg/m³) x [Area (6,375') - Area (lake level)] / (2.092 x 10⁷ m²)

$$\text{Adjusted PM-10 (source level)} = \text{Modeled PM-10 (source level)} - (237\ \mu g/m^3) \times [\text{Area}(6{,}375') - \text{Area (lake level)}] / (2.092 \times 10^7\ m^2)$$

where: 237 = the difference between modeled (387) and attainment (150) PM-10 concentrations; and 2.092×10^7 = the difference in area size between 6,375'and 6,391' source elevations.

At a lake level of 6,391' (lower source level = 6,392'), the air quality at the highest impact site, receptor 45, is 387 $\mu g/m^3$ (interpolated from Table 10, *Final Air Quality Modeling Study*, page 31) and the area size is 3.28×10^6 m^2 (interpolated from Table 7, *Final Air Quality Modeling Study*, page 22). To meet the federal Standard, the impact at receptor 45 must be reduced from 387 to 150 $\mu g/m^3$. Considering the background concentration of 13.1 $\mu g/m^3$ which is used in the model, the source area above 6,392' must decrease its emissions by 63.4%. This would mean that the PM-10 emission rate for the source areas above 6,392' must be about a third or less of the worst-case emission rate that was used for all areas in the model. As previously discussed, because of the decrease in deposition of erodible material and natural revegetation in the area above 6,392', it is reasonable to believe that the emission rate will be significantly less than what was used in the model and it will be less than a third of the worst-case emission rate.

The 63.4% emission reduction that is needed to attain the federal Standard at 150 $\mu g/m^3$ is determined by the following equation:

Emission
Reduction = *1 - (Standard - Background) / [Modeled Impact (at 6,392') - Background]*
= *1 - [(150* $\mu g/m^3$ *- 13.1* $\mu g/m^3$*) / (387* $\mu g/m^3$ *- 13.1* $\mu g/m^3$*)]*
= *0.634 or 63.4%*

This level of reduction or better will be achieved through depletion of deposition material and natural revegetation on the upper playa.

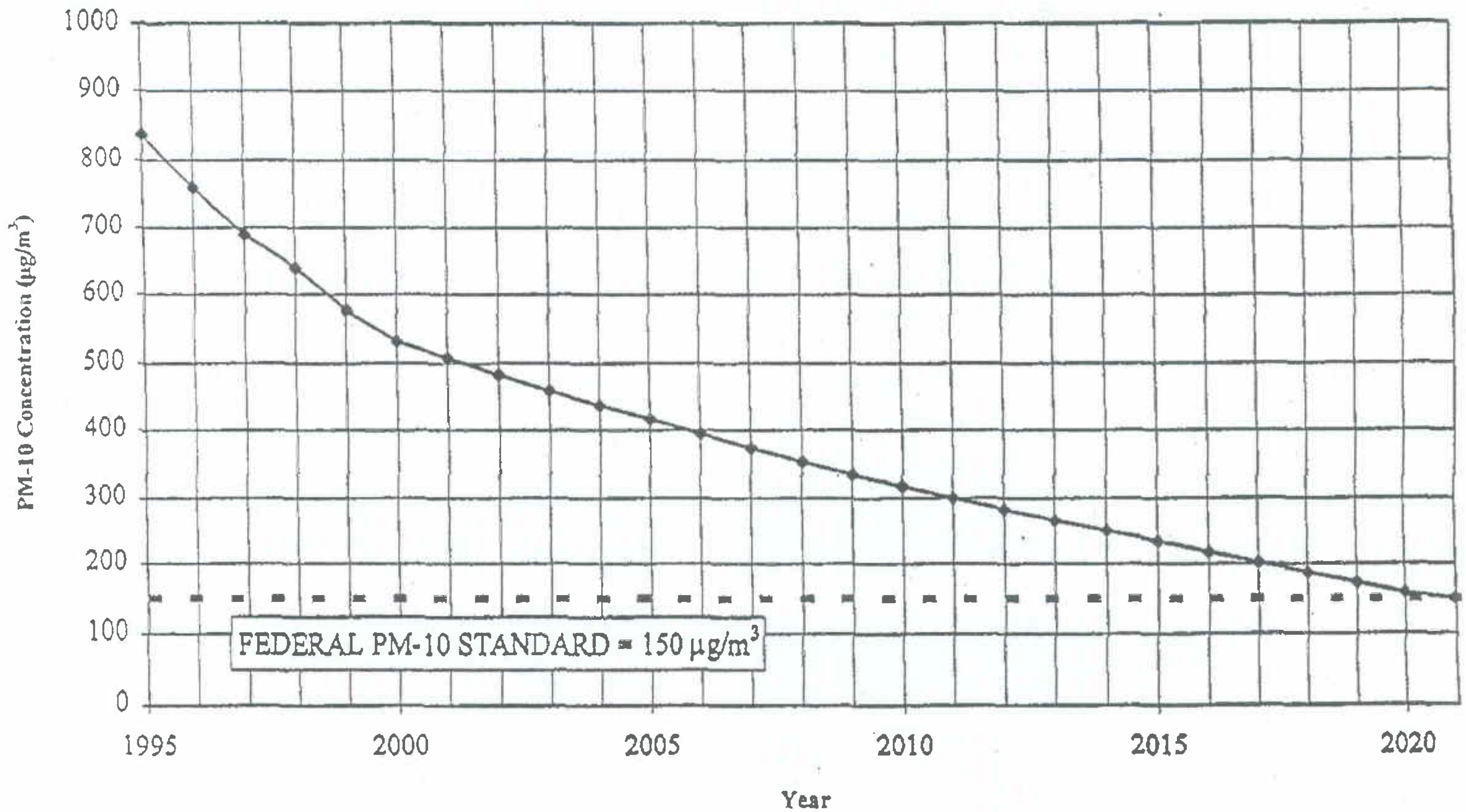
Table 7-2

ADJUSTED PEAK 24-HOUR PM-10 CONCENTRATIONS
($\mu g/m^3$)

Water Elevation	Source Area Size (m^2)	Modeled PM-10 at Receptor 45	Adjusted PM-10 at Receptor 45
6,374'	2.42 (10^7)	895 $\mu g/m^3$	895 $\mu g/m^3$
6,376'	1.98 (10^7)	831 $\mu g/m^3$	781 $\mu g/m^3$
6,380'	1.12 (10^7)	700 $\mu g/m^3$	553 $\mu g/m^3$
6,386'	5.80 (10^6)	540 $\mu g/m^3$	332 $\mu g/m^3$
6,391'	3.28 (10^6)	387 $\mu g/m^3$	150 $\mu g/m^3$

Figure 7-4 shows the changes in adjusted PM-10 concentrations at receptor site 45 as a function of increasing water elevation.

ADJUSTED PM-10 CONCENTRATIONS AT RECEPTOR SITE 45
for Increasing Mono Lake Surface Elevations



* Normal hydrology assumed

Figure 7-4

7.4 Demonstration of Attainment

Table 7-2 and Figure 7-3 show estimates of adjusted PM-10 concentrations at receptor site 45. The combined effects of

(1) increasing the water elevation of Mono Lake to 6,391 feet, and

(2) eliminating deposition of particulate matter in the area between the 6,391' to 6,400' elevation,

accomplishes attainment of the PM-10 Standard of 150 µg/m³. As depicted in Figure 7-1, the water elevation will have risen to approximately 6,391 feet by the year 2014. The rate of increase will depend in large part on future hydrology. However, once the prescribed elevation is restored, the present analysis indicates that the Mono Basin Planning Area will attain the PM-10 Standard and maintain compliance into the future.

The air quality monitoring program currently operating in the Mono Basin will continue PM-10 data collection in order to measure change in emissions as the water elevation increases. This observed data will be compared to predicted results.

If a contingency measure is required to ensure the targeted water elevation--and, thereby, compliance with the CAA--the SWRCB has the enforcement authority to further limit diversion of water by the Licensee. Decision 1631 includes a provision to consider appropriate revisions to the water right licenses, in the event that the water level of Mono Lake has not reached an elevation of 6,391 feet by September 28, 2014.

7.5 Clean Air Act Compliance

This submittal has been prepared to satisfy all SIP requirements of the federal Clean Air Act Amendments of 1990 in a single, consolidated document.

The Introduction described the normal sequence and longest possible time line for compliance actions, as follows:

Moderate PM-10 (RACM) SIP	June 29, 1995
Best Available Control Measures (BACM) SIP	June 29, 1998
Demonstration of Attainment (DOA) SIP	December 29, 2000
Serious Attainment Date	December 31, 2003
Extension of Attainment Date Initial Five Year	December 31, 2008

Presented below are significant accomplishments-to-date which fulfill required elements of RACM, BACM, and DOA SIP submittals for the Mono Basin as a designated nonattainment area:

- Decision 1631 found that the only feasible control measure to reduce PM-10 emissions in the planning area is to increase the water elevation of Mono Lake.The decision, by operation of law upon adoption, represents an enforceable assurance that the control measure will be implemented.

- Modeling predictions demonstrate that full implementation of the control measure will bring the area into attainment with the NAAQS. If the Standard is not attained by December 31, 2008, a 5% reduction of emissions per year is required. This is 12 years before the demonstrated attainment date when the lake level is expected to reach 6,391 feet. Assuming the ambient impact is proportional to the emissions, there must a 15.9 $\mu g/m^3$ average reduction per year to achieve the 5% reduction requirement. The average reduction for the control measure is estimated at 16.5 $\mu g/m^3$ per year. This means that the Mono Basin is expected to experience a 5.2% reduction per year after December 31, 2008 until it reaches attainment in 2021.

- Predictions of PM-10 concentrations at different source elevations provide quantitative milestones to measure emissions reduction as a function of water elevation--a method to demonstrate "reasonable further progress" (RFP). The District commits to submit RFP reports every three years to track progress toward attainment.

- Serious nonattainment areas are required to apply Best Available Control Technology (BACT) to control emissions from "major sources"--those emitting 70 tons or more of PM-10 per year. Existing District Rule 209-A (Appendix 7) meets this requirement.

In conclusion, this document substantially satisfies the compliance requirements of the Clean Air Act Amendments of 1990. It is not possible to comply with the serious attainment date of December 31, 2003, and additional time will be required. An Extension of Attainment Date--to set said date to be coterminous with the schedule prescribed by the SWRCB decision--is considered reasonable and is herewith requested.

REGULATORY TIME LINE OF CLEAN AIR ACT COMPLIANCE ACTIONS FOR THE MONO BASIN PLANNING AREA

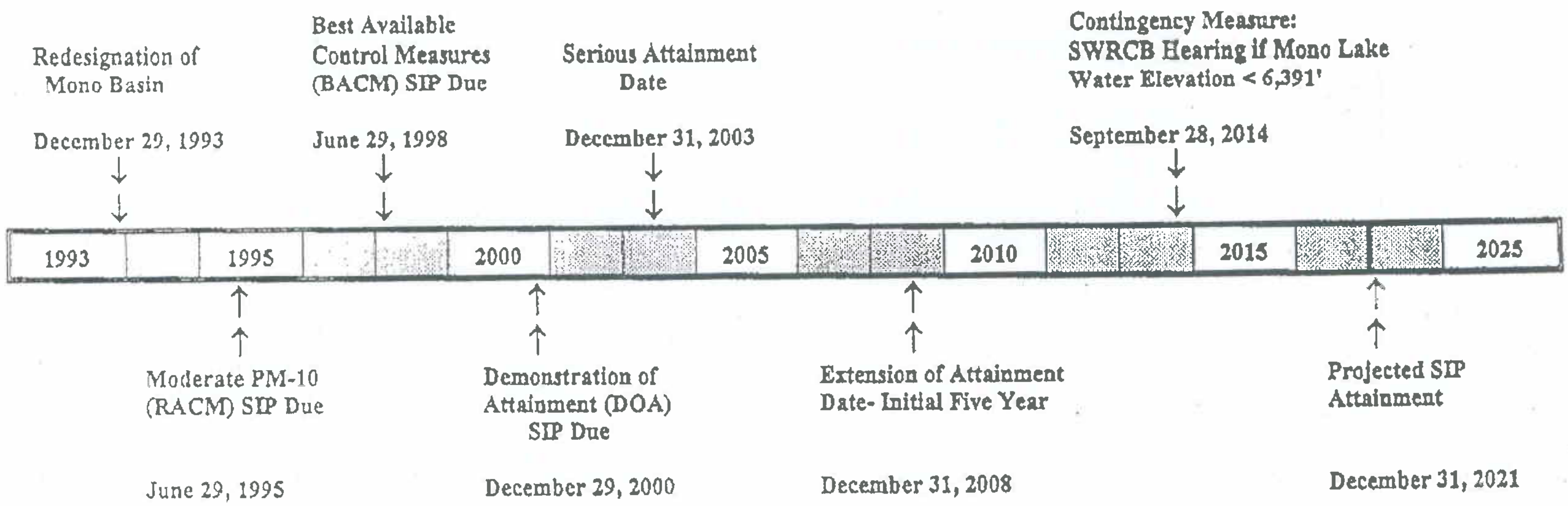


Figure 7-5 Regulatory Time Line

EXHIBIT C-7

Table 3.3 – Annual Ranking of Owens Lake PM_{10} in U.S.

YEAR	Owens Lake Highest in U.S.?	Highest Owens Lake Value	Highest Mono Lake Value	Highest non-GBUAPCD Value
1995	Yes	3,929	-	384
1996	Yes	2,383	-	1,715
1997	Yes	2,229	-	1,264
1998	No	1,464	-	1,477
1999	Yes	2,901	-	442
2000	Yes	10,842	10,466	508
2001	Yes	20,754	4,482	610
2002	Yes	7,915	6,505	590
2003	Yes	16,619	5,745	590
2004	Yes	5,225	987	625
2005	Yes	3,989	2,108	760
2006	Yes	8,299	4,300	1,079

EXHIBIT C-8

SETTLEMENT AGREEMENT

This Settlement Agreement (Agreement) is entered into between the Great Basin Unified Air Pollution Control District (District) and the City of Los Angeles by and through its Department of Water and Power (collectively "City") (the City and District to be referred to as the "Parties") to resolve the City's challenge to the District's Supplemental Control Requirement (SCR) determination for the Owens Lake bed issued on December 21, 2005, and modified on April 4, 2006.

RECITALS

WHEREAS:

A. Owens Lake is located in Inyo County in eastern California, south of the town of Lone Pine and north of the town of Olancha.

B. Large portions of the Owens Lake bed are comprised primarily of dry saline soils and crusts.

C. The lake bed soils and crusts are a source of wind-borne dust during significant wind events, and contribute to elevated concentrations of particulate matter less than 10 microns in diameter (PM_{10}).

D. PM_{10} is a criteria pollutant regulated by the federal Clean Air Act, 42 U.S.C. Section 7401 *et seq.*, as amended (CAA).

E. Under the National Ambient Air Quality Standard (NAAQS) adopted pursuant to the CAA, PM_{10} levels may not exceed an average concentration of 150 micrograms per cubic meter ($\mu g/m^3$) during a 24-hour period more than one time per calendar year averaged over three years.

F. The District has regulatory authority over air quality issues in the region where Owens Lake is situated.

G. Under Health and Safety Code Section 42316, enacted by the California Legislature in 1983, the District has authority to require the City to undertake reasonable measures at Owens Lake in order to address the impacts of its activities that cause or contribute to violations of federal and state air quality standards, including but not limited to the NAAQS for PM_{10}.

H. In 1987, the United States Environmental Protection Agency (EPA) identified the Owens Valley Planning Area (OVPA), which encompasses

Owens Lake, as an area not meeting the NAAQS for PM_{10}. In 1993, the OVPA was reclassified as a serious non-attainment area under the CAA.

I. In 1997, the District adopted the Owens Valley PM_{10} Demonstration of Attainment State Implementation Plan as required by the CAA (1997 SIP). In 1998, the District and the City agreed that the City would construct control measures on 16.5 square miles of the Owens Lake bed by the end of 2003 as part of a SIP revision in 1998.

J. In 2003, through District Board Order 03111-01 (Order), the District required the City to construct dust control measures (DCMs) on an additional 13.3 square miles of the Owens Lake bed by the end of 2006, for a total of 29.8 square miles of dust control measures, as part of a Revised SIP (2003 SIP). The Order and 2003 SIP also established a process whereby the Air Pollution Control Officer of the District (APCO) must evaluate on at least an annual basis the potential need for additional DCMs and "watch areas" at Owens Lake bed in order to attain the NAAQS. The process involves a determination by the APCO and an opportunity for the City to present an alternative analysis.

K. On December 21, 2005, the APCO issued the 2004/2005 SCR determination finding that the City would be required to implement DCMs on an additional 9.31 square miles of Owens Lake bed and identifying 0.66 square miles as "watch area."

L. On January 20, 2006, the City appealed the 2004/2005 SCR determination to the California Air Resources Board (CARB). The District disagreed that the determination was subject to such an appeal.

M. On February 22, 2006, the City submitted an Alternative Analysis contesting aspects of the 2004/2005 SCR determination.

N. On April 4, 2006, the APCO modified the SCR determination issued on December 21, 2005 to reduce the supplemental DCM area to 8.66 square miles and increased the "watch area" to 0.79 square miles (Modified SCR determination).

O. On May 3, 2006, the City filed an appeal of the April 4, 2006 Modified SCR determination with the CARB. The District disagreed that the determination was subject to such an appeal.

P. On May 4, 2006, the City filed a petition for writ of mandate challenging the APCO's April 4, 2006 Modified SCR determination (*City of Los Angeles Department of Water and Power v. Great Basin Unified Air Pollution Control District*, Kern County Superior Court Case No. S-1500-

CV-258678, RJO). The Parties entered into mediation and a temporary stay of the litigation.

AGREEMENT

NOW, THEREFORE, in consideration of the provisions herein contained and to resolve the disputes over methods to address air quality at Owens Lake, including the disputes over the SCR determination issued on December 21, 2005, and modified on April 4, 2006, the City and the District hereby agree as follows:

DUST CONTROL MEASURES (DCMs)

1. The City shall apply DCMs as provided in this Agreement on additional areas of the lake bed beyond the 29.8 square miles required in the 2003 SIP.

   A. The areas on the lake bed on which DCMs will be applied are designated in this Agreement as follows:

      (i) The 12.7 square-mile area of additional DCMs shall be known as the 2006 Supplemental Dust Control Area (SDCA).

      (ii) The 29.8 square miles of DCMs required by the 2003 SIP shall be known as the 2003 Dust Control Area (DCA).

      (iii) The 0.5 square miles of natural drainage channels on the south area of the lake bed shall be known as the Channel Area.

      (iv) The combined 43.0 square miles of DCMs and Channel Area shall be known as the Total Dust Control Area (TDCA).

      (v) The SDCA, DCA, Channel Area and TDCA are delineated on the TDCA Map, attached as Exhibit 1. The SDCA and Channel Area coordinate descriptions are attached as Exhibit 2. The DCA coordinate description is contained in the 2003 SIP.

   B. Minor adjustments may be made to the boundaries of the SDCA upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld. In the event of such modification, the boundaries of the TDCA shall also be modified to reflect the modified SDCA boundaries.

   C. The City may, at its sole option, apply DCMs to additional areas outside the TDCA.

   D. The City shall begin full operation of the DCMs within the SDCA as follows:

(i) Moat and row controls shall be operational by October 1, 2009.

(ii) All other controls shall be operational by April 1, 2010.

E. Following the dates set out above in this Section, the City shall continuously operate and maintain the DCMs within the TDCA. The City shall continuously operate and maintain DCMs within the DCA as required under the 2003 SIP, except as otherwise provided in this Agreement.

2. A. The City shall construct within the SDCA a minimum of 9.2 square miles of Shallow Flood dust controls. The Shallow Flood areas are delineated on the Dust Control Measure Map, attached as Exhibit 3.

B. On the remaining 3.5 square miles of the SDCA not specifically designated for Shallow Flood on the DCM Map (Exhibit 3), the City shall

(i) construct Shallow Flood, Managed Vegetation, or gravel cover, as described in the Dust Control Measures Description, attached as Exhibit 4, and which are currently approved as Best Available Control Measures (BACM) under the 2003 SIP; or

(ii) subject to Sections 3, 7 and 8, treat up to 3.5 square miles of the SDCA with the alternative dust control measure known as "Moat and Row," as described in the DCM Description (Exhibit 4).

C. TDCA areas designated as Channel Area represent areas containing natural drainage channels having potentially significant resource issues and regulatory constraints. While these areas are not a part of the SDCA, they shall be addressed as part of the control strategy for the SDCA. However, it is acknowledged that the control strategy in this area may be subject to additional regulatory constraints, design considerations, and impacts caused by adjacent DCMs.

D. The internal control measure boundaries delineated on the DCM Map (Exhibit 3) are approximate and are subject to final written approval by the APCO. The areas designated on the DCM Map (Exhibit 3) for Shallow Flood and Moat and Row may be modified upon written request by the City to the District and written approval by the APCO, which approval shall not be unreasonably withheld.

3. All DCMs within the SDCA shall be designed, constructed, operated and maintained by the City to achieve the initial target minimum dust control efficiencies (MDCEs) shown on the MDCE Map, attached as Exhibit 5. The initial target MDCEs (Target MDCEs):

A. Are based on the results of air quality modeling, as described in the 2003 SIP, conducted by the City and approved by the APCO for the period July 2002 through June 2006;

B. Assume 100 percent control efficiency in the 29.8 square miles of the DCA required under the 2003 SIP, except during the fall and spring ramping periods as described in Section 26, and achievement of the target MDCEs for the areas in the SDCA. Control efficiencies during the fall and spring ramping periods shall be based on modeling that accounts for reduced wetness cover pursuant to Sections 5 and 26;

C. Have been selected to achieve PM_{10} concentrations that will not exceed the federal 24-hour PM_{10} ambient air quality standard of 150 µg/m^3 (federal standard) at all historic shoreline (elevation 3600 feet above sea level) receptors.

4. Prior to April 1, 2010, the Target MDCEs may be modified, upon request of the City and written approval of the APCO, which approval shall not be unreasonably withheld, if the modified MDCEs meet the criteria set forth in the MDCE Selection Process Spreadsheet, attached as Exhibit 6, pursuant to Section 3.

5. For the Shallow Flood areas identified in DCM Map (Exhibit 3), the percentage of each area that must be wetted shall be based on the Shallow Flood Control Efficiency Curve (SFCE Curve) attached as Exhibit 7, or an update of the SFCE Curve mutually agreeable to the Parties, to achieve the control efficiency levels in the MDCE Map (Exhibit 5).

6. The Parties believe that the City's existing Managed Vegetation site may currently achieve a control efficiency of 99 percent. Therefore, the City shall continue to maintain and the District shall continue to monitor the site to ensure that it achieves 99 percent control efficiency. No later than July 1, 2007, the City shall submit to the District an operation and management plan for the City to maintain cover conditions that achieve 99 percent control efficiency in the Managed Vegetation areas. The plan shall be subject to written approval by the APCO, which approval shall not be unreasonably withheld. Prior to the time that the Managed Vegetation area is in compliance with an approved SIP, the District will not issue a Notice of Violation (NOV) for the existing Managed Vegetation area as long as:

A. From January 1, 2007, to the earlier of July 1, 2007 or the date when the City's operation and management plan is approved by the APCO, the City maintains its current operation and management practices for its Managed Vegetation areas; and

B. After the APCO's written approval of the operation and management plan, the City implements all provisions of its operation and management plan; and

C. The City's Managed Vegetation area site does not cause an exceedance of the federal standard at the historic shoreline.

7. As Moat and Row is not a currently approved BACM dust control measure under the 2003 SIP, the City will develop, in consultation with the District, and conduct Moat and Row Demonstration Projects on the lake bed. These Demonstration Projects will be conducted on two or more locations on the lake bed outside of the DCA. The proposed location of these Demonstration Project areas are shown on attached Moat and Row Demonstration Project Map (Exhibit 8). The actual locations of the projects may be changed by the City, and in such event, the City shall notify the APCO in writing of the changed locations. The City will be the California Environmental Quality Act (CEQA) lead agency for implementation of the Moat and Row Demonstration Projects.

8. Based on results of the Moat and Row Demonstration Projects described in Section 7 and subject to Sections 2 and 3, the City in its sole discretion may decide which DCMs to implement in the areas designated for Moat and Row in Section 2 and Exhibit 3 of this Agreement. The City shall consult with the District before making its decision and inform the District of its decision in writing.

A. Depending on the results of the Moat and Row Demonstration Projects, the measures implemented in these areas by the City may include Moat and Row, enhanced Moat and Row (*e.g.*, closer Moat and Row spacing, Moat and Row with some Shallow Flooding, Moat and Row with some vegetation), combined Moat and Row/Shallow Flood, MDCE-BACM, or BACM.

B. If the City implements Moat and Row, it shall design and construct Moat and Row to achieve the Target MDCEs described in Section 3. The Moat and Row configuration required to achieve these Target MDCEs will be decided solely by the City, after consultation with and written notification to the District.

C. In the event of a dispute regarding the City's proposed decision or action pursuant to Section 8.A or 8.B, either Party may initiate the Dispute Resolution Process pursuant to Section 32.

D. Upon written request of the City, the APCO shall determine in writing if Moat and Row and/or Enhanced Moat and Row constitutes BACM or MDCE-BACM, in accordance with the revisions to the 2003 SIP provided in Section 28.

DUST IDENTIFICATION (DUST ID) PROGRAM

9. The Parties mutually recognize that a method for identifying sources of potential exceedances of the federal standard at the historic shoreline could be developed that is superior to and could replace or modify the current Dust ID Program.

A. The Parties will work cooperatively, with the participation of a mutually agreeable independent third party technical expert or experts under contract to the District and jointly managed by the Parties, in a good faith effort to develop, before April 1, 2010, an improved Dust ID Program. The APCO will implement all mutually-agreeable changes to the Dust ID Program and notify the City in writing of those changes.

B. The District will continue to work with the City after April 1, 2010 to further improve the Dust ID Program and will implement all additional mutually agreeable changes in a written decision.

C. In furtherance of efforts to improve the Dust ID Program:

(i) The Parties will promptly begin a mediated process for refining the Dust ID Program and resolving disputes.

(ii) The Parties will select a mutually agreeable expert or panel of independent third-party technical experts.

(iii) The District, after consultation with the City, will increase the number of PM_{10} monitors at or near the historic shoreline. In all cases, the District will notify the City of the location of the monitors within 30 days of placement of the monitors. If a PM_{10} monitor is located above the historic shoreline, the District will make reasonable attempts to account for non-lake bed sources that may affect the monitor.

(iv) The District, after consultation with the City, will modify the existing sand flux monitor network to concentrate on areas of special interest, and will, in all cases, notify the City of the modifications within 30 days of any modification.

(v) The Parties will establish mutually agreeable model performance measures. Such measures may, but are not required to, include a minimum model performance standard.

(vi) The District will make reasonable efforts to account for impacts of DCM construction activities.

10. The City will lead a joint effort with the District to develop methods for directly measuring PM_{10} emission rates from the lake bed. The District will incorporate mutually agreeable methods into the Dust ID Program.

11. A. If the City is in compliance with Sections 1 and 2 of this Agreement, the following shall apply to the time period before April 1, 2010.

(i) The APCO will not issue any further determinations regarding the need for SCRs that provide for additional requirements beyond those in this Agreement. However, the District will continue to use the Dust ID Program, as that program may be modified pursuant to Sections 9 and 10. The District will periodically advise the City of results in writing and may recommend actions to the City based on the model results.

(ii) Data collected before April 1, 2010 will not be used in future determinations requiring SCRs, except in those areas delineated as Study Areas on the Study Area Map attached as Exhibit 9 and described in Exhibit 2. Data collected from the Study Areas between July 1, 2006 and April 1, 2010 may only be used in SCR determinations after April 1, 2010, and may be used only in accordance with the current form of the Dust ID Program that is in effect after April 1, 2010.

(iii) The District will not issue an order requiring the City to implement any additional controls on any lake bed dust source areas in order to achieve the state PM_{10} standard of 50 micrograms per cubic meter unless compelled to issue such an order by state law.

B. The District shall determine compliance with the state PM_{10} standard based on concentrations only in the surrounding communities, unless otherwise compelled by state law.

12. The City, in consultation with the District, shall annually develop and provide to the District a Performance Monitoring Plan (PMP) to aid in its operation of the Owens Lake dust mitigation program on the Owens Lake bed.

A. The PMP will describe the measurements and methods used to verify the performance of the constructed DCMs and Moat and Row test areas. The PMP will also describe the measurements and methods used to maximize information on dust emissions from areas of special interest.

B. The City shall implement the PMP, and will use the results as a guide for making operational decisions about the type, location, timing, and level of dust control measures needed to prevent exceedances of the federal standard at the shoreline.

C. The District may use information from the PMP to assist in determining the likely sources of dust emissions causing or contributing to exceedances (if any) of the federal standard at the shoreline.

SHALLOW FLOOD BACM REFINEMENT

13. The City shall have the option to conduct field testing to refine the wetness cover requirement to achieve 99 percent control efficiency in Shallow Flood areas within the DCA (Shallow Flood Cover Test).

A. The Shallow Flood Cover Test shall occur on one or more areas totaling not more than 1.5-square-miles, to be selected by the City and approved by the APCO, which approval shall not be unreasonably withheld, from within the TDCA areas requiring 99 percent control.

B. The Shallow Flood Cover Test design shall be prepared by the City and approved by the APCO, which approval shall not be unreasonably withheld, prior to implementation. Based on that design, the APCO will reasonably determine wetness cover requirements for the Shallow Flood Cover Test.

C. The City will be CEQA lead agency for the Shallow Flood Cover Test.

14. If the APCO reasonably determines in writing that DCMs in the TDCA have been operational for one full year (defined as 365 consecutive days) with no exceedance of the federal standard at monitors located at or above the historic shoreline caused solely by sources within the TDCA, the City shall be permitted to reduce the wetness cover by an average of 10 percent over Shallow Flood areas requiring 99 percent control efficiency, excluding areas identified in Section 14.C, provided that:

A. Application of the 10 percent reduction in wetness cover during the Fall and Spring Shallow Flood DCM Compliance periods set out in Sections 25 and 26 shall result in the lower of:

(i) The areal cover resulting from a 10 percent reduction; or

(ii) The areal cover required in Section 26.A.

B. To implement the reductions set out in this Section, the City shall be required to first submit a written Wetness Cover Plan to the District for reducing the wetness cover on the eligible areas. The Wetness Cover Plan shall take into account:

(i) the results of testing carried out pursuant to Section 13, if conducted; and

(ii) the results of fall and spring Shallow Flood wetness cover reduction operations carried out pursuant to Section 26.

C. If, in any year, the Wetness Cover Plan proposes reductions in wetness cover greater than 10 percent in any portion of the Shallow Flood areas covered by the Plan (consistent with the 10 percent limit on the overall average reduction), the City shall obtain the additional written approval of the APCO, which approval shall not be unreasonably withheld.

D. In the event shoreline monitors show an exceedance of the federal standard, whether that exceedance is caused by sources within, outside, or both within and outside of the TDCA, no further reductions in wetness cover shall be permitted for any Shallow Flood area that has contributed to the exceedance, as determined by the methodology in Section 18 and subject to the provisions of Section 16.

E. Except as provided in Section 16, the City may continue to operate using reductions of wetness cover pursuant to a previously approved Wetness Cover Plan.

15. For each Dust Control Season (October 1 of each year through June 30 of the next year) that wetness cover reductions have taken place under the provisions of Section 14, the City shall prepare and submit to the District a written report summarizing the results of the wetness cover reductions within 90 days after conclusion of the corresponding Dust Control Season. The report shall document the percentage of wetness cover for Shallow Flood areas and the effect(s) of wetness cover reductions on PM_{10} concentrations at the historic shoreline.

16. Any areas for which wetness cover has been reduced pursuant to Section 14 and that cause or contribute to an exceedance of the federal standard at the historic shoreline shall be remediated by the City under the Remedial Action Plan requirements pursuant to Sections 18 and 22 below.

A. Subject to APCO written approval, which approval shall not be unreasonably withheld, the City may further reduce the wetness cover beyond that allowed in Section 14 provided that:

(i) The maximum 24-hour PM_{10} shoreline monitor values for at least 365 consecutive days of operation following initiation of the last approved Wetness Cover Plan does not exceed 130 $\mu g/m^3$; and

(ii) The City demonstrates to the reasonable satisfaction of the APCO that the modeled contributions from the lake bed for the same time period set forth in Section 16.A.(i) plus the background of 20 $\mu g/m^3$ do not exceed 120 $\mu g/m^3$ at the historic shoreline.

B. If the monitored values at the historic shoreline exceed 130 $\mu g/m^3$, and it is determined that non-lake bed sources are contributing greater than 20 $\mu g/m^3$, then the District will expeditiously seek to identify and require control of those non-lake bed sources so that the City may continue to implement efficient DCMs on the lake bed.

C. If the City is entitled to further reduce wetness cover pursuant to this Section, the City shall prepare and submit an updated Wetness Cover Plan to the District to describe the wetness cover proposed for the subsequent, applicable Dust Control Season. The updated Wetness Cover Plan shall include:

(i) A map that depicts the eligible Shallow Flood areas;

(ii) The proposed amount of wetness cover for each eligible Shallow Flood area; and

(iii) The method for determining effectiveness of the proposed wetness cover.

D. The Wetness Cover Plan shall be subject to approval of the APCO, which approval shall not be unreasonably withheld.

<u>ACTIONS TO ADDRESS STANDARD VIOLATIONS</u>

17. After May 1, 2010, the APCO will recommence written SCR determinations under the revisions to the 2003 SIP as provided in Section 28. Recommenced determinations will use Dust ID data collected only after April 1, 2010, except as provided in Section 11.A.(ii) for Study Areas, and shall be made at least once in every calendar year.

18. If, pursuant to Section 17, the APCO determines that a monitored or modeled exceedance of the federal standard caused by emissions from the lake bed has occurred at or above the historic shoreline:

A. The APCO, based on all available information, including visual observation, monitoring and modeling, and in consultation with the City, will identify the need for additional controls, monitoring, or both.

B. (i) If the APCO identifies the need for additional controls, the APCO shall issue a SCR determination.

(ii) If the City does not agree with the APCO's determination, the City may, within 60 days of the APCO's determination, submit to the District an Alternative Analysis. If the City submits an Alternative Analysis, the APCO shall consider the Analysis and may withdraw, modify or confirm the SCR determination.

(iii) If the APCO issues a modified SCR determination or confirms the initial SCR determination and the City does not agree with the APCO's action, the City may initiate the Dispute Resolution Process pursuant to Section 32. The APCO may modify the SCR determination based on the Dispute Resolution process.

(iv) In the event the Parties are unable to resolve disagreements over future SCR determinations through the Dispute Resolution Process, the City may appeal future determinations to CARB under the provisions of Health and Safety Code Section 42316 (Section 42316), provided that the Parties expressly intend that this Agreement be the final resolution regarding the existing disputes between the Parties that are the subject of this Agreement. Based on the foregoing, the City stipulates and agrees that all of the provisions and determinations, including the measures and procedures, contained in the 2003 SIP, the provisions of this Agreement to be included in modifications to the 2003 SIP pursuant to this Agreement, and the SCR determination dated April 4, 2006, which the City in good faith disputed, shall be deemed to be valid and reasonable, and that the City will not challenge those provisions or determinations by appeal under Section 42316 or in any other proceeding, including any other administrative or judicial forum. Subject to this Paragraph, the City may challenge any future SCR determination under Section 42316; however any arguments or challenges must be based on data and information that do not currently exist, but that exist after the execution of this Agreement.

C. The City shall prepare and submit for the APCO's consideration and written approval, which approval shall not be unreasonably withheld, a Remedial Action Plan as described in Section 21 to address the exceedance(s). The City shall submit the Remedial Action Plan within 60 days of the date the SCR determination becomes final.

D. The District may, as appropriate, also issue a notice of violation.

19. In the event:

A. The APCO has made a written determination pursuant to Section 18 that an exceedance of the federal standard, occurring after April 1, 2010, resulted from a Control Area or portion of a Control Area treated with Moat and Row; and

B. That Control Area or portion of a Control Area causing the exceedance was remediated by the City as provided in Section 21 below; and

C. That Control Area or a portion of that Control Area is subsequently the sole cause of an exceedance of the federal standard at or above the historic shoreline, (*i.e.*, an exceedance occurred after the City attempted to remediate that area under Section 21);

then the City shall convert that Control Area, or that portion of that Control Area, from Moat and Row to MDCE-BACM or BACM, to address the exceedance described in Section 19.C., for all or the portion of that Control Area that caused the subsequent exceedance, under the time deadlines provided for in Section 24.

20. If the APCO determines that Moat and Row constitutes BACM or MDCE-BACM, then upon issuance of such written determination, the provisions of Section 19 that require the City to convert to BACM or MDCE-BACM may be satisfied by applying the BACM or MDCE-BACM approved under this Section 20.

21. A Remedial Action Plan prepared by the City pursuant to Section 18 will contain a description of:

A. Any and all needed changes, repairs or enhancements to DCMs, including one or some combination of the following:

(i) Maintenance of facilities (*e.g.*, berms, moats and rows);

(ii) Changes to Shallow Flood or Managed Vegetation facilities or operations (*e.g.*, increase in wetness cover extent, improved wetness cover distribution, enhancement of vegetation);

(iii) Augmentation (*e.g.*, more moats and rows) or enhancement (*e.g.*, addition of sand fences, surface wetting, armoring, vegetation, surface roughening) of Moat and Row areas;

(iv) Transition of Moat and Row areas to BACM, or MDCE-BACM.

B. Any and all needed expansion of DCMs, and specific plans for expanding the measures.

C. A schedule for the work to be performed to implement the changes, clearly indicating the point at which facilities will be operational and effective at design levels.

22. The Schedule of Contingency Measures attached to this Agreement as Exhibit 10 sets forth a non-exclusive list of items that shall be included by the City in its Remedial Action Plans, described in Section 21, and the timing required for their implementation.

23. Before any full-scale Moat and Row areas are operational, the City shall submit to the District a conceptual design and schedule for possible implementation of BACM or MDCE-BACM to each Moat and Row area consistent with Section 19. These designs and schedules are the potential contingency measures to be implemented by the City where a transition from Moat and Row to another DCM is needed, or where such transition is required pursuant to Section 19.

24. Areas to be transitioned from Moat and Row to BACM or MDCE-BACM will be operational within the times set forth in the Moat and Row Transition Schedule attached as Exhibit 11. DCMs for new areas will be operational within the times set forth in the DCM Operation Schedule attached as Exhibit 12.

FALL AND SPRING SHALLOW FLOOD DCM COMPLIANCE

25. For the time period from October 16 of each year through May 15 of the next year, the Shallow Flood Control Areas shall be considered to be in compliance with this Agreement and applicable laws and regulations, if the areal wetness cover within each Shallow Flood Control Area in the TDCA meets the MDCE required in Exhibit 6 using the SFCE Curve in Exhibit 7.

26. The provisions set forth in this section shall apply to all Shallow Flood areas with target control efficiencies of 99 percent or more, except those which the City and the District may mutually agree to exclude.

A. Beginning on April 1, 2010, compliance of TDCA Control Areas with 99 percent control efficiency Shallow Flood requirements shall be as follows:

(i) Beginning May 16 and through May 31 of every year, Shallow Flood may be reduced to a minimum of 70 percent areal wetness cover.

(ii) Beginning June 1 and through June 15 of every year, Shallow Flood may be reduced to a minimum of 65 percent areal wetness cover.

(iii) Beginning June 16 and through June 30 of every year, Shallow Flood may be reduced to a minimum of 60 percent areal wetness cover.

(iv) If for any Shallow Flood area, the percent of areal wetness cover in the periods specified in Sections 26A.(i), (ii) and (iii) is below the minimum percentages specified in those sections, and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, that area will be deemed to be in compliance with this Agreement and applicable laws and regulations if the City demonstrates in writing and the APCO reasonably determines in writing that maximum mainline flow was maintained in the applicable period.

B. From July 1 through September 30 of each year, the City is not required by the 2003 SIP to apply water for dust control, but is required to maintain minimum areal wetness cover as required by applicable environmental documents and approvals.

C. Beginning on April 1, 2010, if modeled or monitoring data shows an exceedance or exceedances of the federal standard at the historic shoreline as a result of excessive dry areas on Shallow Flood Control Areas during the dust control periods for each year between May 16 through June 30, and October 1 through October 15, the provisions of Sections 17 and 18 shall apply.

27. The provisions of Sections 25 and 26 are subject to the results of air quality modeling, to be conducted by the City and approved by the APCO, that demonstrates attainment of the federal standard at the historic shoreline using the reduced areal wetness covers set forth in Section 26. The modeling shall be conducted as described in the 2003 SIP using data for the period July 2002 through June 2006. The control efficiency of the areal wetness covers shall be modeled using the SFCE Curve as provided in Section 5.

<u>REVISION OF THE STATE IMPLEMENTATION PLAN (SIP)</u>

28. A. The APCO will propose a District Board Order that will revise the 2003 SIP to incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. The APCO will propose the Board Order and SIP revision at a time sufficient to allow the proposed revisions to be considered and adopted by the District Board by July 1, 2008. The time for consideration and adoption shall take into account, without limitation, the time for legally required environmental review and public notice and hearing. The District Board will act on the proposed SIP revisions by July 1, 2008.

B. If the District Board has the legal ability to act and fails to act by November 1, 2008 on a proposed District Board Order as described in Subsection 28.A, the City may terminate this Agreement by providing written notice to the District, provided, however, that the City will not provide such notice prior to the conclusion of the Dispute Resolution Process pursuant to Section 32, which process may be initiated by either Party.

C. The Parties have developed this Agreement with the intention that its provisions will be incorporated into a revision of the 2003 SIP and are consistent with applicable provisions of the Health and Safety Code, including Section 42316, and applicable provisions of federal law regarding attainment of the NAAQS.

D. The APCO shall confer in good faith with the City to develop procedures to modify and authorize MDCE-BACM for incorporation into the revisions to the 2003 SIP.

E. The District will be CEQA lead agency and will prepare, in consultation with the City, and will consider for certification on or before March 1, 2008 an environmental impact report (EIR) on the proposed SIP revisions.

F. (i) In the event:

(a) the District Board adopts a District Board Order revising the 2003 SIP that does not incorporate all the terms and conditions of this Agreement, except such terms and conditions, if any that may not lawfully be included in the SIP; or

(b) the District Board adopts a District Board Order revising the 2003 SIP that incorporates all the terms and conditions of this Agreement except such terms and conditions, if any, that may not lawfully be included in the SIP, and subsequent judicial action causes the revised SIP to be materially inconsistent or materially in conflict with the terms and conditions of this Agreement,

the City may terminate this Agreement in the case of Section 28.F(i)(a), and either Party may terminate this Agreement in the case of Section 28.F(i)(b), within 30 days of such action by providing written notice to the other Party.

(ii) If the City does not elect to terminate this Agreement pursuant to Section 28.F(i) and any inconsistencies or conflicts exist between this Agreement that preclude compliance with both, the provisions of the District Board Order shall prevail.

G. The City will support and will not appeal or in any other way challenge or oppose revisions to the 2003 SIP and resulting District Board Order that incorporate all of the terms and conditions of this Agreement, except such terms and conditions, if any, that may not lawfully be included in the SIP. After issuance of the District Board Order provided for in this Section, the City shall not challenge the order under CEQA to the extent that Order is consistent with this Agreement.

H. In the event the District Board fails to certify the EIR by March 1, 2008 or to act on the proposed SIP revisions by July 1, 2008, the Parties shall meet and confer as provided in Section 33.A.

I. Any provisions of this Agreement that are incorporated into the District Board Order as provided in Section 28.A. shall, upon adoption of that Order by the District Board, cease to have any further force and effect as part of this Agreement, and shall instead be effective as part of the District Board Order.

J. Any provisions of this Agreement that are not incorporated into the District Board Order as provided in Section 28.A shall remain in full force and effect as part of this Agreement until May 1, 2012, at which time those provisions shall cease to be of any further force or effect as part of this Agreement, provided that the Parties may mutually agree in writing to extend this date.

COVER MEASUREMENT TECHNIQUES AND PERFORMANCE SPECIFICATIONS

29. The District and City will collaboratively develop wetness and vegetative cover measurement techniques, control efficiency relationships, and compliance specifications. Final acceptance of those cover measurement techniques and compliance specifications with regulatory impact will be at the sole discretion of the APCO.

KEELER DUNES

30. The Parties acknowledge that dust emissions from the area known as the Keeler Dunes may cause or contribute to exceedances of federal and state standards for PM_{10}. The City hereby agrees to cooperate with the District and other federal, state and local agencies and experts as necessary to develop a plan to reduce dust emissions from the Keeler Dunes.

COOPERATION BETWEEN PARTIES AND DISPUTE RESOLUTION

31. In carrying out the terms of this Agreement, the Parties intend to cooperate fully and to consult with each other effectively and on a regular basis. The Parties will make good faith efforts to provide each other with relevant documents and

technical information in a timely manner, and they will keep each other informed of their respective progress in actions to implement the actions set forth in this Agreement, including, without limitation, progress in entering into consultant and construction contracts and in securing permits from agencies with permitting authority.

32. Notwithstanding the Parties' commitment to cooperate in implementing the terms of this Agreement, they recognize that differences may arise between them. To address this situation, the Parties agree that, in the event either Party believes that a dispute exists regarding implementation or interpretation of any provision of this Agreement, that Party may, by informing the other Party in writing within 21 days of the decision or determination, action or proposed action triggering the dispute, initiate non-binding mediation between the Parties. A party may not seek non-binding mediation for issues that were already the subject of mediation under this Section unless both Parties agree in writing.

A. The mediator shall be a mediator mutually acceptable to the Parties. The Parties may also by mutual agreement include in the mediation, one or more of the technical experts selected pursuant to Section 9.C.(ii), or any other technical experts, such experts to be under contract to the District and jointly managed by the Parties. The City shall be responsible for the cost of the mediator and the technical experts pursuant to Health and Safety Code Section 42316. The mediation will be conducted and completed within 60 days of the notice initiating the Dispute Resolution Process unless that time period is extended by mutual agreement of the Parties. The mediation will be conducted under all applicable California laws regarding mediation, including but not limited to Cal. Evidence Code Sections 1115-1128.

B. Neither Party will commence any litigation concerning the implementation of terms of this Agreement unless that Party has first initiated the mediation described in this Section, and the sooner of the following two events takes place:

(i) Sixty (60) days has expired from the date that Party first sent written notice to commence the mediation; or

(ii) Both Parties agree, or the mediator(s) states, in writing that the mediation has been completed.

(iii) Notwithstanding the provisions of this Section 32.B, a Party may commence litigation at an earlier time if necessary to pursue a claim or cause of action that would otherwise be time barred under an applicable statute of limitations.

C. If the Dispute Resolution Process pursuant to this Section 32 is initiated to address a dispute regarding a SCR determination issued by the APCO pursuant to Section 18.B, then that SCR determination shall not be deemed final until the conclusion of this process under Section 32.B.

D. Nothing in this section is intended to or shall be construed to restrict or eliminate a Party's right to utilize available legal remedies following completion of the mediation process.

EXTENSIONS OF TIME

33. A. In the event that the District

(i) Anticipates that it will fail to certify or fails to certify an environmental impact report on the proposed SIP revisions and related actions by March 1, 2008; or

(ii) Anticipates that it will fail to act on or fails to act on a proposed District Board Order pursuant to Section 28.A by July 1, 2008,

the District shall promptly notify the City, and Parties shall meet and confer to determine what if any revisions to other dates contained in this Agreement may be appropriate. The Parties may mutually agree to the participation of a mediator in the meet and confer process.

B. In the event the City

(i) Anticipates that it will be unable to complete implementation or fails to complete implementation of moat and row controls pursuant to this Agreement by October 1, 2009; or

(ii) Anticipates that it will be unable to complete implementation or fails to complete implementation of all other controls by April 1, 2010,

the City may seek relief for such failure or delay by obtaining a variance from the Hearing Board of the Great Basin Unified Air Pollution Control District pursuant to District Regulation VI and all applicable law for variance relief from a District Order, including but not limited to Health and Safety Code Section 42350 *et seq*. In such event, the District shall, at the request of the City, meet with the City, prior to or after the filing of a request for a variance, in order to ascertain whether the District will support the City's variance request. In the event the District will not support the City's variance request, the City may invoke the Dispute Resolution Process pursuant to Section 32.

C. Nothing in this Section is intended to or shall limit the ability of the City to seek a variance from requirements not included in this Section.

D. Each Party will undertake to inform the other Party as early as practicable of the fact that it anticipates that it will not meet or has failed to meet any of the dates set out in this Section.

34. In the event either Party claims that the other Party is in material breach of the terms of this Agreement, including without limitation, a claim by the District that the City is in material breach under Section 11, the Party claiming the breach shall provide written notice of the claimed breach to the other Party. In the event the Party claimed to be in breach contests such claim, the issue shall be subject to the Dispute Resolution Process in Section 32.

LAWSUIT/APPEAL SETTLEMENT CONDITIONS

35. Within 15 days of execution of this Agreement, the APCO shall issue a revised SCR determination that incorporates the terms of this Agreement and that supersedes all previous determinations.

36. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall immediately commence the process for implementing additional DCMs on the Owens Lake bed consistent with the terms of this Agreement.

37. Upon issuance by the APCO of the revised SCR determination as described in Section 35, the City shall within seven days dismiss with prejudice its CARB appeals and the litigation against the District as described in the Recitals at Paragraphs L, O. and P.

DEFINITIONS

38. Definitions of terms used in this Agreement are contained herein and in Exhibit 13. Where specifically identified in Exhibit 13, these terms as used in this Agreement and Exhibits shall have the meanings provided in this Exhibit 13. Where no definition is provided herein or in Exhibit 13, the words and terms shall have their meaning as provided in the federal Clean Air Act or state air pollution law in the Health and Safety Code, and where no definition is found there, shall have their ordinary meaning as read in the context of this Agreement and consistent with the expressed intent of the Parties.

NOTICES

39. Whenever, under the terms of this Agreement, written notice is required to be given or a report or other document is required to be sent by one Party to another, it shall be sent by overnight mail and directed to the individual at the address

specified below, unless that individual or his or her successor gives notice of a change to the other Party in writing.

As to the City:

Ronald F. Deaton
General Manager
Los Angeles Department of Water and Power
111 North Hope Street, Room 1550
Los Angeles, CA 90012

As to the District:

Theodore D. Schade
Air Pollution Control Officer
Great Basin Unified Air Pollution Control District
157 Short Street
Bishop, California 93514

ADDITIONAL PROVISIONS

40. By this Agreement, the City and the District intend to settle their disputes regarding methods to address air quality issues at Owens Lake, including disagreements over the SCR determination issued on December 21, 2005, and the Modified SCR determination issued on April 4, 2006.

41. This Agreement is the final integrated agreement between the Parties regarding the matters addressed herein, and may not be modified except in a writing signed by both Parties.

42. This Agreement shall be construed in accordance with the laws of the State of California.

43. In the event any provision of this Agreement is judicially determined to be unenforceable, the Parties shall meet and confer and following such meeting, the Parties may amend the Agreement, or continue the Agreement without amendment, or either Party may terminate the Agreement.

44. This Agreement shall not create any rights in any third party.

45. No failure by a Party to insist on strict performance of any term or condition of this Agreement shall constitute a waiver of such term or condition or a breach hereof.

46. Each Party represents that their respective signatories below have the authority to bind them to the terms of this Agreement.

REVIEWED AND AGREED TO:

Dated: November 30, 2006

Ronald F. Deaton
General Manager, Los Angeles Department of Water and Power

The City of Los Angeles
By and Through the
Los Angeles Department of Water and Power

Dated: December 4, 2006

Henry "Skip" Veatch
Board Chairman

Great Basin Unified Air Pollution Control District

APPROVED AS TO FORM AND LEGALITY
ROCKARD J. DELGADILLO, CITY ATTORNEY

NOV 30 2006

BY JULIE A. CONBOY
Deputy City Attorney

List of Exhibits

1. Total Dust Control Area Map
2. 2006 Supplemental Dust Control Area Coordinate Description
3. Dust Control Measure Map
4. Dust Control Measures Description
5. Minimum Dust Control Efficiency Map
6. MDCE Selection Process Spreadsheet
7. Shallow Flood Control Efficiency Curve
8. Moat and Row Demonstration Project Location Map
9. Study Area Map
10. Schedule of Contingency Measures
11. Moat and Row Transition Schedule
12. DCM Operation Schedule
13. Definitions

EXHIBIT 1 -- TOTAL DUST CONTROL AREA MAP

The Total Dust Control Area (TDCA) is comprised of the 2006 Supplemental Dust Control Area (SDCA) and the 2003 Dust Control Area (DCA).

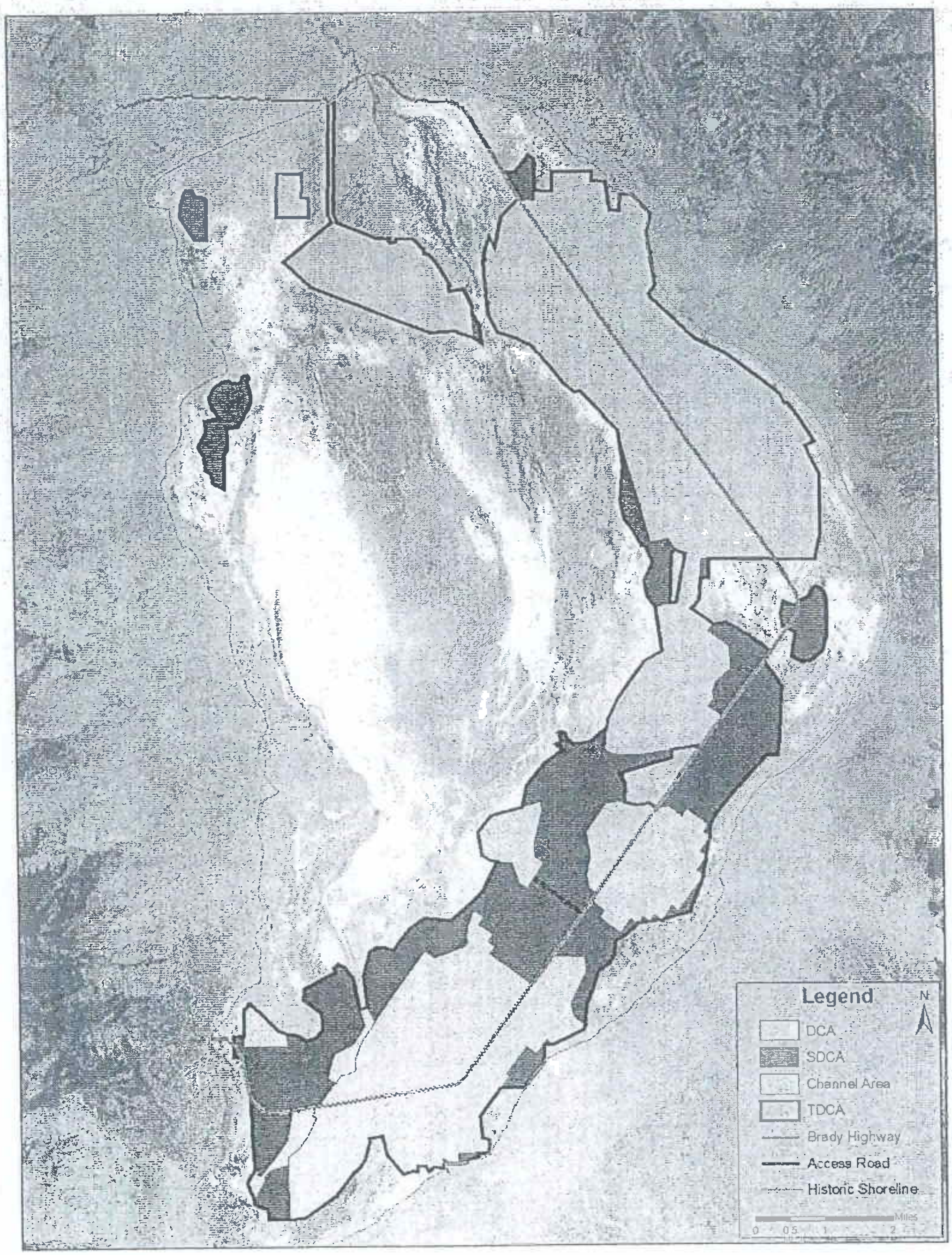


EXHIBIT 2 -- 2006 SUPPLEMENTAL DUST CONTROL AREA COORDINATE DESCRIPTIONS

KEY MAP

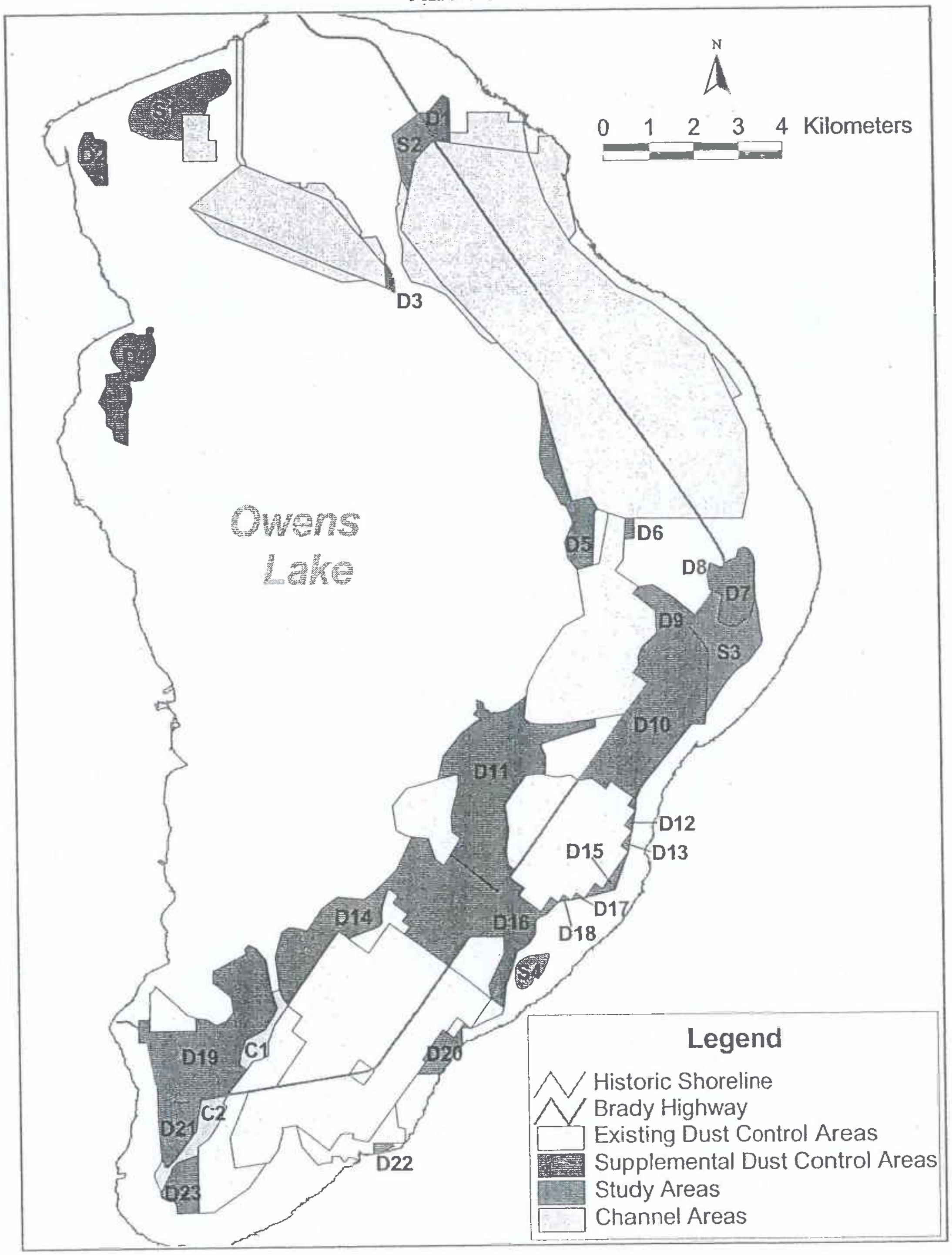


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EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D1	0.16	SDCA	416,001.0310	4,042,347.3789
			415,701.7500	4,042,385.7617
			415,343.2810	4,042,999.8633
			415,539.4060	4,042,999.0234
			415,866.3750	4,043,383.8359
			415,994.4060	4,043,304.2109
			416,002.6250	4,042,981.9922
			416,005.6250	4,042,568.5234
			416,001.0310	4,042,347.3789
D2	0.21	SDCA	408,085.5000	4,041,493.3164
			407,718.8130	4,042,027.7422
			407,731.5000	4,042,299.3945
			407,804.9060	4,042,524.2148
			407,873.2810	4,042,654.1211
			408,032.2500	4,042,647.6875
			408,089.5630	4,042,502.0625
			408,267.6560	4,042,491.4219
			408,347.0630	4,042,440.3203
			408,348.9690	4,041,492.4844
			408,085.5000	4,041,493.3164
D3	0.03	SDCA	414,747.2500	4,039,108.7500
			414,550.5000	4,039,224.6641
			414,528.0310	4,039,697.5156
			414,532.5000	4,039,759.7891
			414,583.3750	4,039,699.2617
			414,643.3130	4,039,605.6250
			414,700.5000	4,039,498.9766
			414,718.6880	4,039,441.7188
			414,729.1250	4,039,314.2500
			414,747.2500	4,039,108.7500
D4	0.59	SDCA	408,694.5000	4,035,836.9883
			408,417.2190	4,035,957.7344
			408,370.5940	4,036,191.9453
			408,249.5940	4,036,258.3164
			408,231.6880	4,036,571.0625
			408,075.5000	4,036,791.1719
			408,254.4060	4,037,157.2813
			408,249.9060	4,037,387.3789
			408,606.5630	4,037,448.5391
			408,414.0000	4,037,664.3359
			408,348.8750	4,037,888.7227
			408,415.9060	4,038,042.2422
			408,494.0000	4,038,156.0977
			408,687.9380	4,038,284.6484
			408,762.7190	4,038,303.7813
			408,853.0940	4,038,290.2422
			408,911.3130	4,038,246.2109
			409,028.9380	4,038,251.5742
			409,126.1560	4,038,258.7344
			409,134.0630	4,038,309.6602
			409,144.5940	4,038,382.5547
			409,201.0630	4,038,424.0508
			409,255.5940	4,038,422.9180
			409,299.1250	4,038,391.3789
			409,304.7190	4,038,329.9609
			409,254.9380	4,038,259.1797
			409,308.0940	4,038,163.0195
			409 312.7190	4,038,061.7695
			409,335.7190	4,038,017.0195
			409,334.3750	4,037,792.3008
			409,260.5630	4,037,628.4492
			409,184.9060	4,037,508.1055
			409,044.0630	4,037,256.8359
			408,869.9060	4,037,236.6055
			408,755.8130	4,037,260.8867
			408,768.2810	4,037,143.0156
			408,784.9690	4,037,079.6914
			408,789.7190	4,036,817.3555
			408,751.4060	4,036,667.7344
			408,706.5940	4,036,616.2422
			408,694.5000	4,035,836.9883
D5	0.57	SDCA	418754.0310	4033026.5000
			418552.9690	4033287.6914
			418484.0000	4033621.1133
			418689.0940	4034066.4102
			418529.0310	4034424.5078
			418434.8130	4034452.0664
			418325.1880	4034653.5234
			418224.7810	4034845.3438
			418067.7500	4035047.7852
			417953.1880	4035467.4961
			417980.5000	4035865.3203
			418027.9060	4036319.6094
			417924.4060	4037110.5117
			418666.3750	4034527.9844
			419065.6880	4034610.9648
			419223.4690	4034342.1406
			419141.3750	4034271.8047
			419084.1880	4033110.8086
			418754.0310	4033026.5000
D6	0.03	SDCA	419801.2810	4033687.7539
			419831.7500	4034141.1016
			420006.8130	4034139.3281
			420012.7190	4033690.4844
			419801.2810	4033687.7539
D7	0.43	SDCA	422105.2500	4031749.0176
			421854.9690	4031871.4102
			421952.1880	4032442.4199
			421827.1560	4032498.3555
			421778.4380	4032522.0762
			421882.0310	4032660.6934
			421931.3130	4032728.7031
			421954.3130	4032765.7129
			421966.3130	4032785.8828
			421992.7810	4032841.0703
			422013.5310	4032894.8164
			422030.0630	4032956.1914
			422039.5000	4033014.7422
			422042.1560	4033068.7461
			422042.4380	4033082.8008
			422040.7810	4033127.2188
			422103.3750	4033191.3320
			422274.9380	4033248.8359
			422331.4380	4033437.2383
			422451.9060	4033492.2617
			422530.2190	4033470.0195
			422579.0940	4033430.6797
			422659.7190	4033313.9453
			422698.6880	4033173.2383
			422688.0630	4032830.0469
			422701.7500	4032367.5195
			422592.2190	4031994.7988
			422299.6560	4031762.5020
			422105.2500	4031749.0176
D8	0.06	SDCA	421758.4690	4032529.3477
			421668.6250	4032569.9238
			421615.5310	4032859.4297
			421680.6250	4033146.5156
			421959.5000	4033044.5586
			422021.5000	4033108.1875
			422022.5630	4033079.4023
			422019.3130	4033018.7031
			422010.1880	4032960.1484
			421994.8130	4032902.9766
			421977.7500	4032858.2227
			421948.4060	4032795.7422
			421918.7190	4032746.2988
			421884.3440	4032697.7148
			421806.2810	4032593.7305
			421758.4690	4032529.3477

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D9	0.53	SDCA	420,265.8440	4,030,508.7188
			419,947.7500	4,030,741.5176
			420,067.1880	4,030,907.7324
			420,051.5940	4,031,073.7461
			420,132.5000	4,031,300.5000
			420,460.9690	4,031,604.7441
			420,449.4060	4,032,103.9551
			419,975.9690	4,032,480.4902
			420,091.3750	4,032,635.9316
			420,399.6560	4,032,679.1270
			420,847.1880	4,032,406.2988
			421,363.7810	4,031,994.1230
			420,995.8750	4,031,495.0273
			420,265.8440	4,030,508.7188
D10	1.75	SDCA	419,965.0000	4,027,728.2520
			419,803.2190	4,027,847.7363
			419,922.8440	4,028,009.4902
			419,437.5940	4,028,368.0176
			419,317.9690	4,028,206.2617
			418,994.5310	4,028,445.2656
			418,730.3440	4,028,397.0371
			419,406.8750	4,029,323.4316
			421,010.9060	4,031,484.3145
			421,216.1560	4,031,761.8594
			421,439.0940	4,031,498.2363
			421,631.0310	4,031,208.7773
			421,571.8750	4,030,077.3184
			421,548.9690	4,029,833.7383
			421,523.2500	4,029,607.1328
			421,241.1880	4,029,607.8887
			421,116.0000	4,029,457.7559
			420,776.0000	4,029,075.9551
			420,233.7500	4,028,421.8027
			420,070.9690	4,028,193.2832
			419,973.2500	4,027,978.3457
			419,965.0000	4,027,728.2520
D11	2.32	SDCA	416,924.2190	4,025,991.8965
			416,906.7190	4,026,000.2598
			416,817.3750	4,026,065.2832
			415,808.9380	4,026,810.0977
			415,803.8440	4,026,822.5840
			415,810.1250	4,026,837.9219
			416,016.5310	4,027,163.7559
			415,829.9690	4,027,301.7383
			415,812.0000	4,027,654.7500
			415,987.3440	4,028,348.8008
			415,969.6880	4,028,562.7461
			415,530.3750	4,028,446.4922
			415,660.2500	4,028,955.4551
			416,062.8130	4,029,458.0664
			416,386.1560	4,029,683.9746
			416,436.9060	4,029,720.7148
			416,449.5000	4,029,732.7207
			416,468.5940	4,029,742.7246
			416,489.8750	4,029,746.4355
			416,529.4060	4,029,741.9941
			416,547.9690	4,029,741.4180
			416,541.4060	4,029,755.8789
			416,528.0940	4,029,767.9277
			416,515.2190	4,029,777.7969
			416,501.9690	4,029,786.2637
			416,489.6560	4,029,794.9004
			416,430.1250	4,029,834.6543
			416,415.3750	4,029,843.4570
			416,400.7190	4,029,849.4766
			416,387.3130	4,029,856.1563
			416,372.5940	4,029,860.3105
			416,368.5310	4,029,870.0703
			416,375.7810	4,029,880.6270
			416,384.4690	4,029,895.7617
			416,385.5310	4,029,910.9023
			416,395.3130	4,029,918.6621
			416,406.0630	4,029,922.9727
			416,419.9060	4,029,929.8086
			416,435.1560	4,029,936.6543
			416,449.2500	4,029,947.3340
			416,459.1250	4,029,961.2246
			416,462.9690	4,029,976.8418
			416,471.5630	4,029,988.3965

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	416481.0000	4029994.3359
			416483.2500	4030000.4590
			416476.4690	4030004.0684
			416464.6250	4030013.5332
			416452.1250	4030020.7266
			416447.3130	4030031.0762
			416454.8750	4030042.8809
			416467.7500	4030052.9766
			416466.0630	4030067.6035
			416454.5310	4030077.5586
			416440.6250	4030076.0938
			416437.6250	4030084.6914
			416445.8130	4030098.3496
			416459.0310	4030110.6875
			416465.9060	4030126.0488
			416467.1560	4030142.7871
			416461.5310	4030157.1523
			416450.1560	4030168.0938
			416439.0940	4030177.2402
			416443.8750	4030188.7227
			416458.4380	4030192.3809
			416470.3130	4030190.8789
			416479.0310	4030177.9727
			416493.8130	4030171.2637
			416510.6250	4030166.2656
			416527.2190	4030165.8828
			416541.7810	4030161.9238
			416568.0630	4030143.3945
			416585.0000	4030137.3281
			416601.6250	4030130.7734
			416608.7190	4030112.7188
			416614.8750	4030093.7324
			416614.1560	4030081.1367
			416606.9690	4030057.0176
			416610.2810	4030041.6328
			416621.0310	4030029.7910
			416626.8440	4030016.4492
			416634.6560	4030003.4863
			416639.6560	4029988.0273
			416642.2500	4029973.2676
			416656.7190	4029972.4727
			416688.3750	4029977.5293
			416704.9380	4029976.5762
			416715.9690	4029964.5742
			416723.1250	4029949.7949
			416734.4690	4029937.7109
			416747.7190	4029929.2070
			416759.0310	4029916.4004
			416768.4690	4029902.2207
			416781.8130	4029898.3633
			416790.3750	4029900.3945
			416827.0940	4029907.2129
			416838.2500	4029915.7813
			416845.7500	4029917.9492
			416852.5940	4029916.0938
			416867.9690	4029916.1543
			416880.3440	4029917.7637
			416895.6880	4029914.7402
			416925.9380	4029904.3965
			416940.7190	4029903.4805
			416954.8130	4029907.8730
			416966.3750	4029914.2246
			417119.3130	4029946.7070
			417187.6250	4029971.9180
			417582.2500	4030268.0078
			417521.0310	4029772.5176
			417701.5630	4029667.0430
			417771.4380	4029656.0293
			417852.7810	4029647.5566
			418130.3750	4029643.4648
			418383.2810	4029647.0859
			419083.7810	4029748.1953
			419086.1880	4029746.9258
			419093.6560	4029564.0527
			417887.0630	4029198.4668
			417896.1560	4029182.4668
			417881.5000	4029187.7246
			418000.2190	4028968.8594
			417985.8130	4028531.7539
			417825.0940	4028556.4668
			417545.0000	4028513.0254

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D11 continued	2.32	SDCA	417,068.6250	4,027,867.9766
			417,152.6880	4,027,307.1758
			417,077.1880	4,026,864.2910
			417,117.7810	4,026,581.1016
			417,277.7500	4,026,460.9707
			416,924.2190	4,025,991.8965
D12	0.02	SDCA	419,887.8440	4,027,285.2500
			419,726.0310	4,027,404.7344
			419,965.0000	4,027,728.2520
			419,949.5310	4,027,659.1582
			419,887.8440	4,027,285.2500
D13	0.02	SDCA	419,810.5000	4,026,842.2539
			419,648.7190	4,026,961.7383
			419,772.4690	4,027,130.8359
			419,887.8440	4,027,285.2500
			419,880.3750	4,027,234.3164
			419,832.8130	4,026,984.5820
			419,810.5000	4,026,842.2539
D14	2.46	SDCA	412,117.6560	4,023,538.0977
			411,983.4060	4,023,714.6152
			411,915.1560	4,023,883.7793
			411,828.0940	4,024,594.2207
			411,988.0310	4,025,141.2695
			412,161.8440	4,025,254.5859
			412,387.4060	4,025,234.3184
			412,577.3130	4,025,175.8184
			412,752.9380	4,025,413.6777
			412,942.5940	4,025,667.2090
			413,298.0630	4,025,913.1816
			413,700.7190	4,025,878.1113
			413,843.4060	4,025,859.0313
			413,892.3750	4,025,869.0625
			414,103.4380	4,026,021.7207
			414,294.0310	4,026,188.3672
			414,574.5630	4,026,473.5742
			414,628.3130	4,026,552.7695
			414,946.8130	4,027,212.3789
			415,303.7810	4,027,171.2480
			415,463.6880	4,026,711.0117
			415,639.0630	4,026,577.9492
			415,777.6250	4,026,784.4590
			415,787.8440	4,026,793.4668
			415,793.6560	4,026,794.4512
			416,290.3440	4,026,429.5527
			416,545.3750	4,026,241.2695
			416,908.5000	4,025,969.6309
			416,207.2500	4,025,017.7598
			415,765.2810	4,024,422.9277
			415,712.3440	4,024,368.7461
			414,755.6880	4,025,075.7559
			414,875.1560	4,025,237.5156
			414,715.5000	4,025,356.9941
			414,832.8440	4,025,518.7598
			414,509.4060	4,025,757.7637
			414,628.8750	4,025,919.4863
			414,432.8750	4,026,064.2539
			414,383.9380	4,025,997.9883
			414,274.7500	4,025,678.2109
			414,249.7810	4,025,496.0098
			414,266.4690	4,025,323.2305
			414,210.4380	4,025,245.9863
			413,519.9380	4,024,988.5723
			413,307 2500	4,025,145.7637
			413,144.4690	4,024,931.4102
			412,117.6560	4,023,538.0977
D15	0.08	SDCA	418,812.6560	4,025,829.9941
			419,051.1560	4,026,152.9863
			419,213.4060	4,026,034.2168
			419,810.5000	4,026,842.2539
			419,655.1250	4,026,404.8789
			419,499.9380	4,025,999.3496
			419,182.9690	4,025,925.2813
			418,812.6560	4,025,829.9941

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D16	0.70	SDCA	416987.0630	4023427.0801
			416718.5630	4023625.5098
			416734.5310	4023647.0078
			416700.3440	4023672.5195
			416689.5630	4023734.1953
			416678.1560	4023741.8613
			416644.1560	4023925.0195
			417010.6880	4024645.2734
			417000.8130	4024984.0566
			417004.5630	4024995.9414
			416997.8130	4025001.7578
			416224.2500	4025007.0430
			416932.7810	4025971.6777
			417170.5000	4026294.0039
			417483.0940	4026061.2461
			417363.6250	4025899.4863
			417848.8440	4025541.0000
			418087.8130	4025864.5176
			418249.6250	4025744.9961
			417981.1560	4025483.1621,
			417862.3130	4025432.8262
			417742.6560	4025357.7832
			417731.0940	4025299.8848
			417711.4060	4025042.9023
			417596.9060	4024857.0391
			417427.9690	4024735.2051
			417308.1560	4024673.9160
			417192.2500	4024288.4082
			417038.6560	4023907.3789
			416987.0630	4023427.0801
D17	0.01	SDCA	418812.6560	4025829 9941
			418722.7810	4025817.3457
			418531.3750	4025787.7188
			418650.8440	4025949.5527
			418812.6560	4025829.9941
D18	0.01	SDCA	418250.0940	4025745.5586
			418369.5630	4025907.3164
			418531.2190	4025787.8750
			418422.7500	4025775.2305
			418250.0940	4025745.5586
D19	1.88	SDCA	410989.2810	4022251.9551
			411145.7810	4022140.5918
			410728.5630	4021605.7773
			410525.7190	4021575.8516
			410434.2500	4021553.4805
			410330.1560	4021538.0020
			410249.0940	4021523.9121
			410165.6880	4021513.8320
			410012.7810	4021489.0801
			409988.7810	4021485.5020
			409958.9380	4021487.3027
			409834.5940	4021472.0918
			409710.8750	4021458.8867
			409588.2190	4021468.2129
			409472.9060	4021506.2676
			409364.2190	4021564.2617
			409273.0310	4021648.9043
			409231.3750	4021698.0781
			409192.6560	4021749.2871
			409142.4380	4021863.0625
			409121.8750	4021936.3730
			409108.8130	4021989.7910
			409094.0000	4022070.1055
			409085.6880	4022117.5977
			409078.5310	4022146.7773
			409061.1250	4022247.9473
			409045.9690	4022310.3633
			409033.1250	4022381.5703
			409029.3750	4022398.8301
			409009.4380	4022518.7207
			409000.8440	4022749.8164
			408748.8130	4022752.2285
			408748.6880	4022994.9199
			408752.0000	4023250.6855
			409002.0630	4023249.9121
			408999.6250	4023000.2637
			410005.0940	4022997.9844
			410001.1880	4023280.3379
			410254.3750	4023245.9746

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
D19 continued	1.88	SDCA	410,472.1880	4,023,123.1172
			410,718.0630	4,023,206.8965
			410,862.1250	4,023,378.8164
			410,821.5940	4,023,731.0039
			410,665.3750	4,023,862.7910
			410,401.5000	4,024,041.8867
			410,411.4380	4,024,308.5215
			410,520.6560	4,024,349.3066
			411,162.2810	4,024,681.8047
			411,124.9690	4,024,778.6250
			411,222.3440	4,024,873.7930
			411,392.4060	4,024,792.1602
			411,607.8130	4,024,539.2461
			411,737.1560	4,023,825.0313
			411,867.2500	4,023,463.2520
			411,784.7500	4,023,306.3613
			411,582.4060	4,023,006.9551
			411,126.7810	4,022,795.5957
			410,994.2500	4,022,416.6367
			410,989.2810	4,022,251.9551
D20	0.21	SDCA	414,982.2190	4,021,997.8164
			415,176.7190	4,022,263.2852
			415,103.2190	4,022,320.4727
			415,581.2500	4,022,965.4922
			415,817.9380	4,022,790.5078
			416,056.9060	4,023,113.9902
			416,207.6250	4,023,003.7656
			415,998.3750	4,023,002.3203
			416,002.5310	4,022,602.1270
			415,526.5000	4,022,002.0215
			414,982.2190	4,021,997.8164
D21	0.39	SDCA	409,784.0630	4,021,446.5840
			409,836.5940	4,021,452.1992
			409,959.4380	4,021,467.4043
			409,986.8440	4,021,465.6152
			410,014.9380	4,021,469.1094
			410,109.0000	4,021,484.2637
			410,027.5940	4,021,036.2754
			409,998.0310	4,020,801.4766
			409,487.5940	4,020,143.3262
			409,409.3130	4,020,065.3262
			409,373.6560	4,020,006.3652
			409,360.9380	4,020,010.4766
			409,276.4690	4,020,023.0879
			409,280.3750	4,020,086.8984
			409,223.5310	4,020,182.5996
			409,166.6250	4,020,986.3672
			409,146.5630	4,021,804.0762
			409,176.1250	4,021,738.1621
			409,218.6880	4,021,681.9980
			409,255.5940	4,021,639.3984
			409,351.8750	4,021,549.4316
			409,464.4690	4,021,488.9551
			409,583.4380	4,021,449.5684
			409,710.2810	4,021,438.8574
			409,784.0630	4,021,446.5840
D22	0.03	SDCA	414,001.2500	4,020,257.5078
			414,001.4690	4,020,502.5137
			414,426.0000	4,020,500.8262
			414,464.0310	4,020,432.0313
			414,293.7190	4,020,338.7207
			414,135.9690	4,020,279.6660
			414,001.2500	4,020,257.5078
D23	0.29	SDCA	409,535.8130	4,018,994.6445
			409,534.9380	4,019,112.7676
			409,493.8750	4,019,250.0898
			409,428.5630	4,019,253.1973
			409,374.7500	4,019,259.9512
			409,200.4380	4,019,355.6914
			409,208.0310	4,019,472.8008
			409,435.7810	4,019,902.2852
			409,445.4060	4,019,983.3887
			409,576.6880	4,020,126.1250
			410,016.9060	4,020,278.1445
			410,025.1560	4,019,002.0527
			409,535.8130	4,018,994.6445

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S1	0.71	Study	410001.6560	4042464.2656
			409290.7190	4042500.2383
			408861.2190	4042688.4688
			408813.8750	4042910.9609
			408859.4380	4043071.8984
			408972.0940	4043285.6914
			409337.5310	4043461.0000
			410500.6560	4043924.3945
			410962.4690	4044000.3555
			411096.8440	4043852.2109
			411108.0630	4043672.6836
			410984.4380	4043481.0273
			410592.0940	4043294.9219
			410496.6250	4043013.0352
			410003.5310	4043008.3594
			410001.6560	4042464.2656
S2	0.27	Study	415072.8130	4041278.8984
			414928.6560	4041572.7422
			414740.2500	4042529.6992
			415304.2190	4042966.9609
			415642.3130	4042393.3203
			415234.1250	4041986.6914
			415072.8130	4041278.8984
S3	0.72	Study	421548.9690	4029833.7383
			421571.8750	4030077.3184
			421631.0310	4031208.7773
			421439.0940	4031498.2363
			421216.1560	4031761.8594
			421260.3750	4031837.4414
			421371.5310	4031985.9238
			421398.8440	4032023.9863
			421454.5000	4032099.1406
			421509.5310	4032174.3066
			421645.9690	4032358.6465
			421725.3130	4032466.9844
			421769.8440	4032526.2539
			421827.1560	4032498.3555
			421952.1880	4032442.4199
			421854.9690	4031871.4102
			422105.2500	4031749.0176
			422299.6560	4031762.5020
			422592.2190	4031994.7988
			422701.7500	4032367.5195
			422732.5630	4032243.8984
			422746.8130	4032159.0254
			422779.7500	4032064.7734
			422779.7190	4031946.8984
			422793.9060	4031814.8984
			422817.5310	4031682.9316
			422840.9690	4031565.0645
			422869.3130	4031447.2109
			422836.2810	4031338.7852
			422713.7500	4031206.8086
			422529.9380	4030985.2422
			422250.5940	4030779.7578
			422000.0310	4030499.9922
			422006.2810	4030500.0156
			421836.9380	4030271.0234
			421548.9690	4029833.7383
S4	0.15	Study	417410.5630	4023845.5176
			417398.8440	4023845.8750
			417387.4380	4023846.9883
			417377.4060	4023848.7207
			417367.8440	4023851.0527
			417358.9380	4023853.9434
			417350.9380	4023857.4238
			417343.0940	4023861.6250
			417335.2810	4023866.7793
			417327.4690	4023872.8066
			417319.6880	4023879.7500
			417310.5940	4023888.9688
			417301.9690	4023899.1680
			417293.6560	4023910.1230
			417286.2810	4023921.5137
			417281.1250	4023930.3848
			417276.9060	4023939.6543
			417273.1560	4023949.9414
			417269.7190	4023961.3281
			417266.5000	4023975.5664
			417263.6560	4023992.3125

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	417,257.5630	4,024,036.4043
			417,255.7810	4,024,053.0898
			417,254.3440	4,024,071.4844
			417,253.3440	4,024,112.0410
			417,253.6880	4,024,135.3887
			417,256.4690	4,024,211.2207
			417,258.9380	4,024,248.6602
			417,260.8130	4,024,266.7930
			417,266.0630	4,024,299.1426
			417,269.5630	4,024,313.8516
			417,274.6560	4,024,330.5859
			417,281.5940	4,024,349.5684
			417,289.7810	4,024,368.9414
			417,298.0630	4,024,386.4863
			417,306.2810	4,024,401.4785
			417,314.9690	4,024,415.0508
			417,324.0630	4,024,427.2441
			417,333.2500	4,024,437.8730
			417,341.8130	4,024,446.3809
			417,362.2810	4,024,463.6328
			417,374.6880	4,024,472.7871
			417,391.6880	4,024,484.4727
			417,422.5940	4,024,504.8984
			417,438.9380	4,024,515.1504
			417,454.8440	4,024,524.5742
			417,469.5000	4,024,532 6895
			417,483 8130	4,024,540.1250
			417,497.9690	4,024,546.9180
			417,525.0310	4,024,558.3184
			417,537.3130	4,024,562.7500
			417,550.9690	4,024,567.0371
			417,565.6880	4,024,571.1504
			417,595.7190	4,024,578.3379
			417,644.3750	4,024,588.4512
			417,671.1560	4,024,593.2676
			417,699.5630	4,024,597.4395
			417,729.9690	4,024,601.0371
			417,763.4060	4,024,604.2285
			417,801.4380	4,024,607.2109
			417,876.5000	4,024,612.3184
			417,885.9690	4,024,613.4160
			417,906.1880	4,024,617.6074
			417,954.9060	4,024,630.4629
			417,966.3750	4,024,632 8535
			417,976.4690	4,024,634.2813
			417,984.4060	4,024,634.8398
			417,991.7190	4,024,634.7266
			417,998.0940	4,024,633.9082
			418,004.0310	4,024,632.4531
			418,009.1560	4,024,630.2891
			418,013.8130	4,024,627.4102
			418,017.8750	4,024,623.8594
			418,021.4380	4,024,619.5566
			418,027.1560	4,024,609.7598
			418,032.4060	4,024,597.6895
			418,034.6560	4,024,589.4512
			418,035.8750	4,024,580 7773
			418,035.6560	4,024,570.7617
			418,034.0630	4,024,559.9766
			418,031.0630	4,024,548.3418
			418,026.3750	4,024,535.4473
			418,020.4690	4,024,521.3984
			418,000.5310	4,024,478.6465
			417,984.5630	4,024,435 9668
			417,970.9060	4,024,402.7227
			417,957.8130	4,024,373.8125
			417,943.3130	4,024,343 8242
			417,931.2500	4,024,320.3027
			417,918.0940	4,024,295.7734
			417,880.1250	4,024,228.6719
			417,859.5000	4,024,190.0117
			417,854.1250	4,024,181.0176
			417,848.9380	4,024,173.2773
			417,843.6250	4,024,166.4160
			417,838.3130	4,024,160.3535
			417,832.0940	4,024,154.4258
			417,825.1250	4,024,149.1992
			417,816.9690	4,024,144.4160
			417,807 5630	4,024,140.0762
			417,799.1250	4,024,136.8242
			417,789.4690	4,024,133.5957
			417,744.3750	4,024,120.6641
			417,733.3130	4,024,116.6641

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
S4 continued	0.15	Study	417723.6250	4024112.4082
			417716.8440	4024108.7773
			417710.6880	4024104.8281
			417693.1880	4024092.0859
			417683.1250	4024084.1797
			417674.4380	4024076.5137
			417667.2810	4024069.1191
			417661.4690	4024061.8086
			417657.0630	4024054.5488
			417654.5000	4024048.2773
			417652.5000	4024040.8516
			417647.9060	4024009.5918
			417646.3750	4024002.8047
			417644.5940	4023996.9746
			417640.7500	4023988.9395
			417636.0310	4023980.8086
			417630 3750	4023972.9629
			417623.6560	4023965.2930
			417617.2810	4023958.7949
			417609.9690	4023952.3184
			417601.7810	4023945.7832
			417592.6250	4023939.0781
			417575.3440	4023927.6641
			417540.5940	4023906.3262
			417526.8440	4023897.4316
			417515.0940	4023889.3320
			417487.6880	4023868.7949
			417472.0940	4023858.9844
			417463.6560	4023854.8926
			417455.1880	4023851.9063
			417444.7810	4023849.1504
			417433.6250	4023847.1348
			417422.1560	4023845.9258
			417410.5630	4023845 5176
C1	0.21	Channel	411145.9380	4022140.5117
			410989.3130	4022252.0020
			410994.2500	4022416.6367
			411126.7810	4022795.5957
			411582.4060	4023006.9551
			411784.7500	4023306.3613
			411867.2500	4023463.2520
			411737.1560	4023825.0313
			411915.1560	4023883.7793
			411983.4060	4023714.6152
			412117.6560	4023538.0977
			411792.0630	4023094.1152
			411782.4060	4023076.2949
			411748.7190	4022994.3965
			411643.6250	4022726.7266
			411641.6880	4022435.3887
			411419.2190	4022347.2383
			411284.5000	4022318.9453
			411145.9380	4022140.5117
C2	0.30	Channel	409201.5000	4019370.5664
			409173.3130	4019532.8418
			409115.7190	4019657.4395
			409058.5940	4019813.5703
			409055.4380	4019859.0117
			409098.6560	4019944.7520
			409192.5940	4020079.2344
			409223.5310	4020182.5996
			409280.3750	4020086.8984
			409276.4690	4020023.0879
			409352.7190	4020011.6758
			409373.6560	4020006.3652
			409409.3130	4020065.3262
			409487.8750	4020143.3594
			409998.1880	4020801.4746
			410027.7500	4021036.2715
			410109.2810	4021484.2578
			410174.2810	4021494.7188
			410242.0940	4021502.6836
			410335.4060	4021518.5000
			410438.7190	4021533.8438
			410529.8750	4021556.1816
			410712.0940	4021583.1074
			410602.7500	4021411.3418
			410686.8440	4021328.9805
			410488.7190	4020946.7344
			410264.6250	4020620.0820
			410015.6880	4020454.4902

EXHIBIT 2 -- Owens Lake 2006 Supplemental Dust Control Area Coordinate Descriptions

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates
C2 continued	0.30	Channel	410,016.9060	4,020,278.1445
			409,576.6880	4,020,126.1250
			409,445.4060	4,019,983.3887
			409,435.7810	4,019,902.2852
			409,208.0310	4,019,472.8008
			409,201.5000	4,019,370.5664

Area ID	Area (miles)	Area type	Coordinates(UTM Zone11 meters NAD83) X-coordinates	Y-coordinates

Total SDCA	12.77
Total Study	1.85
Total Channel	0.50

EXHIBIT 3 -- DUST CONTROL MEASURE MAP

Shown are dust control measures assigned to areas within the SDCA.

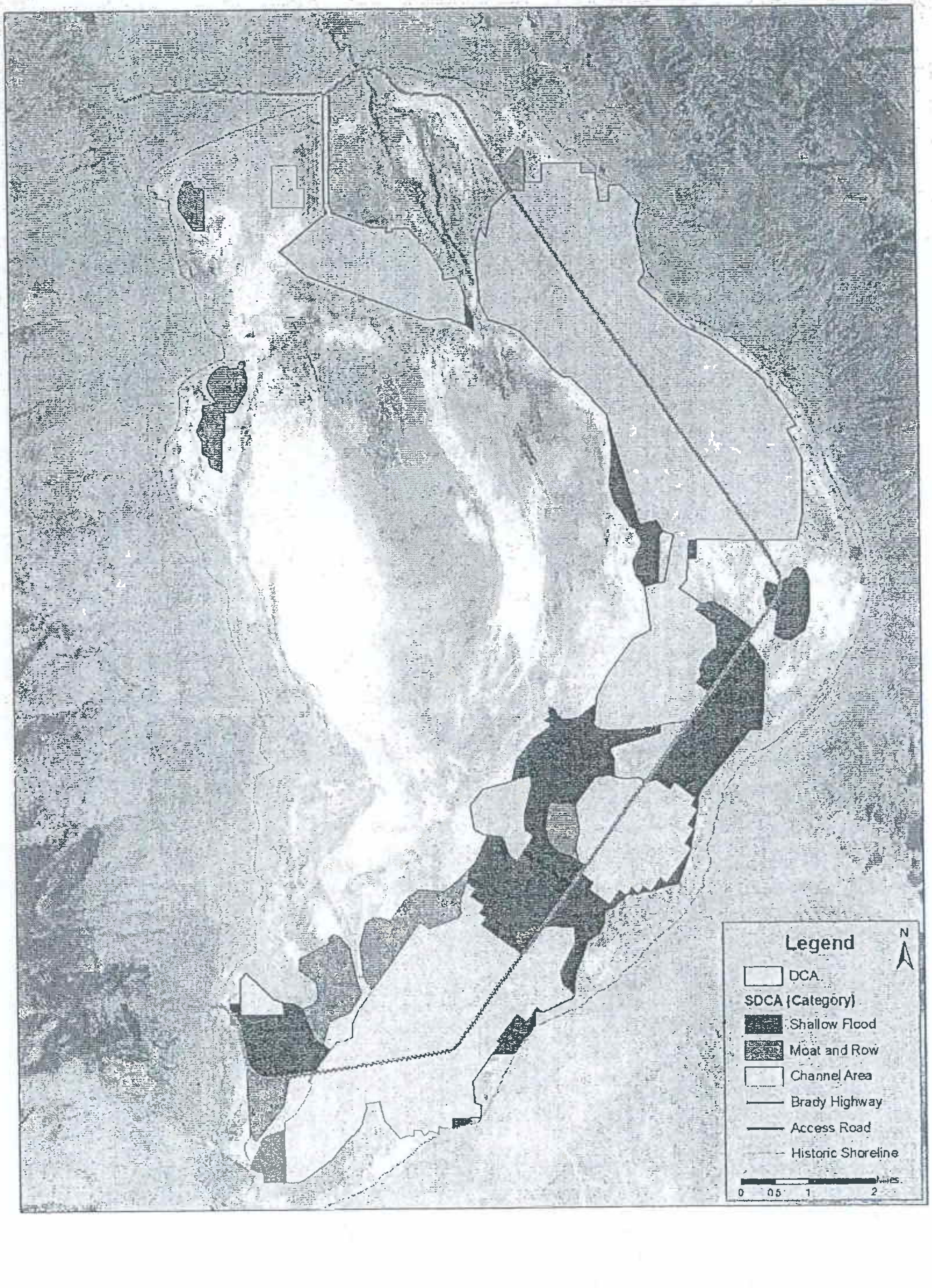

EXHIBIT 4 -- DUST CONTROL MEASURE DESCRIPTIONS

Brief descriptions of dust control measures for use on Owens Lake are given below. More detailed descriptions of the three BACM approved dust control methods (shallow flooding, managed vegetation and gravel) are provided in the 2003 SIP. Modifications to these measures as provided in the Settlement Agreement (Agreement) are noted. All references are to sections of the Agreement; section numbers of the Agreement are contained in square brackets.

Shallow Flooding

The "shallow flooding" (SF) dust control measure involves wetting emissive lake bed surfaces to reduce dust emissions. Performance specifications and a detailed description of the SF measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Otherwise, water shall be applied in amounts sufficient to achieve the required wetness cover as specified in Sections 3 through 5, 25, 26, and 27, or as modified under the provisions of Sections 5, 14, 15, 18, and 29. Satellite imagery, aerial photography or other methods approved by the APCO under the provisions of Section 29 are used to measure wetness cover for compliance.

Managed Vegetation

The "managed vegetation" (MV) dust control measure involves establishing a plant cover on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications and a detailed description of the MV control measure are provided in the 2003 SIP for achieving 99 percent PM_{10} control efficiency. Vegetative cover on the MV site present on the lake bed on January 1, 2007 shall be as specified in Section 6. The performance specification of MV may be modified under the provisions of Section 29. Point-frame measurements satellite imagery or other methods approved by the APCO under the provisions of Section 29 are used to measure plant cover for compliance.

Gravel Cover

The "gravel cover" (GC) dust control measure involves placing a layer of gravel on emissive lake bed surfaces to protect them from the wind, thereby reducing dust emissions. Performance specifications are described in the 2003 SIP.

Moat and Row

The general form of the "moat and row" (MR) measure is an array (see Figure E4-1) of earthen berms (rows) about 5 feet high with sloping sides, flanked on either side by ditches (moats) about 4 feet deep (see Figure E4-2). Moats serve to capture moving soil particles, and rows physically shelter the downwind lake bed from the wind. The individual MR elements are constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the MR array is intended to control emissions under the full range of principal wind directions (see Figure E4-1). Initial pre-test modeling indicates that MR elements' spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM_{10} control effectiveness required on the MR area.

The PM_{10} control effectiveness of MR may be enhanced by combining it with other dust control methods such as vegetation, water, gravel, sand fences, or the addition of other features that enhance sand capture and sheltering or directly protect the lake bed surface from wind erosion. The effectiveness of the array can also be increased by adding moats and rows to the array, which reduces the distance between rows.

The final form of MR will largely be determined from the results of testing on the lake bed as provided in Sections 7 and 8. Final design is subject to test results, required PM_{10} control effectiveness, environmental documentation and permitting, engineering, and monitoring considerations.

In areas where MR is used as a control measure, the City shall implement the measure in a manner consistent with the Agreement, particularly Sections 7 and 8, or as modified by actions pursuant to Sections 18 through 24.

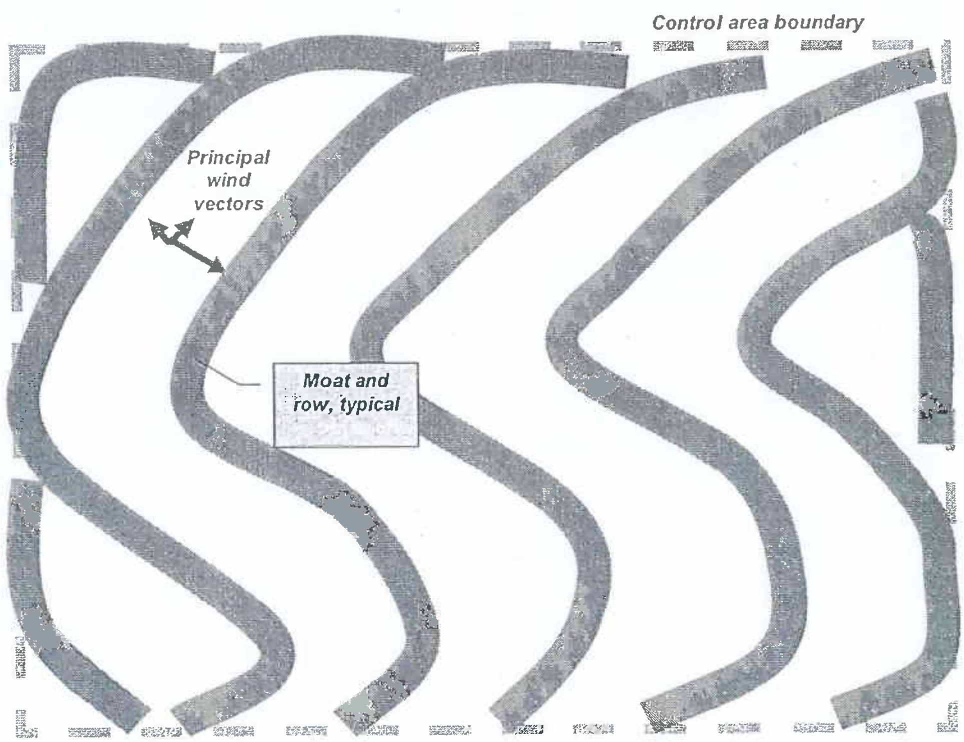

Figure E4-1. Moat and Row Array Plan View (schematic).

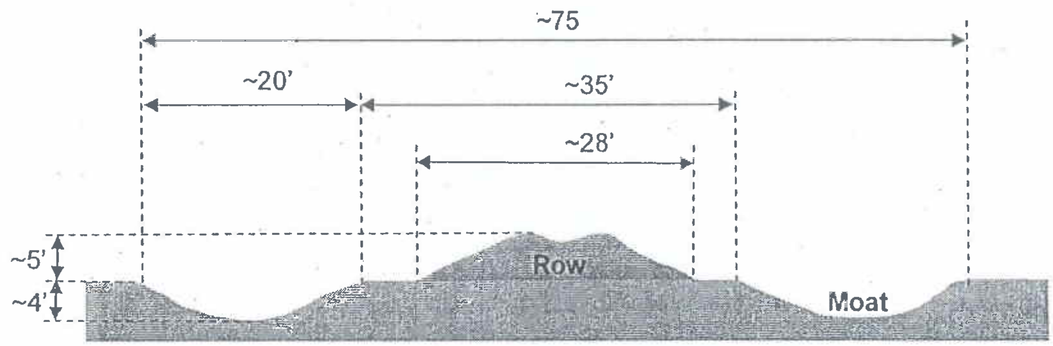

Figure E4-2. Profile of Moat and Row with Approximate Dimensions (schematic).

EXHIBIT 5 -- TDCA MINIMUM DUST CONTROL EFFICIENCY MAP

Shown are MDCEs calculated according to Sections 3 and 4 of the agreement.

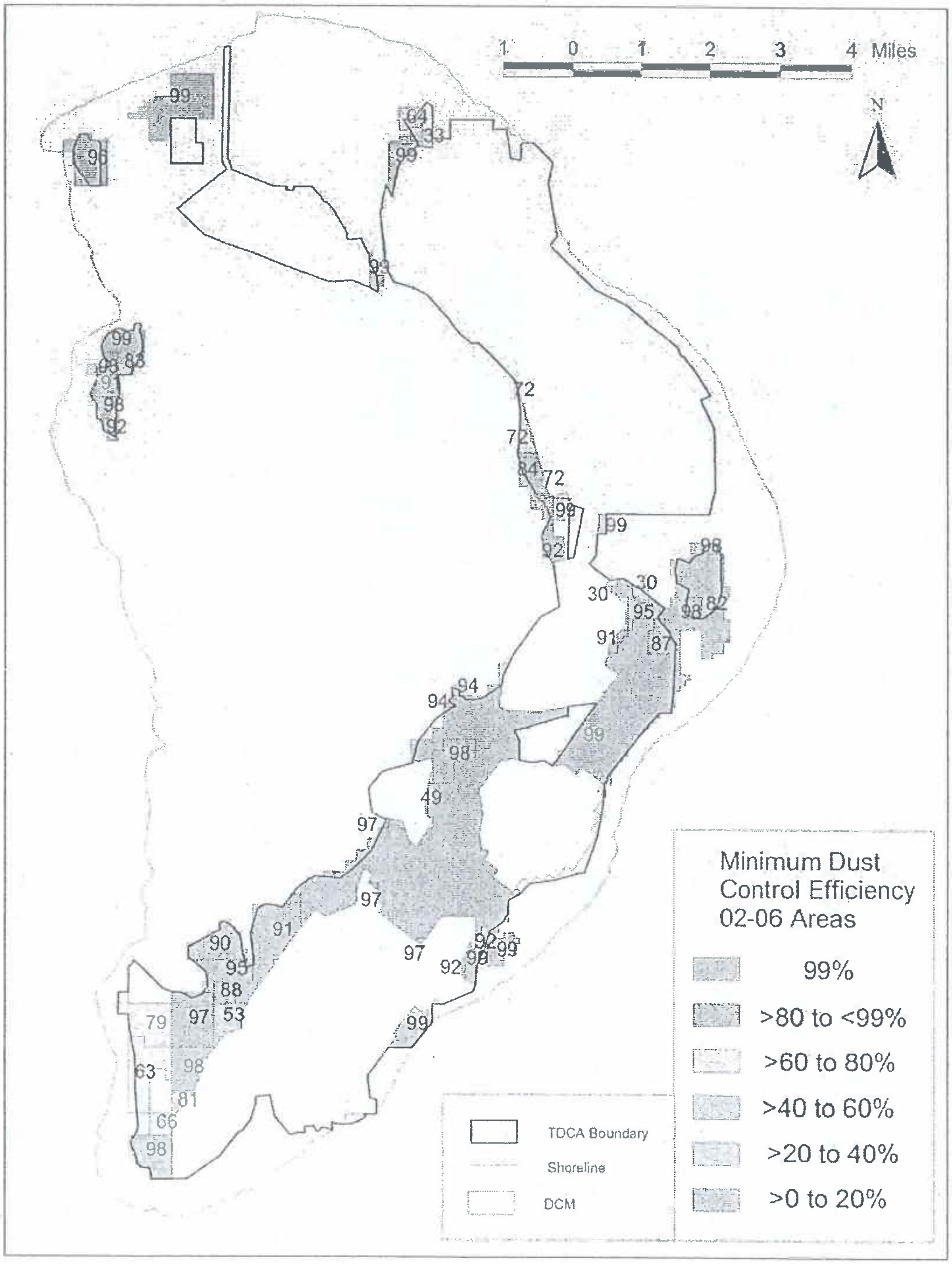

EXHIBIT 6 -- MDCE SELECTION PROCESS

This exhibit summarizes the purpose of the MDCE Selection Process Spreadsheet. A copy of the Process Spreadsheet, which contains a description of the spreadsheet structure and operation, may be downloaded from the District's website at http://www.gbuapcd.org/.

The District developed the Dust ID Model as a tool for identifying dust control areas on the lake bed. The Dust ID Model computes the amount of dust being generated from each source area on the lake bed, but the results cannot be used without additional processing to identify the acceptable combinations of dust control required on each source area (that is, each area's minimum dust control efficiency or "MDCE") to achieve the federal 24-hour PM_{10} standard along the shoreline. There are many possible combinations of MDCEs that could produce the acceptable result of achieving the standard at the shoreline. For example, 50 percent control on hypothetical Area 1 and 99 percent control on Area 2 may produce the same modeled shoreline concentration as 99 percent control on Area 1 and 50 percent control on Area 2. However, the first combination might be more practical and less costly than the second, and for that reason it is important to have a process that can quickly and efficiently identify acceptable combinations. In all cases, the outcome of this process is some combination of area-by-area dust control efficiencies that produces a modeled attainment of the federal PM_{10} standard everywhere along the shoreline.

The process for selecting the acceptable combinations of dust control levels has been, heretofore, a manual process. The MDCE Selection Process Spreadsheet (Process Spreadsheet) was developed to more quickly and efficiently identify combinations of dust controls required to produce compliance with the federal 24-hour PM_{10} standard along the shoreline. The worksheet is set up so that MDCE calculations are automatic, yet it still allows manual adjustments to be made.

EXHIBIT 7 -- SHALLOW FLOOD CONTROL EFFICIENCY CURVE

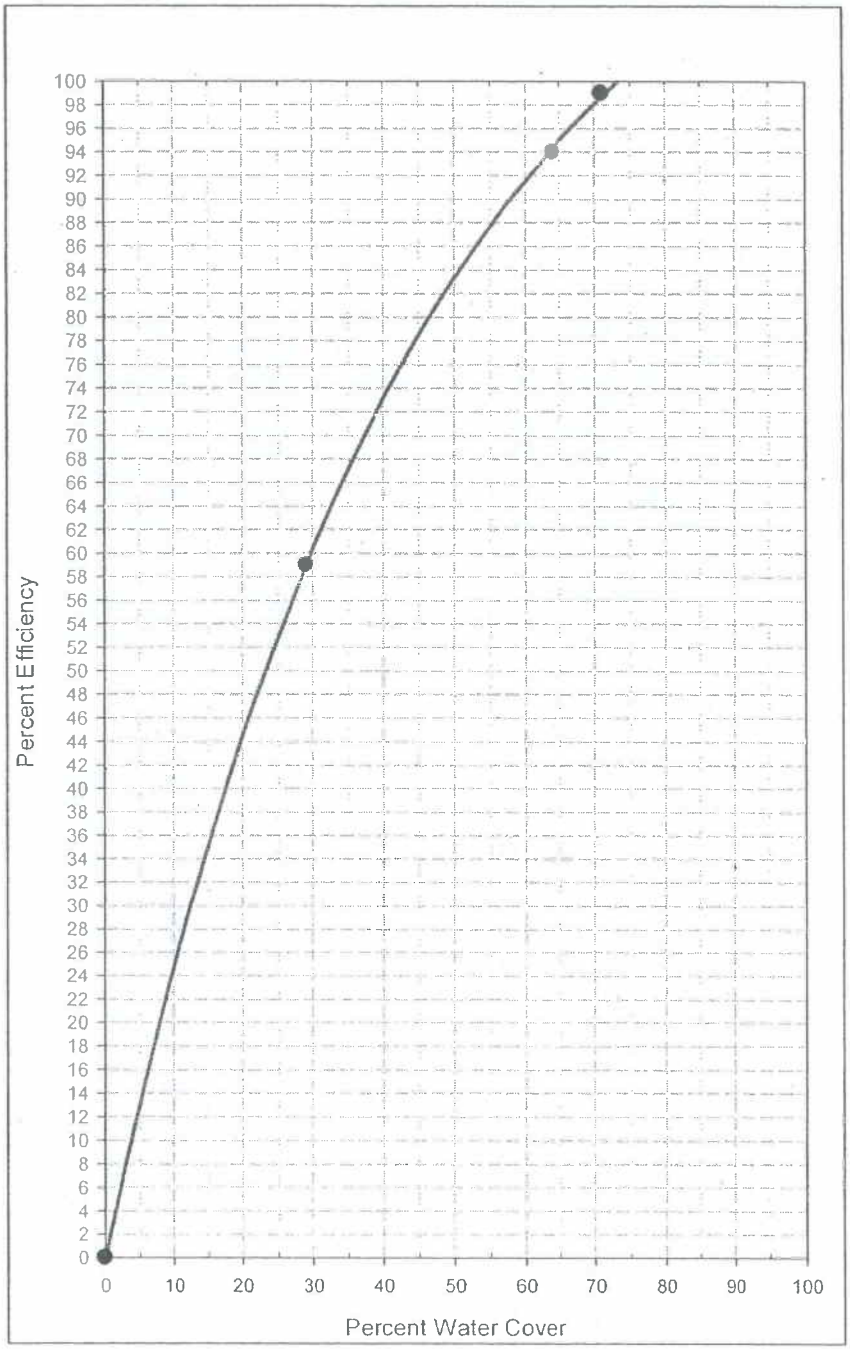

EXHIBIT 8 -- MOAT AND ROW DEMONSTRATION PROJECT LOCATION MAP

Two proposed moat and row demonstration project locations

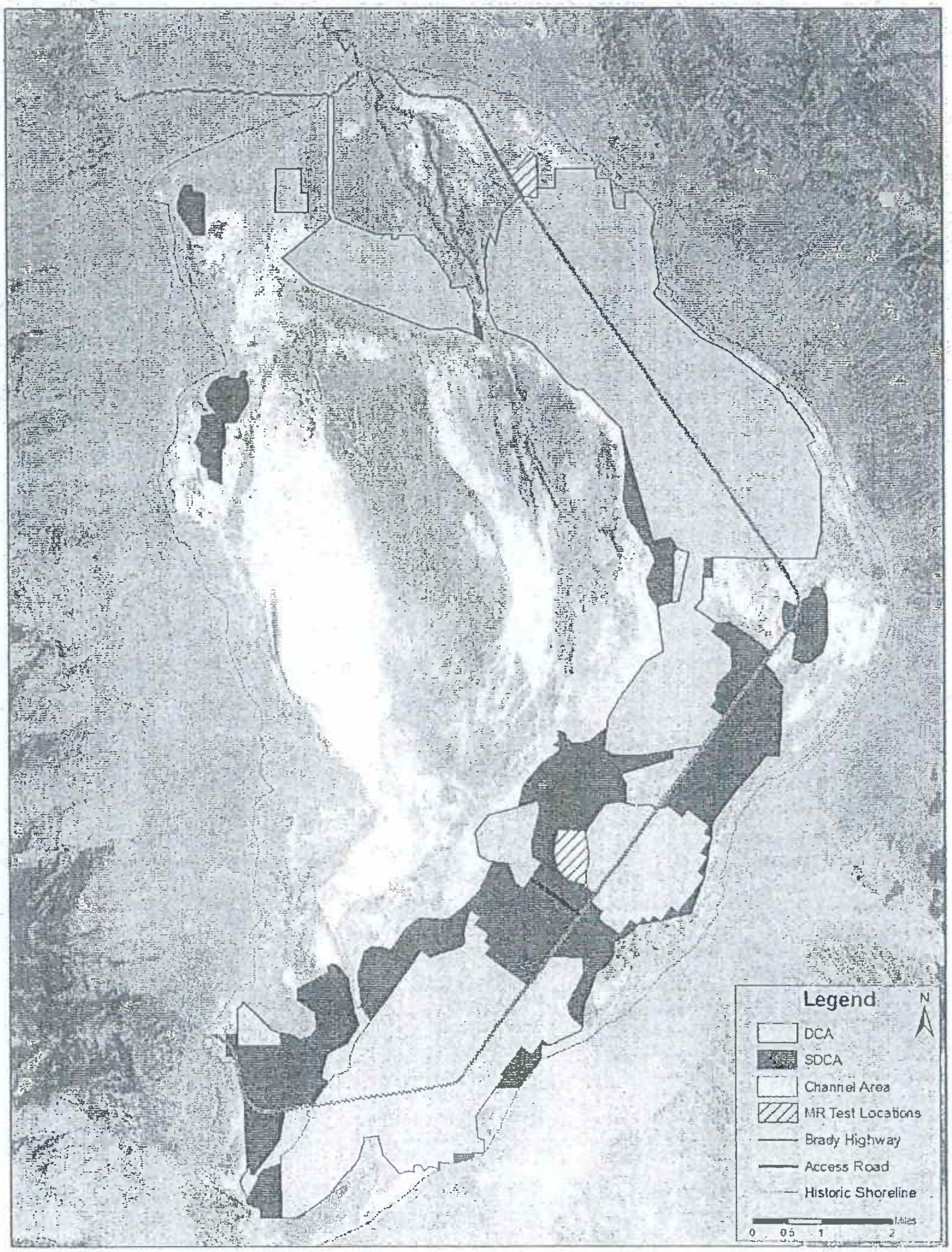

EXHIBIT 9 -- STUDY AREA MAP

Four proposed study area locations

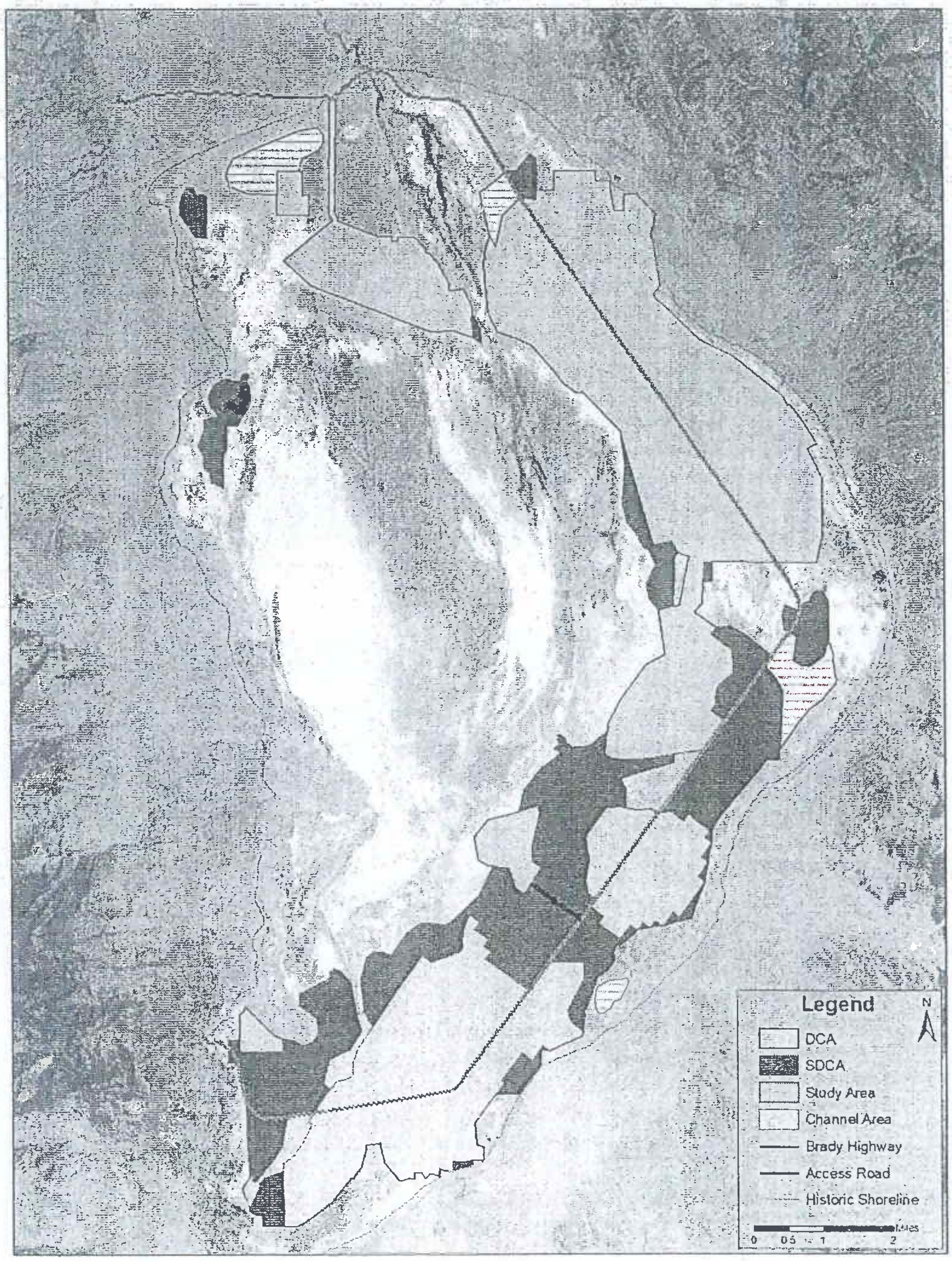

EXHIBIT 10 -- SCHEDULE OF CONTINGENCY MEASURES

Issue	Resolution	Duration	Units
Moat and Row			
Eroded row	Install armoring to prevent further erosion	2	mo/mile
	Install sand fences to prevent further erosion	1	mo/mile
	Reconstruct row in place or adjacent	2	mo/mile
Filled moat	Re-excavate new moat outboard of filled moat, expand existing row onto filled moat	2	mo/mile
Filled sand fence	Clean out or flank with new sand fences	2	mo/mile
Collapsed sand fence	Repair or flank with new sand fences	1	mo/mile
Spacing too large	Pull in intervening sand fence	1	mo/mile
	Add intervening moat and row	3	mo/mile
	Enhance with vegetation and/or wetness	12 to 36	months
	Soil roughening	1 to 3	months/sq mi
	Conversion to reduced BACM/BACM	See Exhibit 11	
Managed Vegetation			
Emissions from bare areas	Enhance/restore vegetation	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Emissions from vegetated areas	Determine and establish necessary cover	36	months
	Stabilize by other means (e.g., moisture, sand fences)	1 to 6	months/sq mi
Gravel Patches			
Infilling pore spaces	Supplement gravel depth	4	months/sq mi
	Stabilize by other means (e.g., vegetation, wetness, sand fences)	6 to 36	months
Shallow Flood			
Emissions from dry areas (insufficient uniformity of wetting)	Wet dry areas. May require land leveling and/or additional laterals.	12	months
Generally too dry	Increase water application rate relative to ET	1	month
Other features			
Gravel source	Open new or re-open existing quarry	4	months
Emissions from roads, berms, etc.	Increase watering frequency	1	month
	Stabilize by other means (e.g., gravel, stabilizing agents)	1 to 4	months/sq mi

0306

EXHIBIT 11 -- MOAT AND ROW TRANSITION SCHEDULE

Activity	Duration (years)
Shallow flood transition from moat & row	1.9
Managed vegetation transition from moat & row	5.9
Gravel cover transition from moat & row	1.8
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0

EXHIBIT 12 -- DCM OPERATION SCHEDULE

Activity	Duration (years)
New area shallow flood DCM[a]	2.9
New area managed vegetation DCM[a]	6.1
New area gravel cover DCM[a]	2.2
Mutually agreeable exceptions:	*Increase over and above durations listed above (years)*
1. Mainline capacity increase	2.1
2. New aqueduct turnout	1.4
3. New power feed	1.0
4. Expanded CEQA triggered	1.4

[a]Assumes that total new area <2 square miles per year

EXHIBIT 13. DEFINITIONS

A. "Background PM_{10} concentration" shall mean the concentration of PM_{10} caused by sources other than from wind blown dust emanating from the Owens Lake bed. For the purpose of modeling air quality impacts, the background concentration is assumed to be 20 $\mu g/m^3$ (micrograms per cubic meter) during every hour at all receptor locations. The monitored and modeled PM_{10} emissions from the Keeler Dunes, which are located off the lake bed are treated as a separate dust source area and are not included in the background concentration.

B. "Best Available Control Measures" or "BACM" shall have the same definition as in the federal Clean Air Act. Approved BACM in the 2003 SIP was associated with PM_{10} emission reductions of at least 99 percent and includes managed vegetation, shallow flood, and gravel cover.

C. "Contingency measures" shall mean dust control measures or modifications to the dust control measures that can be implemented to mitigate dust source areas that cause or contribute to an exceedance of the federal standard at the historic shoreline in the event that a previously approved control strategy was found to be insufficient.

D. "Control Area" shall mean an area on the lake bed for which dust control is required.

E. "Control efficiency" shall mean the relative reduction or percent reduction in PM_{10} emissions resulting from the implementation of a control measure compared to the uncontrolled emissions.

F. "Control measures" shall mean measures effective in reducing the PM_{10} emissions from the lakebed surface over which they are implemented.

G. "Dust control measure" or "DCM" shall mean measures designed to suppress sand motion and reduce dust emissions from the Owens Lake bed.

H. "Dust ID Model" shall mean a computer-based air quality modeling approach developed as part of the 2003 SIP to identify emissive areas on the Owens Lake bed and to estimate the resulting PM_{10} concentrations at the shoreline. See also "Dust ID Program."

I. "Dust ID Program" shall mean a long-term monitoring and modeling program that is used to identify dust source areas at Owens Lake that cause or contribute to exceedances and violations of the federal PM_{10} standard. The current protocol for conducting the Dust ID Program is included in the 2003 SIP (Exhibit 2 – Attachment 4). See also "Dust ID Model."

J. "Emission rate" shall mean the rate (expressed as mass per unit area per unit time) at which an air constituent (PM_{10}, for example) is transported away from the surface of the lake bed.

K. "Exceedance of the federal standard" or "exceedance" shall mean any single-day PM_{10} concentration that is monitored or modeled to be above 150 $\mu g/m^3$ (24-hour average from midnight to midnight) at any location at or above the historic shoreline.

L. "Historic shoreline" or "shoreline" shall mean the elevation contour line of 3,600 feet above mean sea level at Owens Lake, California.

M. "Lake bed" or "Owens Lake bed" or "playa" shall mean the exposed surface within and below the historic shoreline.

N. "Managed Vegetation" is a Dust Control Measure consisting of lakebed surfaces planted with protective vegetation.

O. "May not lawfully be included in the SIP" shall mean that inclusion of the provision in question in the revisions to the 2003 SIP has been determined by binding judicial order to be unlawful.

P. "MCDE-BACM" shall mean Dust Control Measures that achieve Minimum Dust Control Efficiency and are found to be appropriate for the area of application.

Q. "Minimum Dust Control Efficiency" or "MDCE" shall mean the lowest dust control efficiency, as determined by the Dust ID model, in the Supplemental Dust Control Area necessary to meet the federal standard at the historic shoreline.

R. "Moat and Row" shall mean a Dust Control Measure consisting of arrays of sand breaks that arrest sand motion.

S. "PM_{10}" or "particulate matter" shall mean atmospheric particulate matter less than 10 micrometers in nominal aerodynamic diameter.

T. "PM_{10} monitor" shall mean an instrument used to detect the concentrations of PM_{10} in the air.

U. "Sand flux monitor" shall mean a device used to measure the amount and/or rate of moving or saltating sand and sand-sized particles caused by wind erosion.

V. "Shallow Flood" is a Dust Control Measure consisting of lakebed areas wetted to a specified proportion of surface coverage.

W. "2003 SIP" or "2003 Owens Valley PM_{10} State Implementation Plan" shall mean the Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan 2003 Revision – Adopted November 13, 2003.

X. "Supplemental Control Requirements" or "SCR" shall mean Dust Control Measures required by the District on areas outside of the DCA that cause or contribute to an exceedance of the federal PM_{10} standard at the historic shoreline of Owens Lake.

EXHIBIT C-9

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PM_{10} Control Measures

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5

PM_{10} Control Measures

5.1 INTRODUCTION

Owens Lake PM_{10} control measures or, more commonly, dust control measures (DCMs), are defined as those methods of PM_{10} abatement that could be placed on portions of the Owens Lake playa and when in place are effective in reducing the PM_{10} emissions from the surface of the playa. Since 1980 the District and other researchers have been involved with the study of the lake environment and the mechanisms that cause Owens Lake's severe dust storms. Since 1989 the District has pursued a comprehensive research and testing program to develop PM_{10} control measures that are effective in the unusual Owens Lake playa environment. Three dust control measures have been approved for use on the lake and have been designated as a Best Available Control Measure (BACM) by the District (GBUAPCD, 2003). These measures include Shallow Flooding, Managed Vegetation, and Gravel Blanket. In addition, as provided for in the 2006 Settlement Agreement (GBUAPCD, 2006b) and based on the results of a demonstration project conducted by the City of Los Angeles (City), a fourth dust control measure may be implemented on a portion of the Dust Control Area (DCA). This alternative measure is known as Moat & Row.

Dust control measures that were tested on the lake, but were shown to not be effective or practical dust control measures for the SIP, include the use of sprinklers, chemical dust suppressants, surface compaction, sand fences and brush fences. These measures were discussed in the "Owens Valley PM_{10} Planning Area Demonstration of Attainment SIP Projects Alternatives Analysis" document (GBUAPCD, 1996), in the Final Environmental Impact Report (EIR) (GBUAPCD, 1997), EIR Addendum Number 1 (GBUAPCD, 1998b) for the 1998 SIP and in the EIR for the 2003 SIP (GBUAPCD, 2003).

Implementation of all DCMs on the lake bed is subject to appropriate analysis under the California Environmental Quality Act (CEQA) and permitting and approvals by other responsible agencies. A detailed analysis of the environmental impacts of the DCMs to be completed by April 1, 2010 can be found in the project-level EIR prepared for this 2008 SIP (GBUAPCD, 2008). In addition to the District using the 2008 EIR as the CEQA-compliance document for this SIP, the City intends to use the document to meet its CEQA requirements for issuance of construction contracts for the project. Additional descriptions of the control measures as they have been implemented by the City are found in the City's two Mitigated Negative Declarations for Phases 1 and 2 of the project (LADWP, 2000 and LADWP 2001). For the attainment demonstration included in Chapters 6 and 7 of this 2008 SIP, the District is specifying that the PM_{10} control measures used will be BACM and consist of Shallow Flooding, Managed Vegetation and Gravel Blanket, as well as the possibility of the non-BACM demonstration measure known as Moat & Row. All dust control measures shall be designed, constructed, operated and maintained to achieve the required minimum dust control efficiencies (MDCE) as described in the 2006 Settlement Agreement.

This chapter includes a brief description of the three BACM dust control measures, a discussion of the PM_{10} emissions after the control measure is implemented and the conditions that need to be met to achieve the necessary level of control. This chapter also includes a conceptual description of the Moat & Row dust control measure. A more detailed description of the Moat & Row measure will be available following the results of the current testing being conducted by the City. These descriptions contain both mandatory and conceptual elements and are provided to illustrate how the control strategy mandated by this 2008 SIP may be feasibly implemented. Chapter 7 of this document will show where these controls will be used on the playa to achieve the National Ambient Air Quality Standard (NAAQS) for PM_{10}. The mandatory elements of the control strategy are set forth in the Board Order in Chapter 8. Control strategy elements not mandated by this 2008 SIP are left to the discretion of the City and are subject to approval by the California State Lands Commission (CSLC) when DCMs are applied on lands under their management. Nothing in this SIP is intended to give the CSLC, or any other public agency, more authority than their authority under law.

5.2 SHALLOW FLOODING

5.2.1 Description of Shallow Flooding for PM_{10} Control

The naturally wet surfaces on the lake bed, such as seeps, springs and the remnant brine pool, are resistant to windblown dust emissions. These naturally wet areas are found where groundwater is discharged on to the lake bed or where surface water (such as water from the Owens River or Cartago Creek) flows across the lake bed surface (Figure 5.1). The areal extent of wetting depends mainly upon the amount of water present on the surface, evaporation rate and lake bed topography. The size of the wetted area is less dependent on soil type because, once the water table is raised to the playa surface, surface evaporation is virtually soil-type independent. The Shallow Flooding DCM mimics the physical processes that occur at and around natural springs and wetlands and can provide dust control over large areas with reasonably minimal and cost-effective infrastructure. The goal of Shallow Flooding is to provide dust control by maintaining sufficiently wet surfaces. As a result ponding will occur in topographic lows creating habitat conditions for insects and shore birds.

Two methods of Shallow Flooding have been employed by the City on the lake bed since the first DCMs began operation in 2001. The first, known as sheet flooding, consists of releasing water from arrays of low-flow water outlets spaced at intervals of between 60 and 100 feet along pipelines laid along lake bed contours. The pipelines are spaced between 500 and 800 feet apart. This arrayed configuration of water delivery creates large, very shallow sheets of braided water channels. Water depths in sheet flooded areas are typically at most just a few inches deep. The lower edge of sheet flooded areas has containment berms to capture and pond excess flows. The water slowly flows across the typically very flat lake bed surfaces downhill to tail-water ponds where pumps recirculate the water back to the outlets. Figure 5.2 shows sheet flooding from ground level. Figure 5.3 is an aerial photo of a sheet flooded area.

To maximize project water use efficiency, flows to sheet flow areas are regulated at the outlets so that only sufficient water is released to keep the soil wet. Although the quantity of excess water is minimized through system operation, any water that does reach the lower end of the control area is collected and recirculated back through the water delivery system. At the lower end of the sheet flooded areas, or at intermediate locations along lower elevation contours, excess water are collected along collection berms and pumped back up to the outlets to be reused.

The second method of Shallow Flooding employed by the City is known as pond flooding. Pond-flooded areas have water containment berms that allow ponds to be formed that submerge the emissive lake bed areas. These ponds are much deeper than sheet-flooded areas—pond waters are up to four feet deep. The containment berms are typically rock-faced to protect them from wave erosion. Water is usually delivered through one large water inlet per pond. Water is delivered to the pond area until the pond reaches a size and depth sufficient to submerge the required amount of emissive area. Water delivery then ceases until evaporation reduces the pond size to a set minimum. Figure 5.4 shows pond flooding from ground level. Figure 5.5 is an aerial photo of a pond-flooded area.

Based on the City's operation of Shallow Flood DCMs in 2006 and 2007, approximately 3.1 to 4.2 acre-feet of supplied water, respectively, were required to control PM_{10} emissions from an acre of lake bed. It should be noted that below normal rainfall in 2007 resulted in the need to supply more water to the Shallow Flood DCMs to maintain the required 75% wetness cover. It is anticipated that after April 1, 2010 the annual amount of water needed for each acre of Shallow Flood DCM will be reduced as a result of relaxing the wetness cover requirements during the fall and the spring ramping flow periods as discussed in Section 5.2.3.

Non-wetted infrastructure associated with the Shallow Flood DCM includes raised berms, roadways, equipment pads and their associated sloped shoulders (Figure 5.6). In some cases the shoulders are rock-faced to protect them from wave erosion. Well-traveled roads are typically paved with gravel; less-traveled roads and berms are unpaved.

Shallow Flooding requires water transmission, distribution and outlet infrastructure, excess water retention, collection and redistribution infrastructure and the construction of electrical power lines, access roads and water control berms as discussed in the EIR for the 2008 SIP.

The City is required to construct water-retention berms along the down-gradient and side boundaries of each Shallow Flooding irrigation block to prevent leakage and increases in the rate, quantity, or quality of dust control waters and storm water flows to the brine pool area or mineral lease area. These berms will be designed to collect both natural and applied excess surface water along the side and downslope borders of each irrigation block. The requirement to provide water-retention berms does not apply to Shallow Flood area T36-4, due to its adjacency to the Owens River delta and the need to minimize surface disturbances in this area.

5.2.2 PM_{10} Control Effectiveness for Shallow Flooding

Shallow Flooding has been shown to be very effective on a large scale for controlling wind-blown dust and PM_{10} at Owens Lake. Between 1993 and 1996 the District conducted a 600-acre test on the sand sheet between Swansea and Keeler. Effectiveness was evaluated in four ways; a) from aerial photographs assuming that flooded areas provided 100 percent control, b) from portable wind tunnel measurements of test and control areas, c) from fetch transect (1-dimensional) analysis of sand motion measurements, and d) from areal (2-dimensional) analysis of sand motion measurements. The average control effectiveness was 99 percent with surface water coverages of 75 percent and about 60 percent when the site was 30 percent wet (Hardebeck, *et al.*, 1996).

In 2000 the City began construction on a 13.5 square-mile shallow flood project on the north end of the lake bed. Shallow Flooding operations began in December 2001. By December 2006 the City had constructed and is currently operating over 26 square miles of Shallow Flooding DCMs. Visual observations and monitoring since the implementation of existing shallow flood facilities have shown no significant dust plumes originating in properly operated Shallow Flooding areas.

PM_{10} emissions from the 16.5 square mile Shallow Flood dust control area that was completed at the end of 2003 were calculated based upon Dust ID program emission estimates before and after controls were implemented. The control efficiency for this shallow flood area averaged 99.8 percent in 2004. Prior to shallow flooding, PM_{10} emissions for the area were estimated at 35,775 tons in 2000. After shallow flooding, PM_{10} emissions were reduced to an estimated 60 tons from the same area in 2004.

Due to the extreme levels of PM_{10} emissions from Owens Lake before the implementation of DCMs began in 2000, the District required that the City construct and operate all Shallow Flood DCMs to achieve 99 percent PM_{10} control efficiency. Based on the District's research in the 1990s, this meant that all Shallow Flood areas had to be maintained at 75 percent wet. However, not all of the additional emissive areas that require control under this 2008 SIP (Supplemental Dust Controls) require 99 percent effectiveness in order to achieve the PM_{10} NAAQS at the historic shoreline. Based on data collected between July 2002 and June 2006, air quality modeling shows that the actual required levels of PM_{10} control vary from 30 percent to over 99 percent. These varying required control efficiencies reflect the fact that different areas of the lake bed have different emissions rates and that areas closer to the historic shoreline require higher control efficiencies than similar areas well away from the shoreline. Based on air quality modeling conducted using the 2002 through 2006 data, the minimum dust control efficiencies (MDCE) for the Supplemental Dust Control areas are shown in Figure 5.7. All additional DCMs constructed under the provisions of this 2008 SIP will be constructed and operated to achieve the MDCEs shown in Figure 5.7. All DCMs constructed prior to 2007 will be required to continue to achieve 99 percent MDCE, except during the ramping flow periods discussed in Section 5.2.3.

For Shallow Flooding, varying MDCEs can be provided by varying the percent of an emissive area that is kept wet. Based on the District's research, a curve has been developed that relates percent water cover with percent PM_{10} control efficiency. This curve is shown in Figure 5.8. The City will use this curve, along with the MDCEs shown in Figure 5.7 to construct and operate the Shallow Flooding Supplemental Dust Control areas. The required control efficiency for Shallow Flooding areas constructed prior to 2007 will remain at 99 percent. The District and the City will collaboratively work to refine the curve in Figure 5.7.

5.2.3 Fall and Spring Shallow Flooding Ramping Flow Operations

Based on data collected between 2002 and 2006, air quality modeling shows that areas normally requiring 99 percent control efficiency during the most intense wind and surface emissivity conditions do not require that extreme level of control at other, less emissive, times. Dust emissions from the lake bed during early October and from mid-May through June are typically lower in intensity than during the peak winter through early spring dust season. These periods of

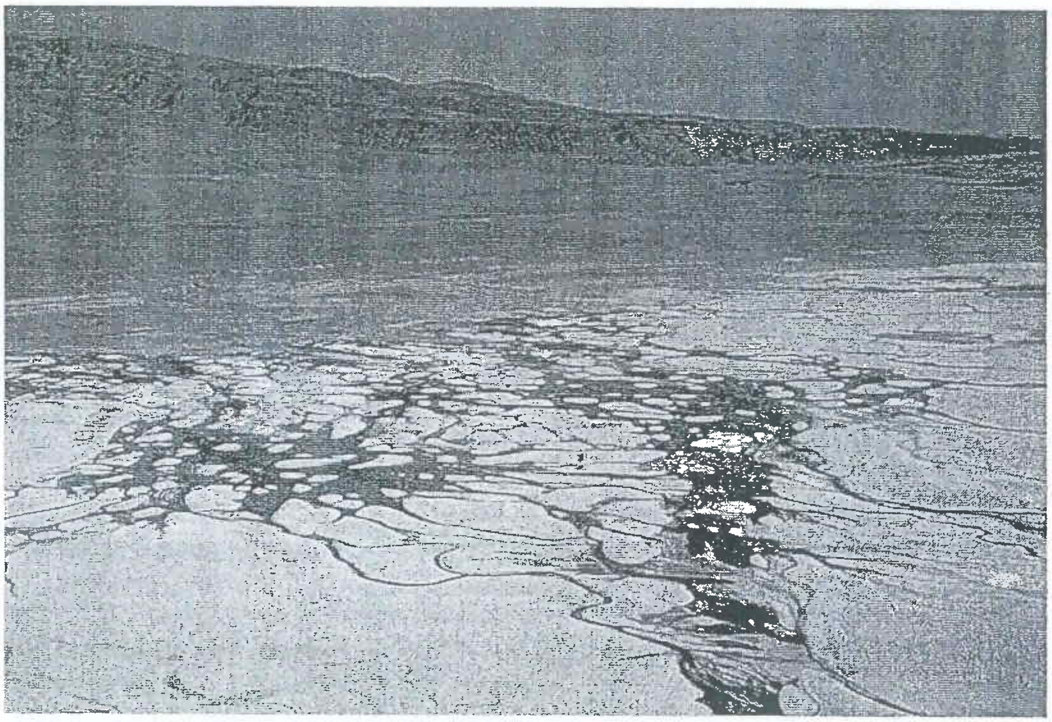

Figure 5.1 – Natural shallow flooding – flows from shoreline seeps and springs out on to lake bed

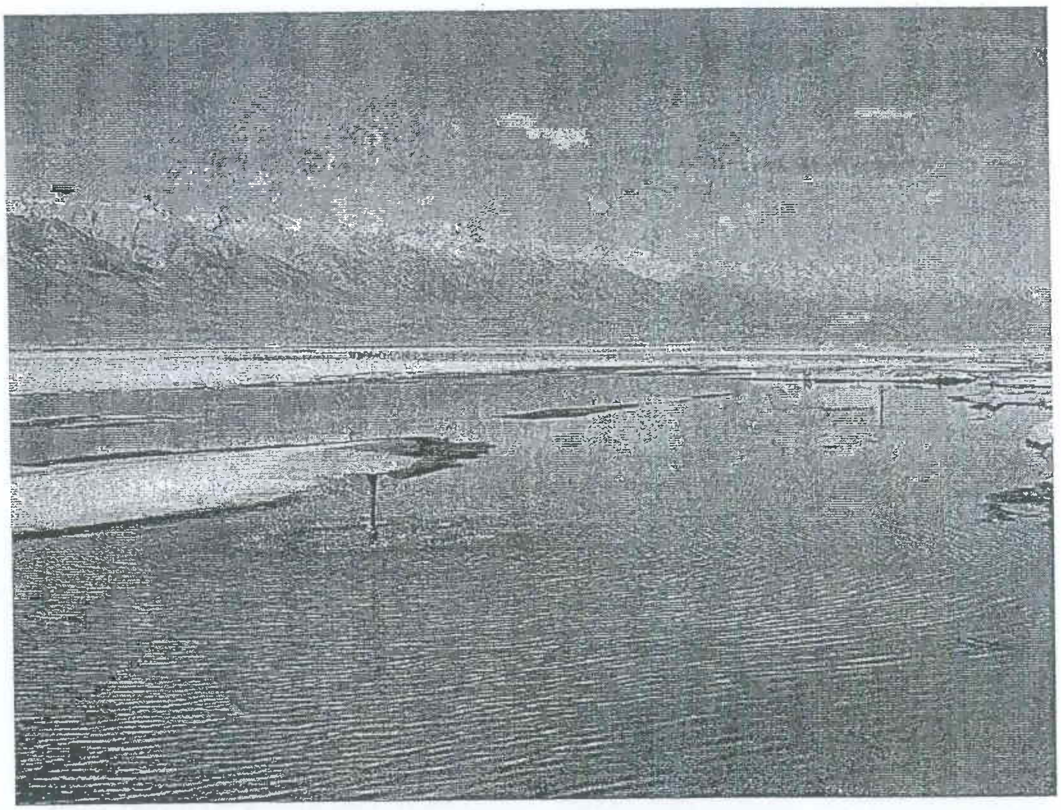

Figure 5.2 – Shallow Flooding – ground level view of sheet flood method

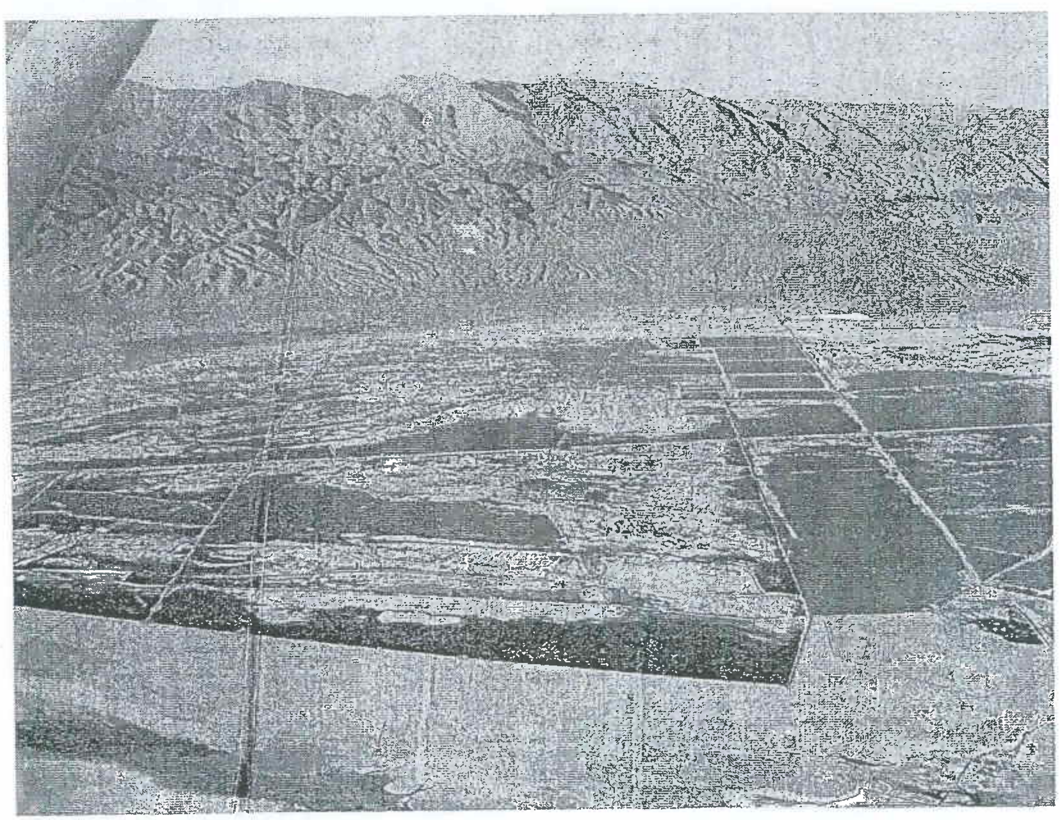

Figure 5.3 – Shallow Flooding – aerial view of sheet flood method (left side of photo)

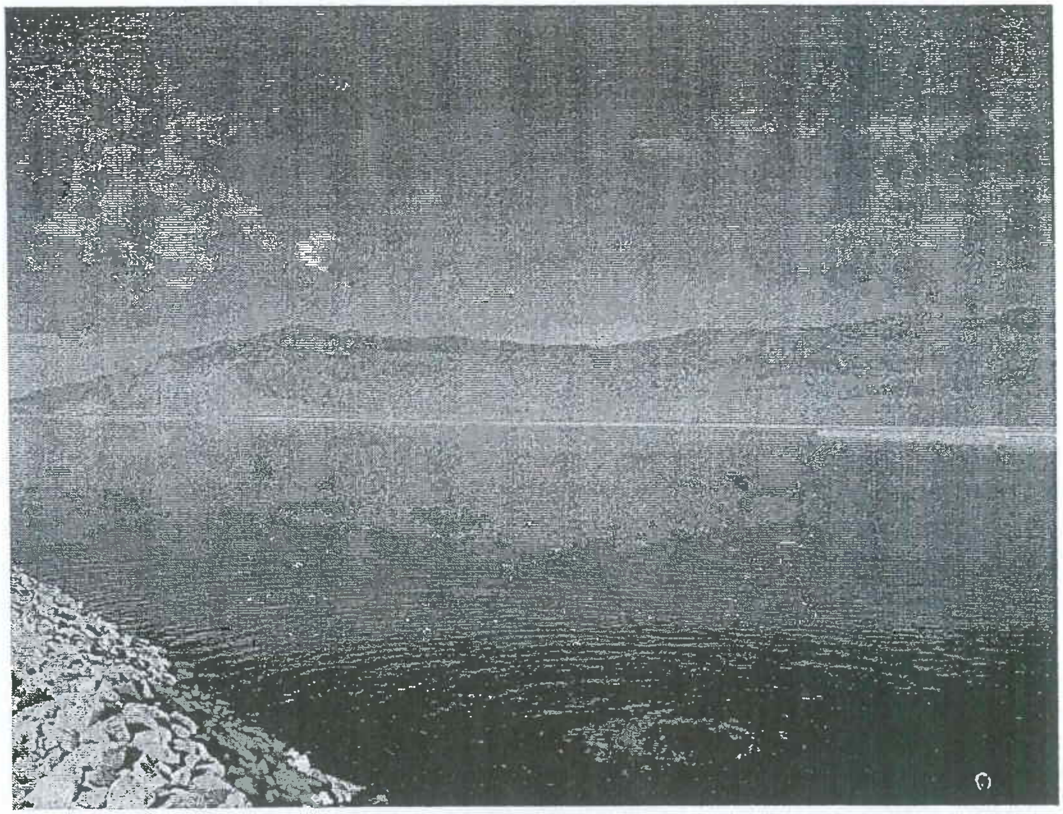

Figure 5.4 – Shallow Flooding - ground level view of pond flood method

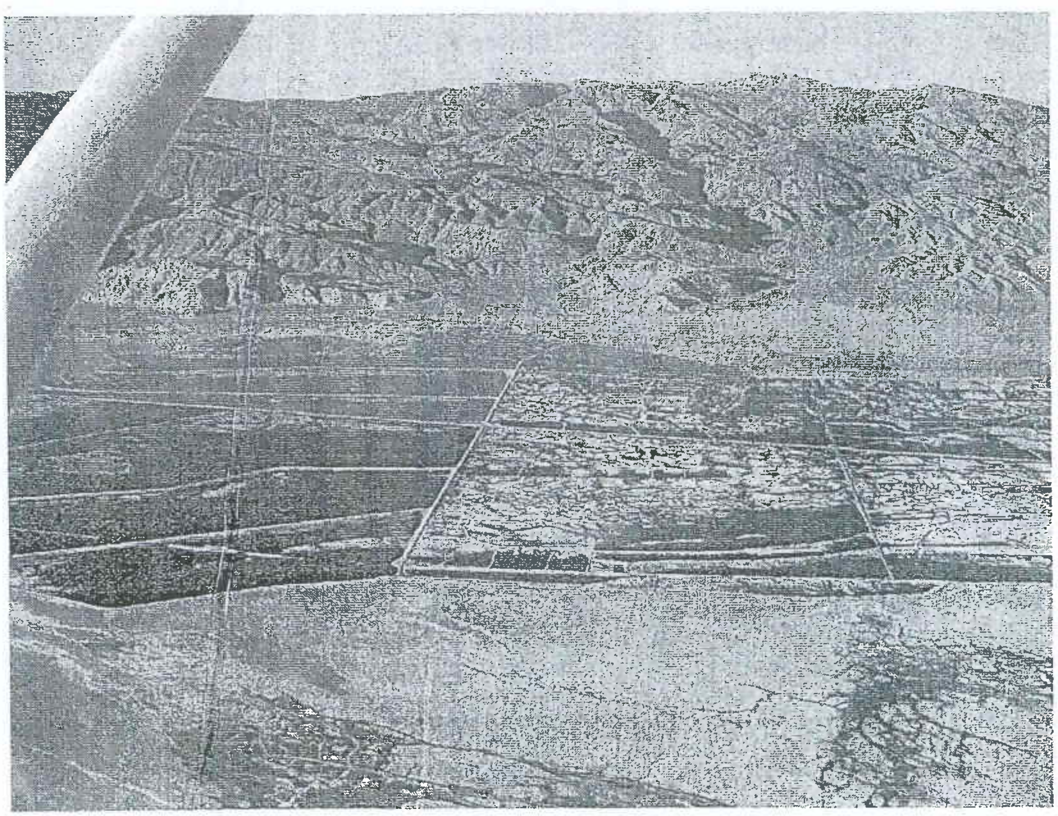

Figure 5.5 – Shallow Flooding – aerial view of pond flood method (left side of photo)

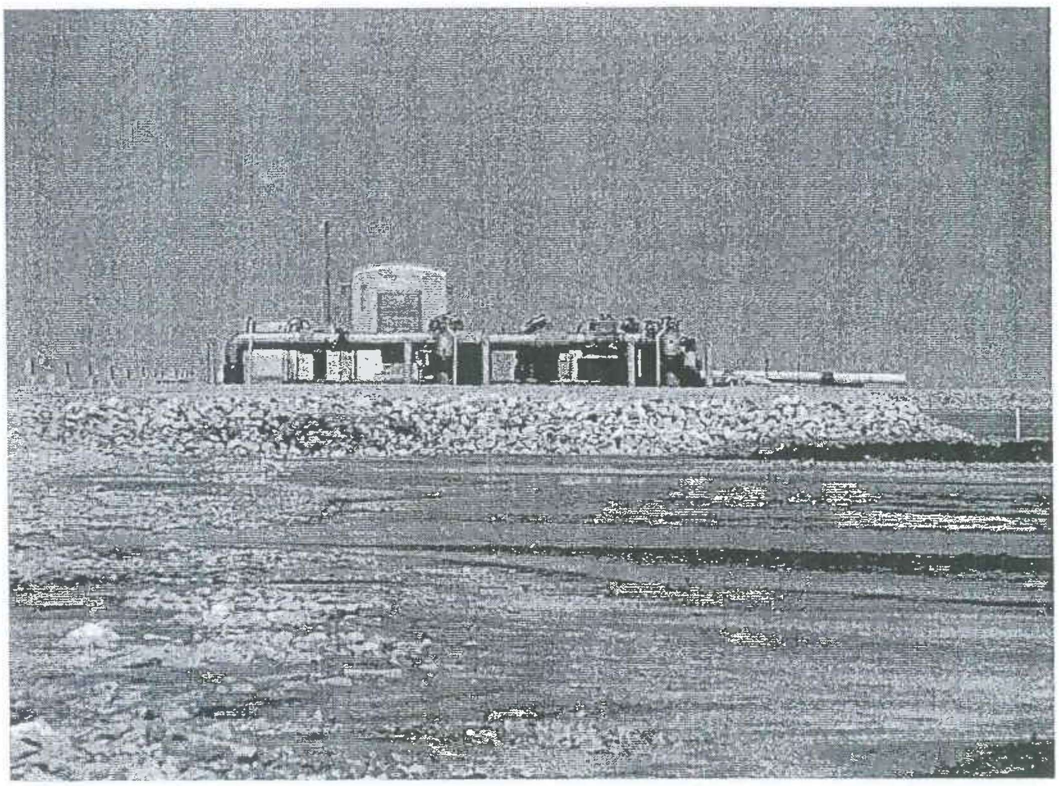

Figure 5.6 – Shallow Flooding – raised equipment pads with armored berms

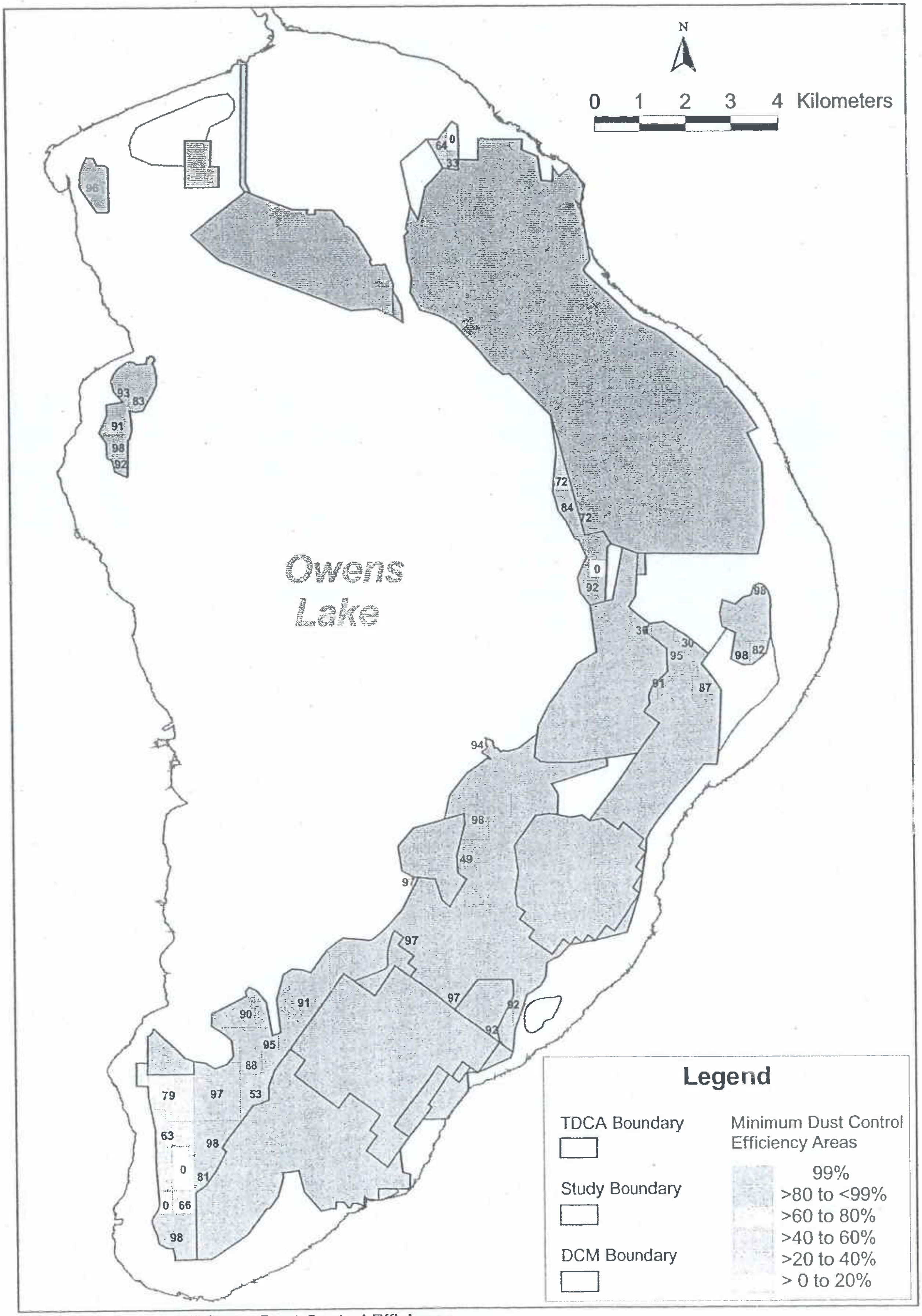

Figure 5.7 - TDCA Minimum Dust Control Efficiency map

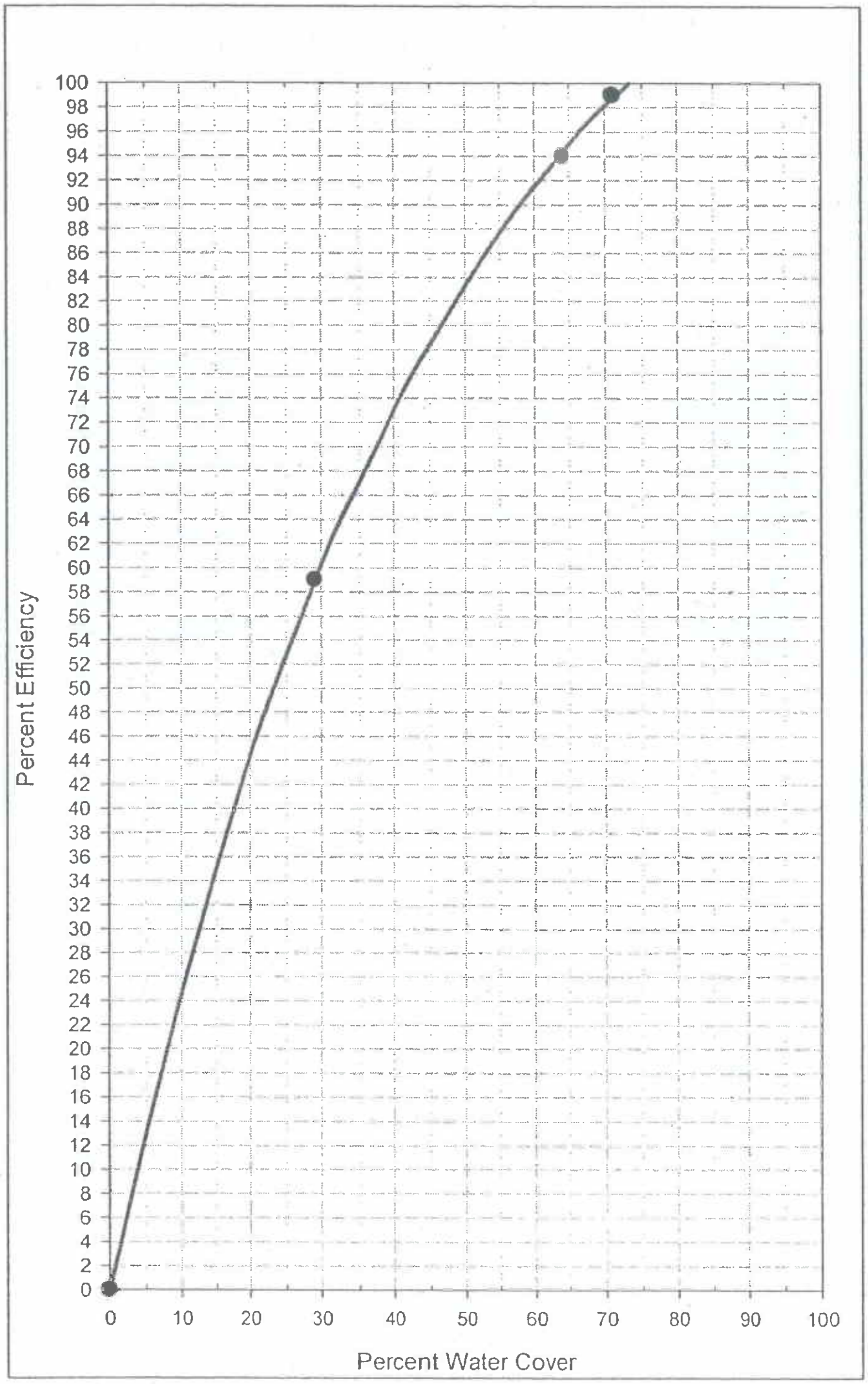

Figure 5.8 - Shallow Flood control efficiency curve

lower emission conditions are referred to as the PM_{10} "shoulder seasons." These lower emission conditions are a result of lower wind speeds and less emissive conditions during the shoulder seasons. Therefore, in order to conserve water resources, while providing the level of PM_{10} control necessary to attain and maintain the federal PM_{10} NAAQS, the provisions of this 2008 SIP will allow the City to reduce the PM_{10} control efficiencies of the Shallow Flooding DCM during the period from October 1 through October 15 and from April 1 through June 30.The percentage of dust control areas that are required to be wet will be ramped up in the fall and ramped down in the spring. The amount of wetting reductions are described below.

5.2.3.1 Fall Shoulder Season — October 1 through October 15

Under the provisions of the 2003 SIP, the City is required to have Shallow Flooding DCM areas fully wetted and operational at the start of the dust season on October 1 of every year. However, in order to get the current 26 square miles of Shallow Flooding areas sufficiently wet by October 1, water deliveries actually start in late August. This means that some level of dust control is actually being provided outside the dust control season as the DCM areas "wet up." Based on data collected during the period from July 2002 through June 2006, as well as District staff's experience over more than two decades on the lake bed, the first two weeks of October are not a period when the lake bed typically experiences highly emissive conditions. Therefore, in order to conserve water resources, full levels of dust control will not be required until October 16 of each year. From an operational standpoint, however, gradually increasing levels of dust protection will occur starting in early September as water deliveries begin. These protection levels will ramp up as additional water is delivered until full levels of protection are provided on October 16. The October shoulder season adjustments will go into effect in October 2010.

5.2.3.2 Spring Shoulder Season — May 16 through June 30

Under the provisions of the 2003 SIP, the City is required to have Shallow Flooding DCM areas fully wetted and operational through the end of the dust season on June 30 of every year. However, based on data collected during the period from July 2002 through June 2006, the required MDCEs are lower during the late spring than they are during the winter and early spring. This is due to the formation of durable, less emissive summer salt crusts on the surface of the lake bed. Late spring is also a time when temperatures in the Owens Valley begin to warm dramatically. The 21-year (1985 through 2005) average temperature for Keeler in March is 54°F—it rises 24 degrees to 78°F for June. Higher air temperatures mean that more of the water applied to DCM areas is lost to evaporation. Therefore, in acknowledgement that the lake bed is naturally less emissive in late spring than during the winter and that, due to increasing temperatures, the City has to apply more water to wet the same amount of area, in order to conserve water resources, starting after April 1, 2010, areas requiring 99 percent MDCE will have the following wetness requirements:

- From October 16 of every year through May 15 of the next year, Shallow Flooding areas with 99 percent MDCE shall have a minimum of 75 percent areal wetness cover.
- From May 16 through May 31, Shallow Flooding areas with 99 percent MDCE shall have a minimum of 70 percent areal wetness cover.
- From June 1 through June 15, Shallow Flooding areas with 99 percent MDCE shall have a minimum of 65 percent areal wetness cover.
- From June 16 through June 30, Shallow Flooding areas with 99 percent MDCE shall have a minimum of 60 percent areal wetness cover.

If any of the Shallow Flooding areas that are allowed to have reduced wetness during the spring shoulder season fail to meet even the reduced wetness requirements, it is possible that the areas failed to meet their minimum targets because not enough water could be delivered through the water distribution infrastructure. Therefore, if the City fails to meet the spring shoulder season targets that start on May 16 and there were no monitored or modeled exceedances of the federal standard at the historic shoreline, those areas that did not meet the reduced minimums will be deemed to be in compliance, if the City demonstrates in writing and the APCO reasonably determines in writing that maximum water delivery mainline flows were maintained throughout the applicable period. This provision does not penalize the City as long as the maximum amount of water is delivered to the site and there are no NAAQS exceedances.

Shallow Flooding areas with less than 99 percent MDCEs shall not be allowed any spring shoulder season areal wetness reductions.

5.2.4 Shallow Flooding Operational Refinements

The District's research on the Shallow Flooding DCM in the 1990s established the relationship between the amount of water coverage on an emissive area and the PM_{10} control effectiveness provided (Hardebeck, *et al.*, 1996). Research control effectiveness varied from as high as 99 percent when 75 percent of an area was wetted down to 60 percent control when water covered 30 percent of the test area. As most of the areas on which the City deployed DCMs in the period from 2000 through 2006 required high levels of control, both the 1998 and 2003 SIP required 99 percent PM_{10} control effectiveness in all DCM areas. This means that all existing Shallow Flooding areas must be 75 percent wetted in order to be in compliance, except as provided during the "shoulder seasons" described in Section 5.2.3.

However, it is possible that the District's research developed percent-wetted requirements that are conservative and the City's large-scale Shallow Flooding DCMs are being operated with more water coverage than is necessary to provide 99 percent PM_{10} control effectiveness. Therefore, this 2008 SIP contains a provision to "fine tune" the amount of water required for 99 percent control. Two types of refinement tests are provided for: 1) an immediate test on up to 1.5 square miles of existing Shallow Flood area requiring 99 percent PM_{10} control efficiency and 2) a large-scale test that allows annual reductions averaging 10 percent wetness, once a set of preconditions have been met. The detailed procedure for the Shallow Flooding operational refinements are set forth in Attachment D to the Board Order in Chapter 8 ("2008 Procedure for Modifying Best Available Control Measures (BACM) for the Owens Valley Planning Area"). The procedure will be summarized here, but, as with all such descriptions, the actual Board Order takes precedence over the summary.

The Shallow Flooding adjustment procedure allows the City the option of immediately conducting a preliminary wetness cover refinement field test on up to 1.5 square miles of existing Shallow Flooding dust control area that requires 99 percent control. The City must select a test area and prepare a test design for it. The District's Air Pollution Control Officer (APCO) must approve the test area and test design prior to implementation. The City is required to conduct all required environmental analyses and secure all necessary permits and approvals for the test. The City can then use the results of the test as a basis for the larger-scale Shallow Flooding wetness refinements, described below.

In addition to the 1.5 square-mile Shallow Flood wetness cover refinement test discussed above, the City may undertake Shallow Flooding wetness refinements in annual increments averaging 10 percent wetness reduction on a large scale, after the following preconditions have been met:

1. All the DCMs required by this 2008 SIP have been constructed.
2. All the DCMs required by this 2008 SIP have been operational for one full year (365 consecutive days).
3. There have been no monitored exceedances of the PM_{10} NAAQS at or above the historic shoreline caused solely by emissions from the 2008 total DCM area for one full year (365 consecutive days).
4. The City prepares a written wetness cover plan that takes into account the results of the preliminary wetness cover refinement field test described above, as well as the results of the fall and spring "shoulder season" wetness reductions described in Section 5.2.3. The City is required to conduct all required environmental analyses and secure all necessary permits and approvals for the test.
5. The APCO approves the wetness cover plan. (Depending on the location and extent of refinement, CSLC approval may also be required.)

Once the above preconditions have been met, the City will be permitted to implement the wetness cover plan and reduce the wetness cover by an average of 10 percent over the Shallow Flooding areas that require 99 percent control efficiency. If shoreline PM_{10} monitors show any exceedances from anywhere in the Planning Area, no further reductions will be permitted for any Shallow Flooding area that has contributed to any exceedance and wetness increases will have to be made in those areas from which excess PM_{10} emissions originated. If there are no monitored 24-hour PM_{10} values exceeding 130 μg/m³ or modeled PM_{10} values exceeding 120 μg/m³ for one full year after the City has implemented the wetness cover plan, the City may apply to the APCO to further reduce wetness coverage in areas requiring 99 percent control. These adjustments may continue until monitored/modeled PM_{10} values exceed the respective 130/120 μg/m³ limits discussed above.

It should be noted that, for state lands on the Owens Lake bed, the California State Lands Commission may have discretionary authority over modifications to the project description for implementing DCMs, including the above-described operational refinements. However, nothing in this SIP is intended to give any regulatory agency more authority than their authority under law. In addition, operational refinements may require CEQA analysis of the potential environmental impacts, particularly to vegetation and wildlife. The responsibility for all CEQA analyses and all required permits and approvals associated with DCM operational refinements are the responsibility of the City.

5.2.5 Shallow Flooding Compliance Monitoring

Using the required MDCE for each DCM area set forth in Figure 5.7, the MDCE vs. wetness curve set forth in Figure 5.8 and adjusting the required wetness during the spring shoulder season, a minimum wetness value can be determined for all Shallow Flooding DCM areas at any time during the year. The actual wetness coverage for Shallow Flooding areas can be determined by aerial photography, satellite imagery or any other method approved by the APCO (Hardebeck, *et al.*, 1996, Schade, 2001, HydroBio, 2007). Currently the District is using publically available USGS Landsat satellite imagery and a process developed by the District's remote sensing consultant, HydroBio, to determine the percent wetness for Shallow Flooding areas. Figure 5.9 shows one of the satellite images and Figure 5.10 shows the compliance status for the image date. Figure 5.11 is a detail showing the wet and dry areas on a portion of the satellite image.

The following portions of the areas designated for control with Shallow Flooding are exempted from the wetness coverage requirements:

1) Raised berms, roadways and their shoulders necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive.
2) Raised pads containing vaults, pumping equipment or control equipment necessary for the operation of Shallow Flooding infrastructure which are otherwise controlled and maintained to render them substantially non-emissive.

"Substantially non-emissive" shall be defined to mean that the surface is protected with gravel or durable pavement sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

5.2.6 Shallow Flooding Habitat

When fresh water is distributed across the playa for Shallow Flooding, opportunistic plant species establish themselves where the water has a low salinity creating favorable growing conditions. Limited stands of cattails (*Typha* spp.), sedges (*Carex* spp.), saltgrass (*Distichlis spicata*) and other species associated with saturated alkaline meadows of the region colonized the immediate vicinity of the water outlets on the District's 1993 to 1996 flood irrigation project. However, during the operation of the first phases of the City's Shallow Flood DCMs, recirculated flood waters generally keep the salinity of the water high preventing significant establishment of volunteer vegetation. Based on testing performed by the District at the North Flood Irrigation Project test area and the City's operation of the first phases of Shallow Flooding, naturally established vegetation can be expected to occur on between zero and 0.5 percent of the area that is controlled with Shallow Flooding.

The expansive shallow flooded areas provide ephemeral resting and foraging habitat for wildlife use. Figure 5.12 is a photo of one of the City's Shallow Flooding control areas west of the community of Keeler. Shorebirds can be seen using the wetted area. Shorebird utilization of wet areas on the lake bed was common during the District's control measure testing as well as during the City's operation of the first phases of large-scale Shallow Flooding (Ruhlen and Page, 2001, 2002). Based on these previous experiences, it is anticipated that Shallow Flooding will create large areas of wildlife habitat in areas where very little previously existed.

In addition to desirable plant species, such as those listed above, that may grow and help control PM_{10} emissions, there is the possibility that undesirable non-native plants may invade wet playa areas. Fortunately, the existing saline soil conditions inherent to the lake bed are inhospitable to most plants including exotic pest plants such as tamarisk, puncture weed and Russian thistle and noxious grasses such as *Cenchrus*. The Board Order requires the City to remove all exotic pest and weed plants from the dust control areas. Removal will be accomplished through an appropriate combination of biological, mechanical and chemical control methods. Depending on

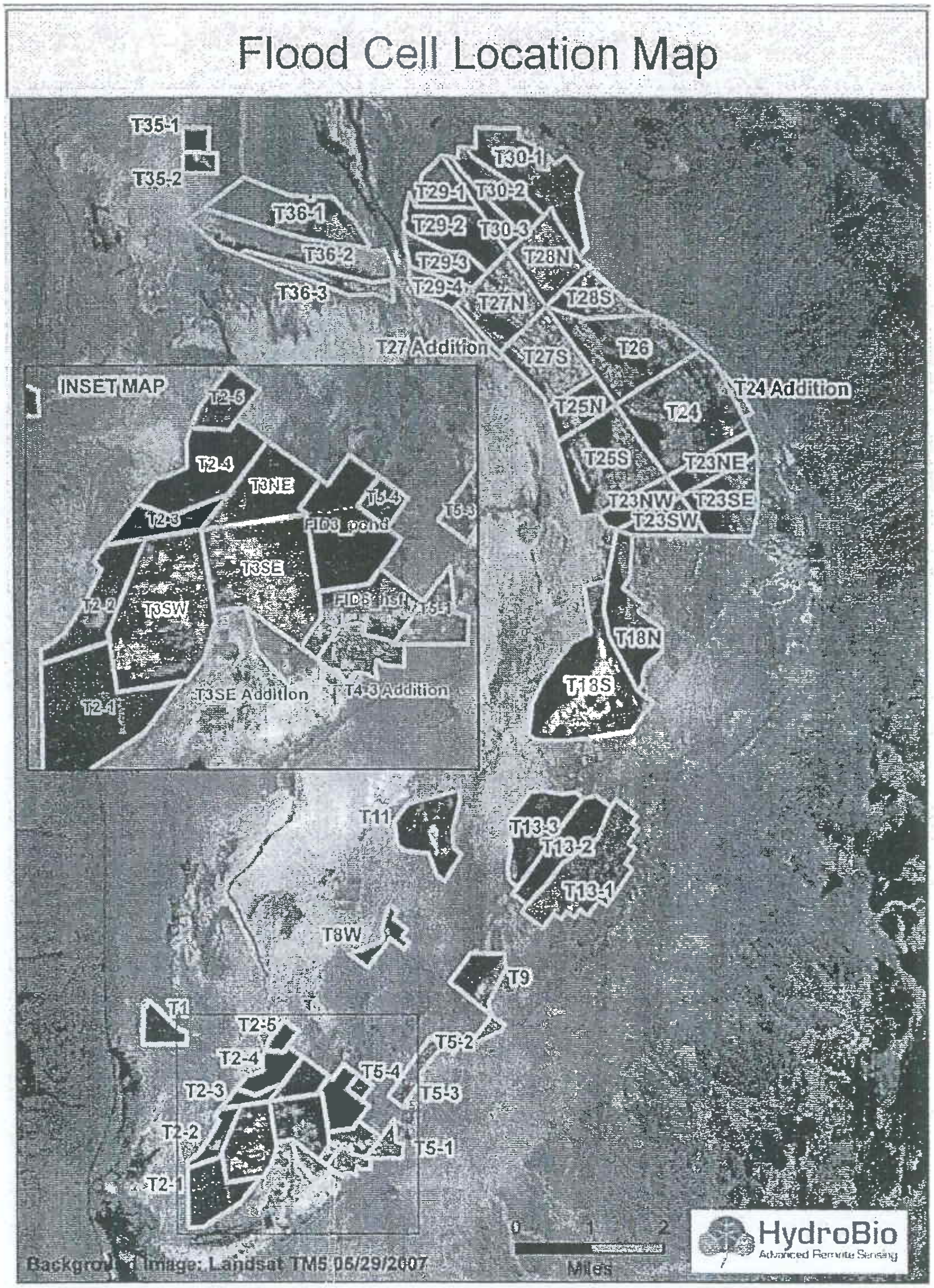

Figure 5.9 – Shallow Flooding satellite image

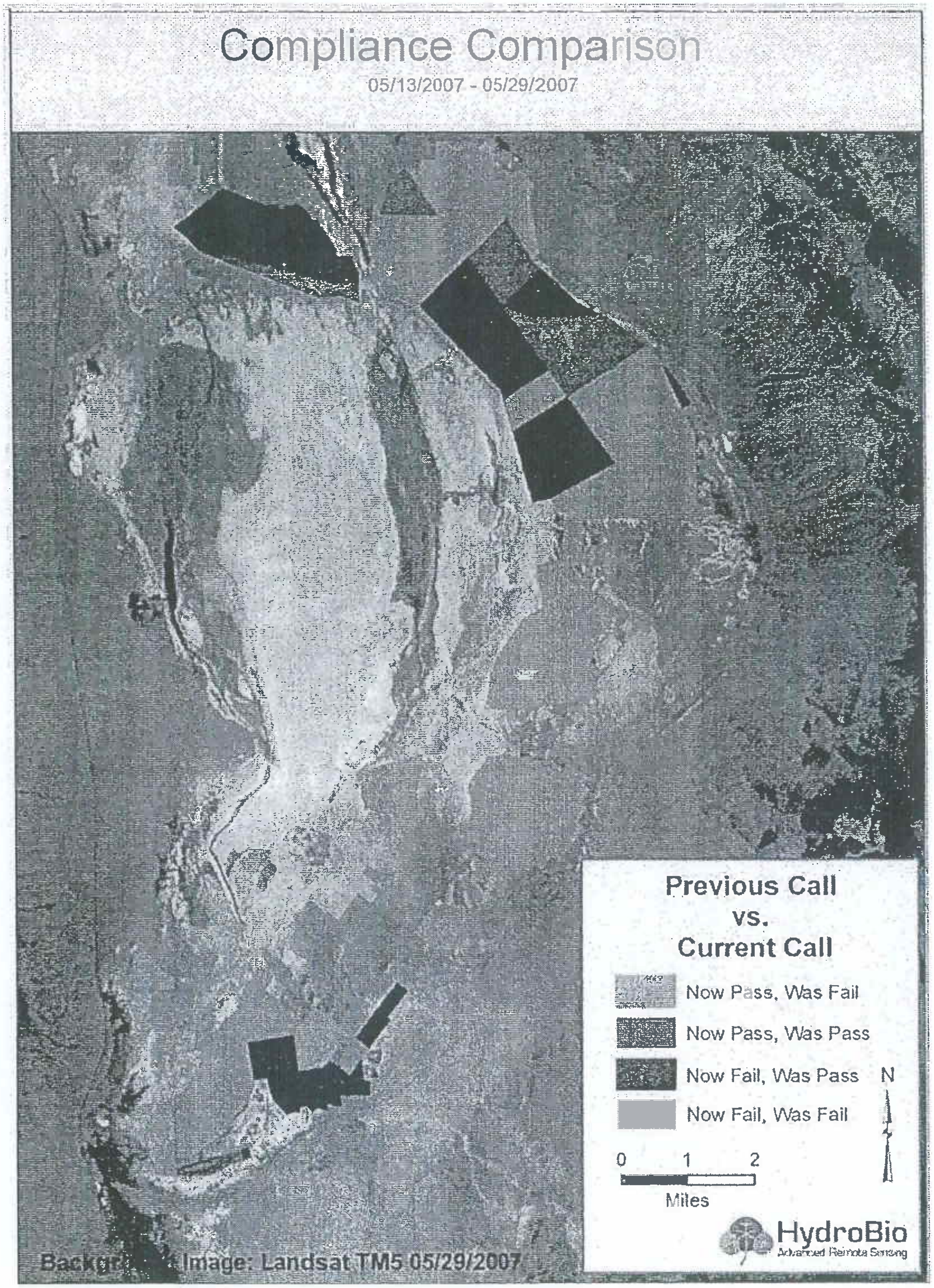

Figure 5.10 – Shallow Flooding compliance status

This view shows the NW region of the Owens Lake with failing cells outlined in red and compliant (wet) pixels shown in blue

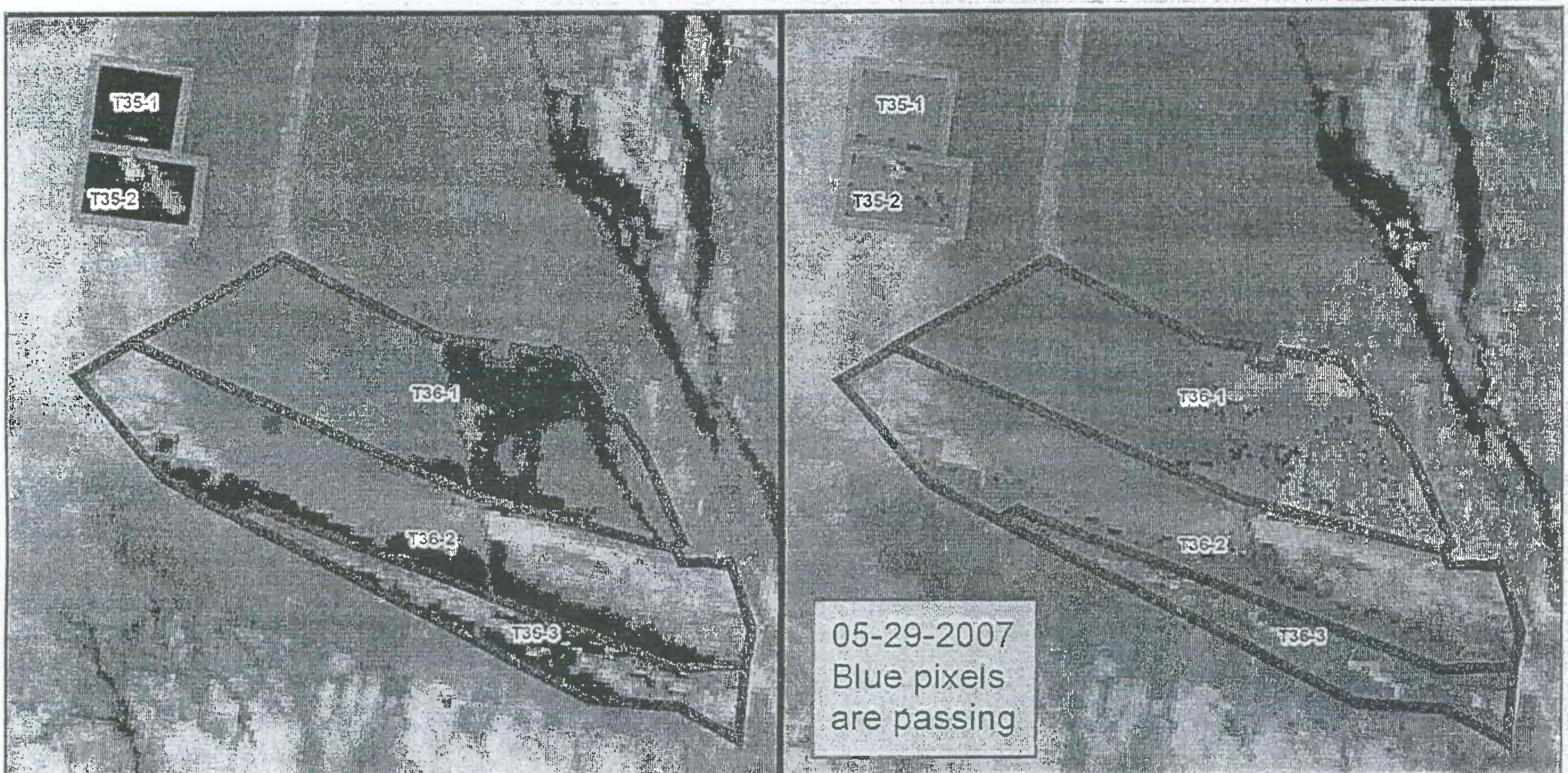

Figure 5.11 – Shallow Flooding compliance detail

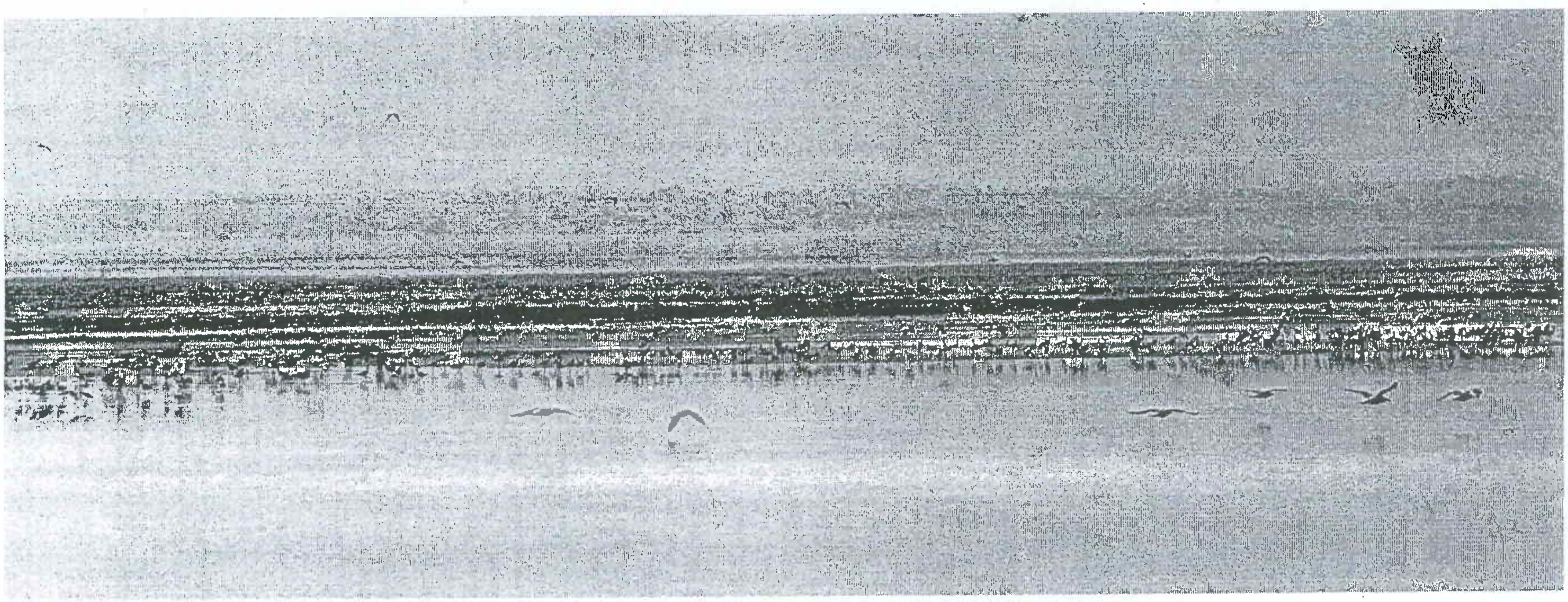

Figure 5.12 – Shallow Flooding wildlife

the method of exotic pest and weed plant control selected by the City, the City may need to conduct the appropriate CEQA analysis and secure approval from other responsible agencies, especially the State Lands Commission, for activities on state lands. In addition, a mitigation monitoring program for all potentially significant impacts to wildlife may be required.

Field investigations were performed by mosquito entomologists from the University of California, Davis at District Shallow Flooding test sites and at natural pond, spring and seep areas around Owens Lake to determine the potential for water-based control measures to create mosquito-breeding habitat (Eldridge, 1995). These investigations concluded that mosquito habitat had limited potential to occur on the lake bed, but could occur when water depths range from 2 to 20 inches and when water had essentially no movement.

A mandatory element of this project will be a program to abate mosquito and other pest vector breeding and swarming. Abatement activities may include site design elements to minimize vector breeding habitat, application of pesticides and/or biological controls. These measures are successfully used throughout the Owens Valley. As an alternative to a separate mosquito and pest abatement program, the City of Los Angeles may petition the County of Inyo to annex all water-based control measure areas into the Inyo County Mosquito Abatement Program. If annexation occurs, appropriate assessments may be levied to ensure that abatement activities can take place. In recognition of the location of the source emission control areas in an area that is a stopover location for shorebirds and waterfowl, the mosquito and pest abatement programs shall be designed to minimize the potential impacts on the breeding success of western snowy plovers and other birds that use the playa. Depending on the method of mosquito and pest insect control selected by the City, the City may need to conduct the appropriate CEQA analysis and secure approval from other responsible agencies, especially the State Lands Commission for activities on state lands. In addition, a mitigation monitoring program for all potentially significant impacts to wildlife may be required. All mosquito and pest insect abatement costs shall be the sole financial responsibility of the City.

5.2.7 Shallow Flooding Operation and Maintenance

Water flows between October 15 and June 30 will be maintained to provide the required water coverages in substantially evenly distributed standing water or surface-saturated soil. Based on the City's actual operation of large-scale Shallow Flooding area in 2006 and 2007, operating the Shallow Flooding control measure is predicted to use approximately 3.1 to 4.2 acre-feet per year (ac-ft/yr) of water per acre controlled. Drains installed near naturally occurring wetlands would be operated so as not to cause significant groundwater drawdown or loss of surface water extent in the adjacent areas. The District will continue its program of monitoring water levels and vegetation cover in Owens Lake bed wetlands to ensure installed drains are not adversely impacting existing wetlands.

Maintenance activities associated with Shallow Flooding consist of grading, addition of supplemental water outlets, and berming on the control areas to ensure uniform water coverage and prevention of water channeling. Other activities include regular and preventative maintenance of pipeline, valves, pumping equipment, berms, roads and other infrastructure. Based on District projects and operation of the first phases of Shallow Flooding by the City, staffing requirements for operation and maintenance of the Shallow Flooding areas will be approximately one full-time equivalent employee (FTEE) per 580 acres of flooded area.

5.3 MANAGED VEGETATION

5.3.1 Description of Managed Vegetation for PM_{10} Control

Vegetated surfaces are resistant to soil movement and thus provide protection from PM_{10} emissions. Vegetation that has established 50 percent total surface cover provides a very effective barrier that prohibits wind speeds from reaching the threshold velocity for emissions at the playa surface. Vegetation has naturally become established where water appears on the playa surface with quantity and quality sufficient to leach the salty playa soils and sustain plant growth. Natural saltgrass meadows around the playa margins and the scattered spring mounds found on the playa are examples of such areas (Figure 5.13). Observation of these naturally vegetated areas has shown that very little dust emissions are generated from them. The Managed Vegetation strategy is modeled on these naturally protective saltgrass vegetated areas. Dust control using Managed Vegetation is a mosaic of irrigated fields provided with subsurface drainage that create soil conditions suitable for plant growth using a minimum of applied water. Aerial and ground-level views of existing Managed Vegetation PM_{10} controls constructed by the City are shown in Figures 5.14, 5.15a and 5.15b.

The Managed Vegetation control measure consists of creating a farm-like environment from currently barren playa. The saline soil must first be reclaimed with the application of relatively fresh water, and then planted with salt-tolerant plants that are native to the Owens Lake basin. Thereafter, soil fertility and moisture inputs must be managed to encourage rapid plant development to, and maintenance of, 50 percent cover. Existing Managed Vegetation controls on the lake bed are irrigated with buried drip irrigation tubing and a complex network of buried tile drains capture excess water for reuse on the Managed Vegetation area or in Shallow Flooding areas.

Managed Vegetation is sustainable at Owens Lake only if salt from the naturally occurring shallow groundwater is prevented from rising back into the rooting zone. Leaching and irrigation water applied to the Managed Vegetation serves to create and maintain a gradient of salts down and away from the rooting area of the planted vegetation. A subsurface drainage system is present beneath each Managed Vegetation field and allows collection of irrigation flows and removal of high salinity groundwater so that levels do not rise into the root zones of the established saltgrass. Drain water is pumped from the site and placed into brine storage ponds where it can be recycled and used for Shallow Flooding or for mixing with fresh irrigation water so that the applied water has salinity sufficient to maintain the soil structure as well as irrigate the salt tolerant *Distichlis spicata* (saltgrass). However, depending on local site conditions and compliance requirements, alternative irrigation and drainage configurations, water supply quality, irrigation scheduling regimes, and plant communities may be employed, so long as the essential ground coverage compliance requirements for an approved DCM are achieved. In clay dominated soils irrigation with low-salinity or fresh water can potentially cause a collapse of the soil structure, preventing water infiltration and salt leaching. The City's existing Managed Vegetation site has a target applied water salinity of approximately 9 decisiemens per meter (a measure of electrical conductivity—seawater has a salinity of about 35dS/m) and requires addition of saline drain water to reach this salinity level. Drains installed near naturally occurring wetlands are operated so as not to cause significant groundwater drawdown or loss of surface water extent in the adjacent wetland areas.

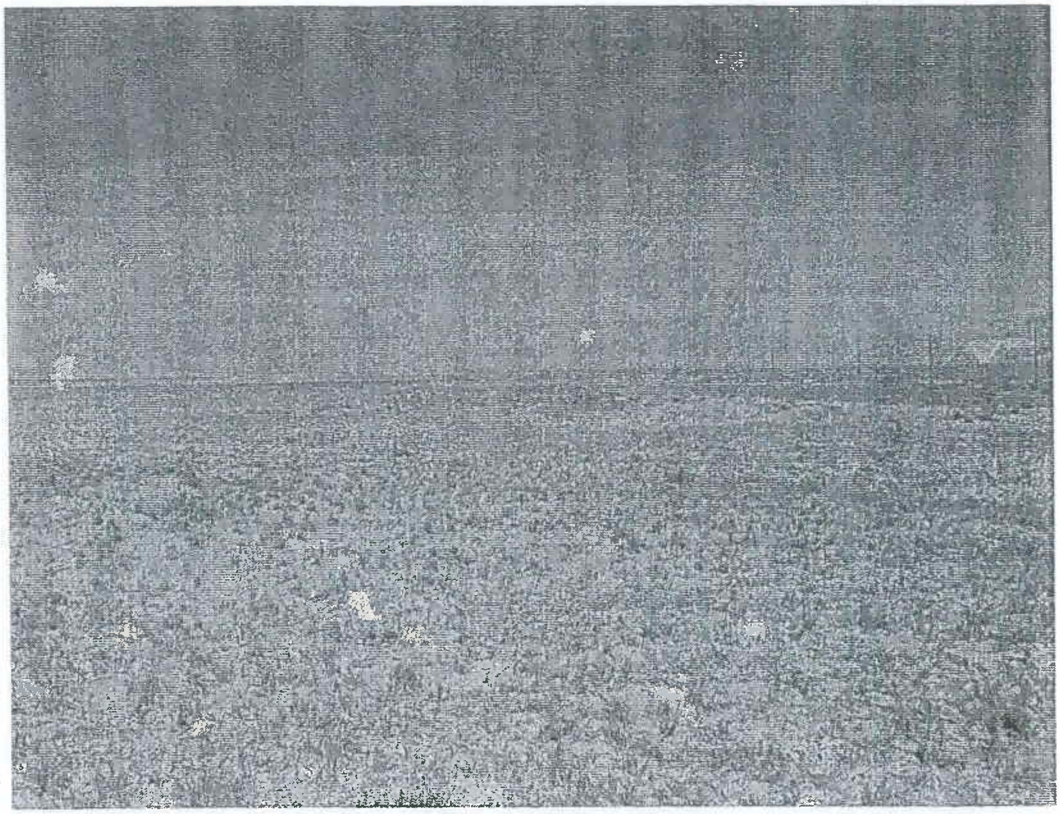

Figure 5.13 – Natural saltgrass meadows on northeast corner of the Owens Lake bed

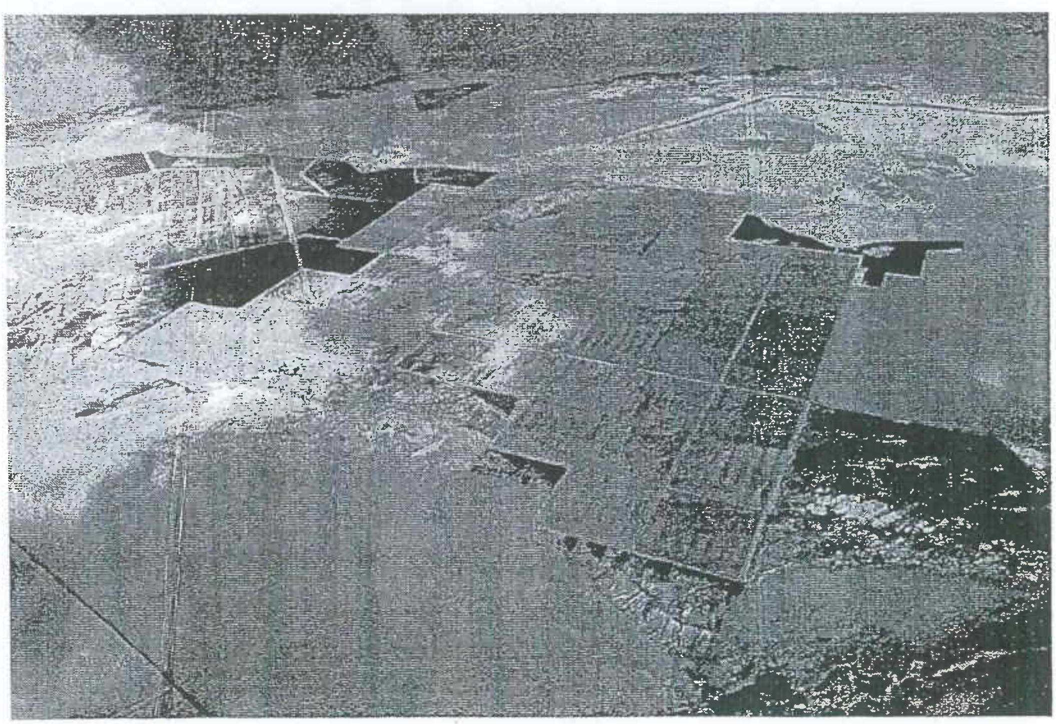

Figure 5.14 – Managed Vegetation – aerial view

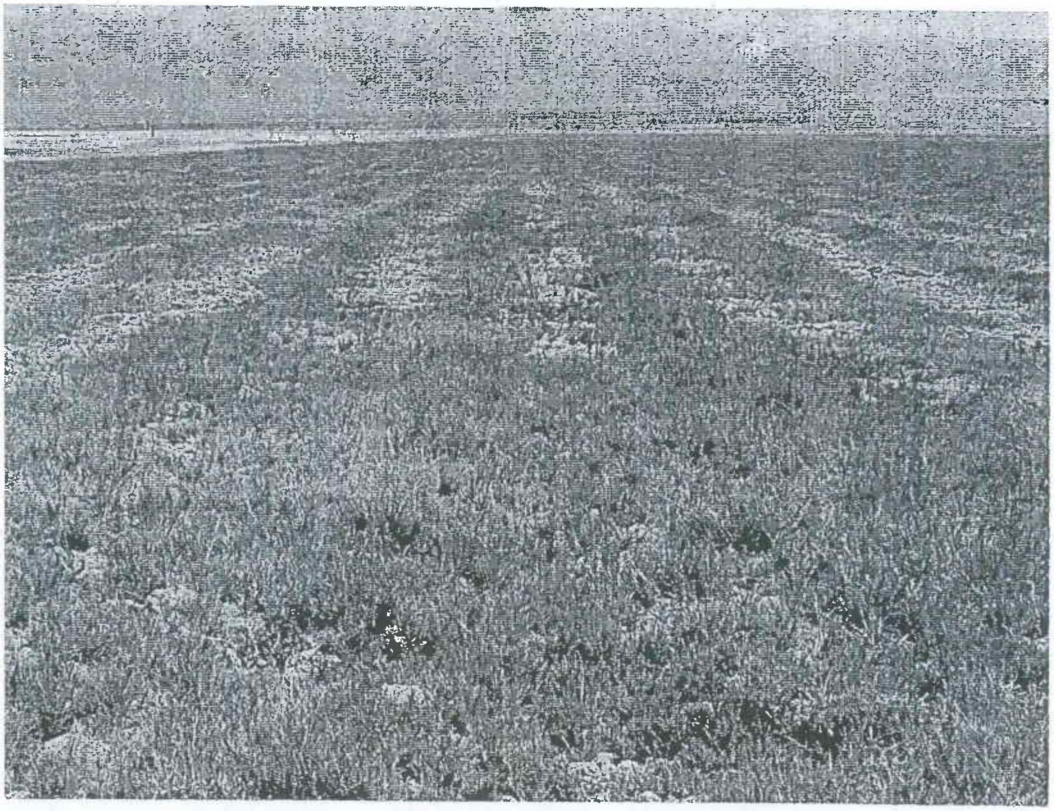

Figure 5.15a – Managed Vegetation – ground level view

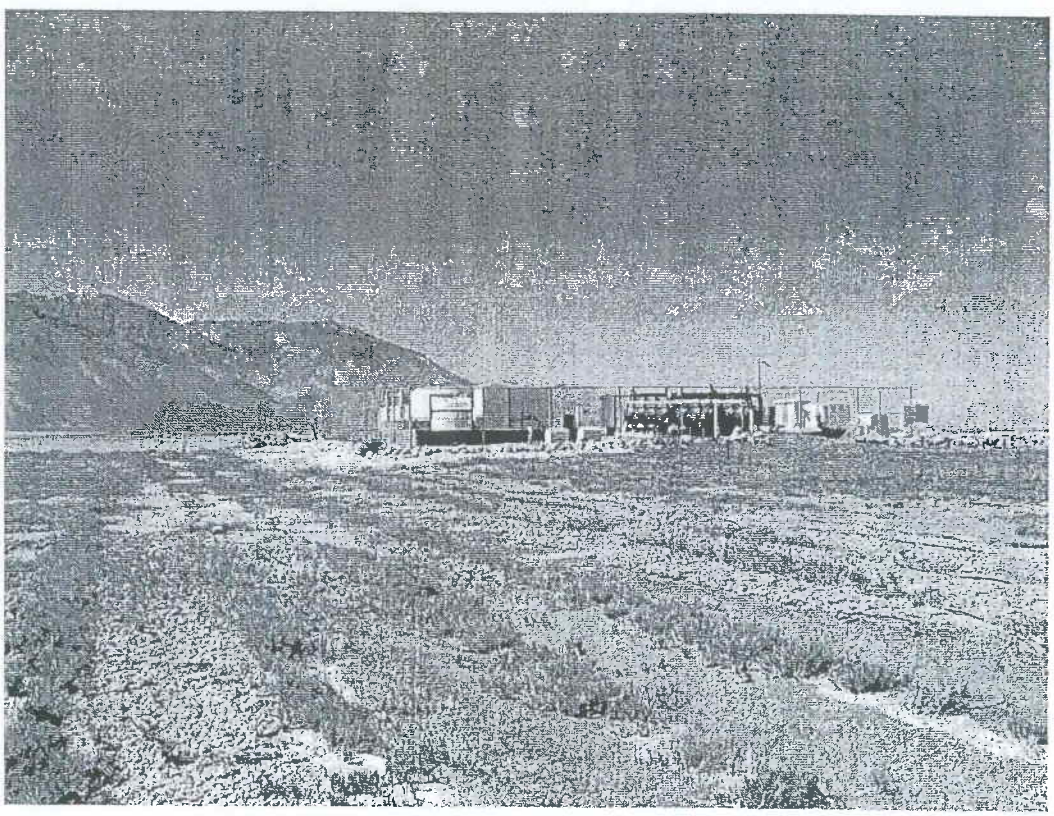

Figure 5.15b – Managed Vegetation – equipment pad with sand filters and chemical tanks

The clay soils found on many areas of the lake bed are appropriate for the construction of earthen infrastructure. The native profiles, texture and fractured structure of the clay soil makes it well suited for water distribution and drainage. The lower profiles in clay soils often include a network of existing fractures, facilitating effective drain water collection and natural drainage so that the groundwater does not intrude into the rooting zone. The fine clay particles have a very high pore volume (approximately 50 percent) and therefore retain water for long periods between irrigation events (Stradling, 1997 and Ayars, 1997).

Tests by the District and others have shown that vegetation covers ranging from 11 to 54 percent provide the surface protection necessary for the 99 percent PM_{10} control needed at Owens Lake in order to meet the NAAQS. In order to provide the margin of safety necessary to prevent PM_{10} emissions in all conditions, the District has determined that 50 percent total cover averaged over every acre is an appropriate, conservative prescription for the Managed Vegetation PM_{10} control measure. Total cover includes living plants and any dead plant materials, as both function to prevent PM_{10} emissions. Once the target cover of 50 percent is attained, saltgrass stands can be sustained at or above this level of cover with less than 2.5 acre-feet per year of irrigation water (GBUAPCD, 2002a, 2002c).

The City currently has about 3.5 square miles of Managed Vegetation PM_{10} controls on the lake bed. The Managed Vegetation area is in one contiguous block near the south end of the lake bed. Initial site planting occurred in the summer of 2002 and the City has worked since that time to improve vegetation cover. Although there are portions of the existing Managed Vegetation area that meet the 50 percent cover requirement, the overall site vegetation cover averages about 24 percent. This is well below the SIP requirement of 50 percent vegetation cover on every acre. However, the 3.5 square mile site, as a whole, has achieved a high level of PM_{10} control (Air Sciences, Inc., 2006).

As part of the 2006 Settlement Agreement between the District and the City entered into in December 2006, (Chapter 8, Attachment A, 2006 Settlement Agreement, Paragraph 6) the parties agreed that the existing Managed Vegetation site had achieved a high level of PM_{10} control. They also agreed that the City would prepare an Operation and Management Plan that ensured the site continued to achieve control sufficient to prevent emissions that caused or contributed to NAAQS violations. The Plan is to be approved by the APCO. As long as the City continues to operate and maintain the site such that it meets the Plan's requirements and as long as the site does not cause an exceedance of the NAAQS at the historic shoreline, the District will deem the existing Managed Vegetation site to be in compliance.

The City prepared a draft of the required Managed Vegetation Operation and Maintenance Plan and submitted it to the District prior to the July 1, 2007 deadline set forth in the Settlement Agreement. The Plan will not be approved prior to the adoption of this 2008 SIP, but will be approved by the APCO as expeditiously as possible. The provisions of the Plan only apply to the Managed Vegetation area that was in place and operational prior to January 1, 2007. Any Managed Vegetation dust controls that are constructed after January 1, 2007 must meet the 50 percent cover on every acre requirement.

The following portions of the areas designated for control with Managed Vegetation are exempted from the vegetative cover requirements:

1) portions consistently inundated with water, such as reservoirs, ponds and canals,
2) roadways and equipment pads necessary to access, operate and maintain the control measure which are otherwise controlled and maintained to render them substantially non-emissive, and
3) portions used as floodwater diversion channels or desiltation/retention basins.

"Substantially non-emissive" shall be defined to mean that the surface is protected with gravel, durable pavement or other APCO-approved surface protections sufficient to meet the requirements of District Rules 400 and 401 (visible emissions and fugitive dust).

Percent cover can be measured by the point frame method or via ground-truthed remote sensing technologies such as aerial photography or satellite imagery or by any other method approved by the APCO (Scheidlinger, 1997, Groeneveld, 2002, HydroBio, 2007).

Saltgrass *(Distichlis spicata)* is currently the only plant species approved for introduction into Managed Vegetation fields. Saltgrass is tolerant of relatively high soil salinity, spreads rapidly via rhizomes and provides good protective cover year-round even when dead or dormant. It is adapted to produce its most vigorous growth during the spring and autumn, and then use minimal amounts of applied water during the hot summer. Saltgrass grows vigorously in conditions of soil salinity that exclude invasive pest exotics. Eventually, salt-tolerant, locally native shrubs such as salt bushes (*Atriplex* spp.), greasewood (*Sarcobatus vermiculatus*), and seepweed (*Sueada moquinii*) may be introduced to established saltgrass fields to increase diversity and possibly reduce total water demand. Locally adapted native plant species other than saltgrass may intentionally be planted for dust control only upon approval of both the District and the California State Lands Commission.

5.3.2 PM_{10} Control Effectiveness for Managed Vegetation

Field and wind tunnel research using Owens playa soils and saltgrass indicate that even sparse populations of saltgrass are effective in reducing sand migration and PM_{10} emissions within the stand (Lancaster, 1996, White, *et al.*, 1996, Nickling, *et al.* 1997, White, 1997, Air Sciences, Inc., 2006). Lancaster concluded that for the coarse sands on the northern portion of Owens Lake, a 95 percent reduction in sand movement can be achieved with a saltgrass cover of between 16 to 23 percent, depending on wind speed and direction. White showed that in wind tunnel tests a vegetation cover of 12 to 23 percent will significantly reduce the amount of entrained sand and PM_{10}. Nicking *et al.* showed that on clay soils PM_{10} was reduced by two orders of magnitude from vegetated surfaces as compared to the natural playa surface. Similar PM_{10} reductions were also observed from non-vegetated leached clay soils. This indicates that treatment of the clay surfaces at Owens Lake by watering and leaching surface salts can by itself significantly reduce wind erosion without vegetation. However, saltgrass vegetation cover will provide additional surface protection after evaporation decreases the initial protection provided by surface wetting. In a companion project by White (1997), Owens Lake clay soils planted with saltgrass were subjected to various wind speeds in a wind tunnel at the University of California

Davis. Results indicate that 54 percent vegetation cover reduces the emission rate of PM_{10} at wind speed of 45 mph by 99.2 percent as compared to emissions from the natural playa at Owens Lake. Air Sciences (2006) concluded that the existing Managed Vegetation dust control implemented by the City of Los Angeles on the lake bed controlled sand motion by 99 percent with average vegetation covers of over 20 percent.

Control efficiencies were calculated for Owens Lake clay soils in both the field on natural plant stands and in the laboratory using wind tunnels. The field studies showed 99.5 percent control efficiency with 11 to 23 percent saltgrass cover and the laboratory study demonstrated 99.2 percent control efficiency at 54 percent cover as compared to uncontrolled emissions at Owens Lake. A high control effectiveness for low levels of plant cover in agricultural-type soils is supported by field research performed by Buckley and Grantz, *et al.* in places other than Owens Lake, which indicate that a plant cover of even 30 percent can achieve better than 99 percent reduction of soil erosion (Buckley, 1987; and Grantz, *et al.*, 1995). Based on the Buckley and Grantz field studies, the field studies at Lake Texcoco, near Mexico City, other work relating to PM_{10} emissions and vegetation and studies done at Owens Lake, the District believes that more than 99 percent reduction of soil erosion and PM_{10} will be achieved at Owens Lake with a saltgrass cover of 50 percent. The cover achieved within the Managed Vegetation would include a mix of live, dead and/or dormant stems. This level of cover will be retained with appropriate plant husbandry and irrigation during the growing season. It will function during winter months without irrigation. Table 5.1 summarizes research results regarding vegetation cover and control effectiveness.

5.3.3 Managed Vegetation Habitat

Even if saltgrass is the only plant species that is intentionally introduced to the Managed Vegetation area, other native plant species are expected to establish themselves opportunistically. Native plant species observed on saltgrass test plots include inkweed (*Nitrophila occidentalis*), alkali sacaton (*Sporobolus airoides*), arrowscale (*Atriplex phyllostegia*), cattail (*Typha latifolia*) parry saltbush *(Atriplex parryi*), seablight (*Sesuvium verrucosum*) and stinkweed (*Cleomella sp*.). The species typical of transmontane alkaline meadows elsewhere in the Owens Basin, including sedges (*Scirpus* spp.), greasewood (*Sarcobatus vermiculatus*), and yerba mansa (*Anemopsis californica*) would also be expected to appear where soil leaching is most complete, adding diversity and wildlife habitat value to the fields. Although these species are not yet approved for intentional planting, they are locally-adapted native species and do not need to be removed by the City.

On saltgrass test plots established by the District on the playa, evidence of use by birds, rabbits, mice, kangaroo rats, gophers, foxes, coyotes, and a diverse group of invertebrates has been found. Care must be taken to avoid creating disturbed, highly freshened habitats that facilitate pest vector (e.g., mosquito) or noxious weed (e.g., salt cedar) infestations. The mosquito and salt cedar control programs discussed in Section 5.2.6 would also take place on the Managed Vegetation control measure. The Board Order requires the City to remove all exotic pest plants from the dust control areas. Removal will be accomplished through an appropriate combination of biological, mechanical and chemical control methods.

5.3.4 Managed Vegetation Operation and Maintenance

Water use is highest during the initial stages of development of this measure, in order to leach the root zone soil to a salinity level tolerable to saltgrass. Since the later stages of leaching can be accomplished after planting, the total water input that will be required for the first year of implementation will be at most seven ac-ft/ac. Managed Vegetation will consume up to 2.5 acre feet of fresh or mixed water per irrigated acre once the target cover of 50 percent is reached. The City's existing Managed Vegetation site was established with about 2.5 ac-ft/ac of water and their actual water use (with less than 50% average cover) has been between 1.0 to 1.3 ac-ft/ac per year. Non-irrigated acres used for roads, berms, water infrastructure and water storage will alsouse some water for maintenance of protective (non-emissive) salt-crusted surfaces. The distribution of the water over the entire vegetated area will be irregular, because at any given time some fields will be irrigated for maximum growth while others will receive minimal amounts of water allowing for minimal stand maintenance.

Operation and maintenance activities for Managed Vegetation consists of implementing irrigation and fertilization schedules for the fields and monitoring drainage and vegetation conditions, as are appropriate for any sustainable perennial cropping system. Necessary maintenance will include repair and periodic replacement of water delivery and drainage infrastructure. Based on District projects and actual large-scale implementation of Managed Vegetation by the City, staffing requirements for operation and maintenance are approximately one full-time equivalent employee (FTEE) per 230 acres of vegetated area.

5.4 GRAVEL BLANKET

5.4.1 Description of Gravel Blanket for PM_{10} Control

A four-inch layer of coarse gravel laid on the surface of the Owens Lake playa will prevent PM_{10} emissions by: (a) preventing the formation of efflorescent evaporite salt crusts, because the large pore spaces between the gravel particles disrupt the capillary movement of saline water to the surface where it can evaporate and deposit salts; and (b) creating a surface that has a high threshold wind velocity so that direct movement of the large gravel particles is prevented and the finer particles of the underlying lake bed soils are protected. Gravel Blankets are effective on essentially any type of soil surface.

The District constructed small-scale gravel test plots on the Owens Lake bed that were in place for approximately 17 years and continued to completely protect the emissive surfaces beneath. Gravel placed onto the lake bed surface will be durable enough to resist wind and water deterioration, physical/mechanical/chemical weathering and leaching and, to minimize visual impacts, will be approximately the same color as the existing lake bed. The City installed about 90 acres (0.14 square-miles) of Gravel Blanket on the northern portion of Owens Lake in 2005 from rock taken from the Dolomite gravel quarry. A picture of the large scale Gravel Blanket is shown in Figure 5.16.

Under certain limited conditions of sandy soils combined with high groundwater levels, it may be possible for some of the Gravel Blanket to settle into lake bed soils and thereby lose effectiveness in controlling PM_{10} emissions. To prevent the loss of any protective gravel material into lake bed soils, a permeable geotextile fabric may be placed between the soil and the gravel, where necessary. This will prevent the settling of gravel particles into lake bed soils.

Table 5.1 – Summary of studies relating the surface cover of vegetation to percent control of PM_{10} emissions

Reference	Surface Cover Characteristics	Wind Speed	% Control
Air Sciences, Inc., 2006	20% saltgrass cover on Owens Lake clay and sand soils	NA	99%
Buckley, 1987	30% ground cover.	NA	99%
Fryrear, 1994	50% canopy cover.	48 mph	96.3%
Grantz, *et al.*, 1995	31% cover on sandy soil.	NA	99.8%
Lancaster, 1996	16-23% saltgrass cover at Owens Lake on sandy soil.	39 mph	95%
Musick & Gillette, 1990	25% vegetation lateral cover, 19.4 mph threshold on bare surface.[1]	NA	100%
Nickling, *et al.*, 1997	11-30% saltgrass cover at Owens Lake on clay soil.	$\geq$ 45 mph	99.5%[3]
van de Ven, *et al.*, 1989	4-5 inch high stubble, 30 stems/ sq. ft 19.28 mph threshold on bare surface.	NA	100%
White, *et al.*, 1996	12% cover on loose Owens Lake sand in a wind tunnel.	44 mph	97.1%[2]
White, 1997	54% saltgrass cover in wind tunnel at UC Davis in clay soil	45 mph	99.4%[3]

Notes:

1 Wind speeds are normalized to an equivalent 10 meter wind speed at Owens Lake. This conversion uses the surface boundary layer equation assuming 0.01 cm surface roughness and the free stream speed for a given height if 10 meter wind speeds are not available.

2 Measured PM_{10} emission reduction in the wind tunnel.

3 Use uncontrolled $PM_{10} = 2.6 \times 10^{-3}$ g/m^2/s (from 1998 SIP (GBUAPCD, 1998a))

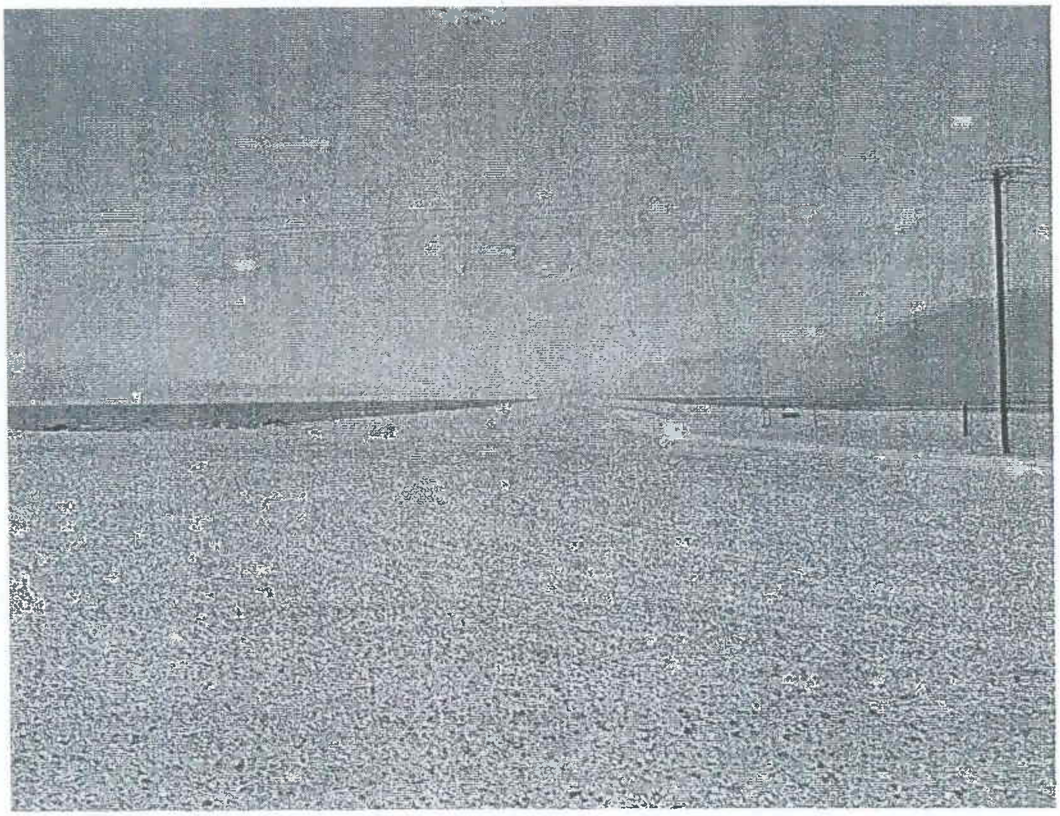

Figure 5.16 – Gravel blanket on north end of Owens Lake bed

To prevent pore space infilling and possible capillary rise of emissive salts to the surface, Gravel Blanket areas must be protected from water- and wind-borne soil and dust deposition. The Gravel Blanket should be the last control measure to be installed or graveled areas should be surrounded by non-emissive areas. This will minimize wind-borne depositions into the Gravel Blanket. Gravel areas should also be protected from flood deposits with flood control berms, drainage channels and desiltation/retention basins. The large pore spaces between the coarse gravel particles must be maintained to ensure that the Gravel Blanket will remain an effective PM_{10} control measure for many years.

To attain the required PM_{10} control efficiency, 100 percent of all areas designated for Gravel Blanket must be covered with a layer of gravel four inches thick. All gravel material placed shall be screened to a size greater than ½-inch in diameter. The gravel material shall be at least as durable as the rock from the three sources analyzed in the EIR and EIR Addendum Number 1 associated with the 1998 SIP. The material shall have no larger concentration of metals than found in the materials analyzed in the 1998 EIR. To minimize visual impacts, the color of the gravel material used shall be such that it does not significantly change the color of the lake bed.

5.4.2 PM_{10} Control Effectiveness for Gravel Blanket

A Gravel Blanket forms a non-erodible surface when the size of the gravel is large enough that the wind cannot move the surface. If the gravel surface does not move, it protects finer particles from being emitted from the surface. Gravel and rock coverings have been used successfully to prevent wind erosion from mine tailings in Arizona (Chow and Ono, 1992). The potential PM_{10} emissions from a Gravel Blanket can be estimated using the USEPA emission calculation method for industrial wind erosion for wind speeds above the threshold for the surface (USEPA, 1985). PM_{10} will not be emitted if the wind speed is below the threshold speed.

Based on a minimum particle size of ½ inch, the proposed Gravel Blanket will have a threshold wind speed of more than 90 miles per hour measured at 10 meters (USEPA, 1992, Ono and Keisler, 1996). This wind speed is rarely exceeded in the Owens Lake area. A more typical gust for Owens Lake is around 50 miles per hour.

The proposed four-inch thick Gravel Blanket is intended to prevent capillary movement of salts to the surface. Fine sands and silts that fill in void spaces in the gravel will allow the capillary rise of salts and reduce the effectiveness of a Gravel Blanket to control PM_{10} at Owens Lake. In addition, finer particles will lower the average particle size and lower the threshold wind speed for the surface. Gravel Blanket tests were performed at two sites on Owens Lake starting in June 1986. These tests showed that four-inch thick Gravel Blankets composed of ½ to 1½-inch and larger rocks prevented capillary rise of salts to the surface. Observations of ungraveled test plots in the same area, one with no surface covering and another with local unscreened, unsorted alluvial soil, showed that salts would otherwise rise to the surface (Cox, 1996).

The PM_{10} emissions are expected to be virtually zero for the Gravel Blanket since the threshold wind speed to entrain gravel, and thus PM_{10}, is above the highest wind speeds expected for the area. This will result in 100 percent reduction of PM_{10} from areas that are covered by the Gravel Blanket.

5.4.3 Gravel Blanket Operation and Maintenance

Because fine particles cannot be allowed to cover or significantly infill the gravel, the Gravel Blankets should be the last measure implemented after all adjacent erodible areas are controlled. Once the Gravel Blanket has been applied to the playa, limited maintenance would be required to preserve the Gravel Blanket. The gravel will be visually monitored to ensure that the Gravel Blanket was not filled with sand or dust, or had not been inundated or washed out from flooding.

If any of these conditions were observed over areas larger than one acre, additional gravel will be transported to the playa and applied to the playa surface. The District estimates that operation and maintenance staffing requirements are one FTEE per five square miles of gravel and an average ongoing maintenance amount of gravel of 7,000 cubic yards per square mile per year (this allows for complete gravel replacement once every 50 years).

5.5 MOAT & ROW

5.5.1 Description of Moat & Row for PM_{10} Control

In 2006, during the settlement negotiations between the District and the City over the APCO's determination that additional controls were necessary on Owens Lake beyond the 29.8 square miles required by the 2003 SIP, the City proposed a new Owens Lake PM_{10} control measure known as "Moat & Row." It was the City's intention to develop a control measure that cost less to implement and used less water than the approved BACM controls. The Settlement Agreement that resulted from the 2006 negotiations contains provisions for up to 3.5 square miles of Moat & Row to be constructed in the 2008 SIP control area. (See Board Order, Chapter 8, Attachment A, Paragraph 2.B.) However, Moat & Row is currently only a demonstration measure—it is not an approved BACM control.

The general form of Moat & Row is an array of earthen berms (rows) about 5 feet high above the lake bed surface with sloping sides, flanked on either side by slope-sided ditches (moats) about 4 feet deep. The rows are topped with sand fences up to 5 feet high that increase the effective height of the rows. Figures 5.17 and 5.18 are photographs of the Moat & Row test being conducted by the City. Moats are intended to serve to capture moving soil particles, and rows are intended to physically shelter the downwind lake bed from the wind.

The individual Moat & Row elements are to be constructed in a serpentine layout across the lake bed surface, generally parallel to one another, and spaced at variable intervals, so as to minimize the fetch between rows along the predominant wind directions. The serpentine layout of the Moat & Row array is intended to control emissions under the full range of principal wind directions. Initial pre-test modeling conducted by the City indicates that Moat & Row element spacing will generally vary from 250 to 1000 feet, depending on the surface soil type and the PM_{10} control effectiveness (MDCE) required on the Moat & Row area. See Exhibit 4 of the 2006 Settlement Agreement for conceptual drawings of the Moat & Row measure (2008 SIP Chapter 8, Attachment A).

As mentioned above, the Moat & Row PM_{10} control measure is not a currently-approved BACM. The final form of the Moat & Row PM_{10} control measure will be solely determined by

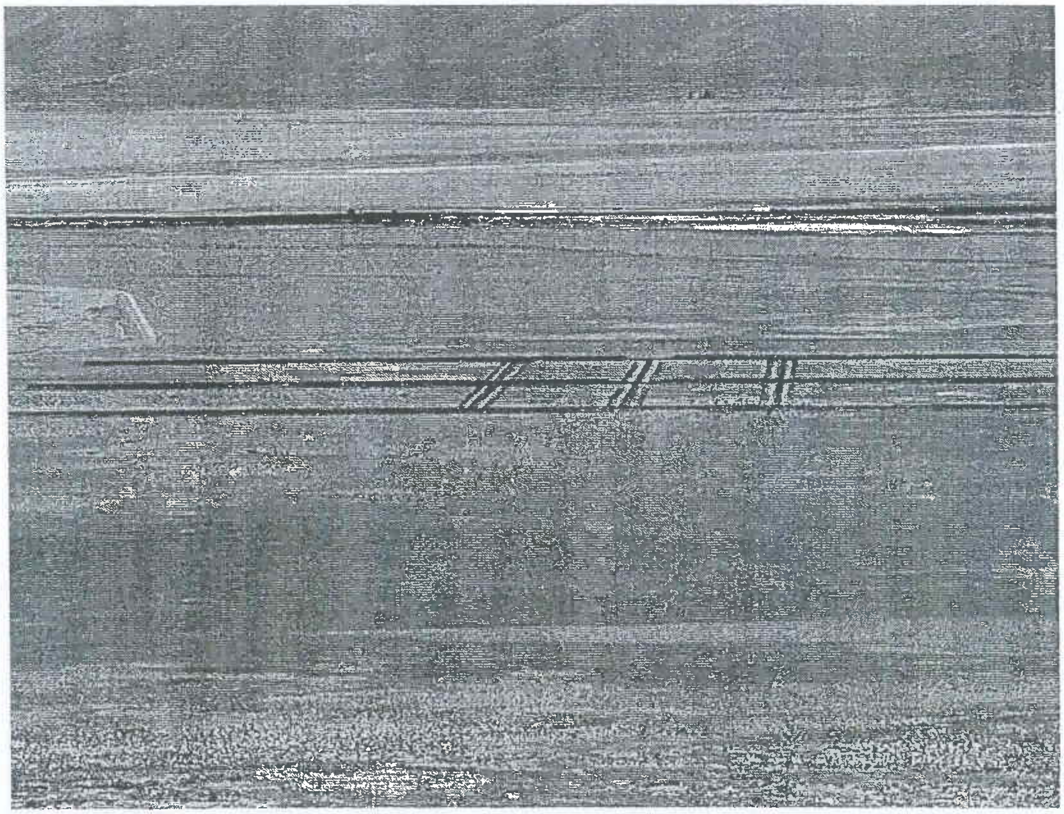

Figure 5.17 – Moat and Row test – oblique view

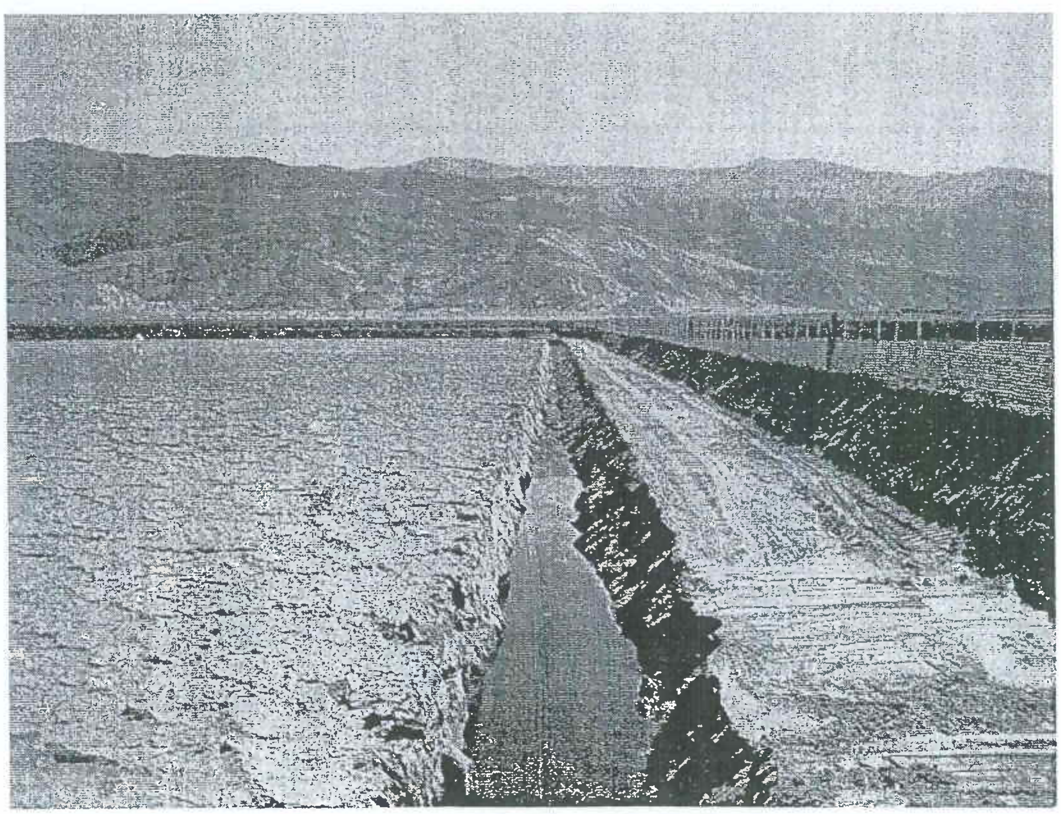

Figure 5.18 – Moat and Row test – ground level view

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the City based primarily on modeling and the results of a demonstration project and testing being conducted by the City at two locations on the lake bed. One of the test areas is at the northeast corner of the lake bed in primarily sandy soils and the other is in a central area dominated by clay soils. The two Moat & Row test areas total about 0.5 square mile (310 acres). Testing will be conducted on the lake bed during the 2007-2008 dust season prior to implementation on a large scale before the end of 2009. The final form of the Moat & Row PM_{10} control measure will largely be determined from the results of testing conducted by the City on the lake bed. Final design is subject to test results, required PM_{10} control effectiveness, environmental documentation, permitting, engineering, and monitoring considerations.

Areas of Moat & Row that do not function as designed or that cause or contribute to an exceedance of the federal 24-hour PM_{10} NAAQS will be remediated as specifically provided in the Board Order (Chapter 8, Attachment B, "2008 Owens Valley Planning Area Supplemental Control Requirements Procedure"). In summary, the City will use the results of their 2007-2008 Moat & Row tests to design large-scale implementation of the measure to meet all control requirements. The design will then be implemented on up to a maximum of 3.5 square miles within the 2008 SIP DCM area (See Figure 2.3). If the Moat & Row controls are not effective and contribute to a NAAQS exceedance, the City will be given one chance to improve the Moat & Row controls. If the area that was improved is subsequently the cause of a second NAAQS exceedance, the City is required to convert that area to an approved BACM control.

5.5.2 PM_{10} Control Effectiveness for Moat & Row

The District does not know how effective Moat & Row will be. The testing to be conducted by the City during the 2007-2008 dust season is intended to provide the data necessary for final configuration. However, in order for Moat & Row to be a successful dust control measure and in order for it to be designated as a BACM control at some point in the future, it will be required to attain the MDCEs for those areas on which it is implemented (See Figure 5.7).

It is anticipated that the PM_{10} control effectiveness of Moat & Row could be enhanced by combining it with other approved DCMs or other measures to increase the overall dust control effectiveness. Moat & Row enhancement measures could include the addition of Shallow Flooding and/or Managed Vegetation areas between Moat & Row elements, the addition of more Moats & Rows and/or sand fences to the areas between the initially constructed Moat & Row elements and the application of brine or rock facing to the rows to maintain them in a non-emissive condition. These enhancements would ensure that if significant dust sources (hot spots) develop within these areas, they will be addressed. Moat & Row enhancement activities beyond the scope of that anticipated and described in the EIR for this 2008 SIP would require additional CEQA analysis. As with all DCM implementation on lands under CSLC jurisdiction, enhancement measures on state lands would be subject to approval by the CSLC.

5.5.3 Moat & Row Operation & Maintenance

If the City develops a design for Moat & Row that is effective, in order for it to remain effective, it must be maintained. Moats that lose effectiveness by filling with blown soil must be cleared. Rows that deteriorate due to wind or water erosion must be repaired. Sand fences that top the rows and provide increased effective height must also be maintained. As the District has not tested Moat & Row and as the City has yet to develop its final design, it is unknown what level of maintenance will be required for the measure.

5.5.4 Moat & Row as BACM

If Moat & Row is successfully implemented on the Owens Lake bed and achieves the required minimum dust control efficiencies, the City may apply to the District to designate the measure as BACM. The Board Order contains a procedure for designating new BACM controls (Chapter 8, Attachment D, "2008 Procedure for Modifying Best Available Control measures (BACM) for the Owens Valley Planning Area"). In summary, with regard to Moat & Row, the procedure allows the City to implement up to 3.5 square miles of Moat & Row as a test. If the test area is effective for three years, the City may apply to the District for a SIP revision to designate Moat & Row as BACM. The SIP revision is subject to approvals by the District Governing Board, the California Air Resources Board and the USEPA.

5.6 STORMWATER MANAGEMENT

The bed of Owens Lake is subject to infrequent, but significant flooding, alluvial deposition and fluctuating brine pool levels caused by stormwater runoff flows. In order to protect the PM_{10} control measures installed on the lake bed, as well as the downstream lease holders, the City shall design, install, operate and maintain flood and siltation control facilities. Flood and siltation control facilities shall be designed to provide levels of protection appropriate for the PM_{10} control measures being protected. For example, lake bed areas controlled with Managed Vegetation or Gravel Blanket may require a higher level of flood and siltation protection than areas controlled with Shallow Flooding. Appropriate flood and siltation control facilities shall be integrated into the design and operation of all PM_{10} control measures. All flood and siltation control facilities shall be continually operated and maintained to provide their designed level of protection. All flood and siltation control facilities and PM_{10} control measures damaged by stormwater runoff or flooding shall be promptly repaired and restored to their designed level of protection and effectiveness.

All flood and siltation control facilities shall be designed so as not to cause the existing trona mineral deposit lease area (California State Lands Commission leases PRC 5464.1, PRC 3511 and PRC 2969.1) to be subjected to any greater threat of water inundation and alluvial material contamination than would have occurred under natural conditions prior to the installation of PM_{10} control measures.

5.7 REGULATORY EFFECTIVENESS

Rule effectiveness is a measure of the compliance by the regulated sources with the control measures required under the plan. Since virtually all the PM_{10} emissions in the Planning Area originate from the dry playa of Owens Lake, and since a single operator, the City of Los Angeles, is required to undertake the control measures required under this plan to control those emissions, the District projects a rule effectiveness of 100 percent for the plan's control measures.

The District will enforce the plan's requirements through continual oversight and inspection of the City's efforts to construct, operate and maintain the control measures, and through periodic inspection and monitoring. The plan contains milestones in 2009 and 2010 for construction and operation of the control measures, and test methods for determining the compliance of the City's control strategy implementation with the performance standards required under this plan.

5.8 REFERENCES

Air Sciences, Inc., 2006. Managed Vegetation Control Efficiency Study, Owens Dry Lake, California, prepared for the Los Angeles Department of Water & Power, Los Angeles, California, July 2006.

Ayars, 1997. Ayars, James, Reclamation Studies on Owens Lake Bed Soil Using Controlled Flood Irrigation, Prepared for the Great Basin Unified Air Pollution Control District, Bishop, California, May 2, 1997.

Buckley, 1987. Buckley, R., *The Effect of Sparse Vegetation on the Transport of Dune Sand by Wind*, Nature, 325:426-29, 1987.

Chow and Ono, 1992. Chow, Judith, and Duane Ono, eds., PM_{10} Standards and Non-traditional Particulate Sources, "Fugitive Emissions Control on Dry Copper Tailings with Crushed Rock Armor," Air & Waste Management Association, Pittsburgh, Pennsylvania, 1992.

Cox, 1996. Cox, Jr., Bill, Gravel as a Dust Mitigation Measure on Owens Lake, Great Basin Unified Air Pollution Control District, Bishop, California, October 1996.

Eldridge, 1995. Eldridge, B.F. and K. Lorenzen, Predicting Mosquito Breeding in the Restored Owens Lake, University of California, Davis, California, August 1, 1995.

Fryrear, 1994. Fryrear, Donald W., letter from U.S. Department of Agriculture, Agricultural Research Service, to Ellen Hardebeck, Great Basin Unified Air Pollution Control District, Bishop, California, July 22, 1994.

GBUAPCD, 1996. Great Basin Unified Air Pollution Control District, Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Project Alternatives Analysis, GBUAPCD, Bishop, California, October 23, 1996.

GBUAPCD, 1997. Great Basin Unified Air Pollution Control District, Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Final Environmental Impact Report, GBUAPCD, Bishop, California, July 2, 1997.

GBUAPCD, 1998a. Great Basin Unified Air Pollution Control District, Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan, GBUAPCD, Bishop, California, November 16, 1998.

GBUAPCD, 1998b. Great Basin Unified Air Pollution Control District, Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Final Environmental Impact Report Addendum Number 1, GBUAPCD, Bishop, California, November 16, 1998.

GBUAPCD, 2002a. Great Basin Unified Air Pollution Control District, Saltgrass Meadow Establishment and Maintenance Using Flood Irrigation: Lawrence Clay soil at Owens Lake, California (Draft), GBUAPCD, Bishop, California, 2002.

GBUAPCD, 2002c. Great Basin Unified Air Pollution Control District, Meadow Establishment and Maintenance on the North Sand Sheet at Owens Lake, 1994-2001 (Draft), GBUAPCD, Bishop, California, 2002.

GBUAPCD, 2003. Great Basin Unified Air Pollution Control District, Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan - 2003 Revision, GBUAPCD, Bishop, California, November 13, 2003.

GBUAPCD, 2006b. Great Basin Unified Air Pollution Control District, Settlement Agreement between the District and the City to resolve the City's challenge to the District's Supplemental Control Requirement determination issued on December 21, 2005 and modified on April 4, 2006, GBUAPCD, Bishop, California, December 4, 2006.

GBUAPCD, 2007b. Great Basin Unified Air Pollution Control District, 2008 Owens Valley PM_{10} Planning Area Demonstration of Attainment State Implementation Plan Draft Subsequent Environmental Impact Report, State Clearing House Number 2007021127, GBUAPCD, Bishop, California, September 14, 2007.

Grantz, *et al.*, 1995. Grantz, David, David Vaughn, Rob Farber, Mel Zeldin, Earl Roberts, Lowell Ashbough, John Watson, Bob Dean, Patti Novak, Rich Campbell, Stabilizing Fugitive Dust Emissions in the Antelope Valley from Abandoned Farmland and Overgrazing, *A&WMA's 88th Annual Conference & Exhibition*, June 1995, San Antonio, Texas, Paper #95-MP12.04, Air & Waste Management Association, Pittsburgh, Pennsylvania, June 1995.

Groeneveld, 2002. Groeneveld, David G., A Remote Sensing Approach to Monitoring Owens Lake Mitigation, prepared for Great Basin Unified Air Pollution Control District by HydroBio, Santa Fe, New Mexico, 2002.

Hardebeck, *et al.*, 1996. Hardebeck, Ellen, Grace Holder, Duane Ono, Jim Parker, Theodore Schade and Carla Scheidlinger, Feasibility and Cost-Effectiveness of Flood Irrigation for the Reduction of Sand Motion and PM_{10} on the Owens Dry Lake, Great Basin Unified Air Pollution Control District, Bishop, California, 1996.

HydroBio, 2007. HydroBio, Inc., Bibliographic Summary of Owens Lake Dust Control Measure Compliance Reports and Supporting Documentation, Santa Fe, New Mexico, September 2007.

LADWP, 2000. Los Angeles Department of Water and Power, Mitigated Negative Declaration, North Sand Sheet Shallow Flooding Project, Owens Lake Dust Mitigation Program, Owens Lake , California, Los Angeles, California, April 2000.

LADWP, 2001. Los Angeles Department of Water and Power, Mitigated Negative Declaration, Southern Zones Dust Control Project, Owens Lake Dust Mitigation Program, Owens Lake , California, Los Angeles, California, September 2001.

Lancaster, 1996. Lancaster, Nicholas, Field Studies to Determine the Vegetation Cover Required to Suppress Sand and Dust Transport at Owens Lake, Desert Research Institute, Reno, Nevada, July 1996.

Musick & Gillette, 1990. Musick, H.B. and D.A. Gillette, *Field Evaluation of Relationships between a Vegetation Structural Parameter and Sheltering Against Wind Erosion*, Journal of Land Degradation and Rehabilitation, December 1990.

Nickling, *et al.*, 1997. Nickling, William G., Nicholas Lancaster, and John Gillies, Field Wind Tunnel Studies of Relations Between Vegetation Cover and Dust Emissions at Owens Lake, an interim report prepared for the Great Basin Unified Air Pollution Control District, University of Guelph, Ontario, Canada, and Desert Research Institute, Reno, Nevada, May 8, 1997.

Ono and Keisler, 1996. Ono, Duane and Mark Keisler, Effect of a Gravel Cover on PM_{10} Emissions from the Owens Lake Playa, Great Basin Unified Air Pollution Control District, Bishop, California, July 1996.

Ruhlen and Page, 2001. Ruhlen, T.D. and G.W. Page, Summary of Surveys for Snowy Plovers at Owens Lake in 2001, report prepared for CH2MHILL, Santa Ana, California, 2001.

Ruhlen and Page, 2002. Ruhlen, T.D. and G.W. Page, Summary of Surveys for Snowy Plovers at Owens Lake in 2002, report prepared for CH2MHILL, Santa Ana, California, 2002.

Schade, 2001. Schade, Theodore, Procedure to Determine Compliance with SIP Performance Criterion for Shallow Flood Dust Control Measure, Great Basin Unified Air Pollution Control District, Bishop, California, November 2001.

Scheidlinger, 1997. Scheidlinger, Carla, Vegetation as a Control Measure, Great Basin Unified Air Pollution Control District, Bishop, California, May 1997.

Stradling, 1997. Stradling, Frank, Agrarian Test Area Construction Costs Summary, Agrarian Research & Management Company, Provo, Utah, January 1997.

USEPA, 1995. United States Environmental Protection Agency, Compilation of Air Pollution Emission Factors AP-42 (Fifth edition), USEPA, Research Triangle Park, North Carolina, January 1995.

USEPA, 1992. United States Environmental Protection Agency, Fugitive Dust Background Document and Technical Information Document for Best Available Control Measures, EPA-450/2-92-004, USEPA, Research Triangle Park, North Carolina, September 1992.

van de Ven, *et al.*, 1989. Van de Ven, T.A.M., D.W. Fryrear, W.P. Spaan, *Vegetation Characteristics and Soil Loss by Wind*, Journal of Soil and Water Conservation, Soil and Water Conservation Society, July-August 1989.

White, *et al.*, 1997. White, Bruce, Victoria M.-S. Tsang, Greg Hyon-Mann Cho, Final Report UC Davis Wind Tunnel A Wind Tunnel Study to Determine Vegetation Cover Required to Suppress Sand and Dust Transport at Owens (dry) Lake, California, Contract No. C9464, prepared for the California State Lands Commission and the Great Basin Unified Air Pollution Control District, Davis, California, February 1997.

White, 1997. Pers. Comm. with Bruce White, University of California Davis; and Carla Scheidlinger, Great Basin Unified Air Pollution Control District, regarding wind tunnel test results, GBUAPCD, Bishop, California, May 13, 1997.

EXHIBIT C-10

No direct air quality impacts would be associated with operation of the Proposed Project in the Salton Sea subregion. Operation of the on-farm conservation measures would not occur in this subregion.

Impact AQ-7: Indirect air quality impacts from potential for windblown dust from exposed shoreline. Implementation of the Proposed Project would result in the conservation of up to 300 KAFY for transfer and a reduction in the volume of water discharged to the Salton Sea. The amount of water conserved is expected to increase at a rate of approximately 25 KAFY as conservation measures are implemented incrementally, until the full amount of conservation is reached. The effect of the conservation measures and reduced inflow volumes on the Sea would not be noticeable in the short-term. The water level and the total surface area of the Salton Sea would, however, decrease in the long term.

Under the Proposed Project, the elevation of the Salton Sea would decrease from the Baseline level of -235 feet msl to -250 by the year 2077, a decrease of 15 feet. The total surface area of the Sea would decrease from the Baseline area of about 217,000 acres to about 167,000 acres. The decrease in Sea level would expose about 50,000 acres of currently submerged bottom sediments or playa. This is approximately 3.5 times the exposed area of about 16,000 acres predicted under the Baseline conditions.

The predicted decrease in Sea level and increase in exposed area would increase the potential for dust suspension. Spatial variations in sediment characteristics and soil erodibility, temporal variations in wind conditions, and variation in factors contributing to the formation of salt crusts prevent any reasonable quantitative estimate of emissions and associated impacts from the exposed shoreline. Therefore, a qualitative assessment of the potential for dust suspension is provided in this Draft EIR/EIS.

Several conditions at the Salton Sea currently exist or would be expected to exist in the future as a result of lowered Sea levels. Qualitatively, it is anticipated that the combination of moisture present in the unsaturated zone beneath the exposed playa, the probable formation of dried algal mats and stable efflorescent salt crusts consisting of chloride and sulfate salts, and the relatively low frequency of high wind events at the Salton Sea would inhibit the suspension of dust. It is likely, however, that these assumptions would not apply to all areas of exposed playa or shoreline at all times, so dust events could potentially occur.

Based on the factors influencing emissions at the Salton Sea as discussed above, the extent of any increases in dust emissions and associated increases in ambient concentrations of the nonattainment pollutant PM_{10} in the future, as shoreline conditions change, is unknown. On occasion, existing concentrations of PM_{10} in the Salton Sea area violate national and state ambient air quality standards. Wind erosion of natural desert soils and vehicle travel over unpaved roads are expected to continue to represent the predominant source of dust emissions around the Salton Sea.

To further consider the potential impact for emissions from the Salton Sea , a comparison was made to existing dry lake beds where dust impacts have been observed. Fortunately, conditions found to produce dust storms on dry salt lake beds, such as Owens Lake, were not found to be present at the Salton Sea. The following three primary factors would be expected to make the situation at the Salton Sea much less severe than at Owens Lake:

- **Soil chemistry:** As a result of the relatively high salinity of groundwater beneath the playa at the Salton Sea, formation of an efflorescent salt crust on the surface of the playa is likely to occur. The soil system at the Salton Sea is predominately sodium sulfate and sodium chloride. These salts do not change in volume significantly with fluctuations in temperature, so the crust at the Salton Sea should be fairly stable and resistant to erosion. This anticipated situation at the Salton Sea is different from similar current situations at Owens and Mono Lakes, where a significant portion of the salinity is in the form of carbonates. The volume of carbonate salts is much more sensitive to temperature fluctuations, and desiccation of these salts produces fines that are readily suspended from playa at these lakes. Therefore, the salt crust on the exposed playa at the Salton Sea should be more stable and less emissive than Owens Lake. Also, distribution of mobile sand on the dry lakebed at Owens Lake is part of what drives high emissions rates, and comparable conditions are not expected at the Salton Sea.
- **Meteorology:** The frequency of high wind events at the Salton Sea is less than at Owens Lake. Therefore, the dust storms at the Salton Sea would be less frequent than at Owens Lake. To substantiate this statement, threshold wind speeds that might be required to initiate erosion of playa soils have been estimated and compared to wind measurements in the area. Threshold velocity values for playas, which consist of soils high in clay and salt content, have been found to be larger than 100 cm/s when disturbed and 150 cm/s when undisturbed (Gillette 1980). Threshold velocities for skirts around playas, which are siltier and have slightly hard crusts, have been found to range from 20 to 60 cm/s when disturbed and 150 cm/s when undisturbed. Based on these threshold velocities, an average roughness height of 1.0 cm, and an anemometer height of 366 cm, wind speeds at the Salton Sea required to initiate erosion of disturbed playa soils would need to exceed 27 knots (kts). Wind speeds required to initiate erosion of undisturbed playa soils would need to exceed 40 kts. Hourly wind data collected from two CIMIS weather stations located north and west of the Salton Sea (Station Nos. 127 and 154, respectively) indicate that wind speed exceeded 22 kts approximately 0.1 to 0.2 percent of the time between 1995 and 1999. The predominant wind direction at the Salton Sea is also favorable; during high wind events at the Sea, it is from the west and northwest, which is perpendicular to the orientation of the playa. Dust suspension on the playa of the Salton Sea would be higher if the playa were oriented parallel to the predominant wind direction.
- **Recession Rate:** The anticipated decline in water levels at the Salton Sea is predicted to be significantly slower than what occurred at Owens Lake (only about 20 percent as fast). Natural processes may contribute more to controlling dust emissions at the Salton Sea than they have at Owens. These natural processes could include (a) the enabling of vegetation through development of soil conditions favorable to plant growth (including improvement in natural drainage), (b) development of native plant communities; (c) sequestration of sand into relatively stable dunes; and (d) formation of relatively stable crusts.

As discussed in Section 3.1, Hydrology and Water Quality, a reduction of the Salton Sea surface elevation, and resulting exposure of playa, is expected even in the absence of the Proposed Project, but it would be accelerated when the Proposed Project or its alternatives are implemented. It should be noted that the model projections included throughout the document for the Proposed Project reflect the worst-case scenario for the Proposed Project. The projections for the Salton Sea assume a maximum level of conservation of 300 KAFY accomplished via on-farm irrigation improvements and water delivery system improvements with no fallowing. This scenario also includes the additional 59 KAFY conservation required to comply with the IOP. As described in Chapter 2, the Proposed Project could be implemented with lesser amounts of conservation and using fallowing, both of which would result in lesser impacts to the Salton Sea.

To be conservative, this analysis concludes that windblown dust from exposed shoreline may result in potentially significant air quality impacts. (Potentially significant impact.)

Mitigation Measure AQ-7: To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation, via fallowing or other measures in the IID Water Service Area, to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea and shoreline associated with the reduced flow. Additional details of Approach 2 can be found in Chapter 2, Description of the Proposed Project and Alternatives.

With implementation of this approach, this impact would be avoided; without it, it would remain a potentially significant unavoidable impact. Until an HCP Approach for the Salton Sea is selected, this impact will remain potentially significant and unavoidable. (Potentially significant unavoidable impact.)

One possible approach to reduce this from a potentially significant unavoidable impact to an impact that is less than significant with mitigation would be for the project proponent to negotiate a Salton Sea monitoring and mitigation plan with the SCAQMD and the ICAPCD.

Impact AQ-8: Potential for decreased water flow and quality to increase odorous impacts in proximity to the Sea. Decreased water flow and quality in the Salton Sea could contribute to the premature death of flora or fauna and/or increase the summertime algae blooms, either or both of which would contribute to odorous emissions. However, as a result of low population levels around the Sea, it is not likely that "objectionable odors would affect a substantial number of people." This impact is expected to be less than significant.

3.7.4.4 Alternative 1: No Project

LOWER COLORADO RIVER

Water Conservation and Transfer

Implementation of the No Project would result in no air quality impacts in the LCR subregion.

IID WATER SERVICE AREA AND AAC

Water Conservation and Transfer

Implementation of the No Project would result in no air quality impacts in the IID water service area and AAC subregion.

TABLE ES-1
Summary of Significant Impacts and Mitigation Measures

Summary of Potential Impacts from Proposed Project	Summary of Mitigation Measure(s)	Significance after Mitigation	Alternative 1: No Project	Alternative 2: 130 KAFY On-Farm Irrigation System Improvements Only	Alternative 3: 230 KAFY All Conservation Measures	Alternative 4: 300 KAFY Fallowing Only
AQ-7: Indirect air quality impacts due to the potential for windblown dust from exposed shoreline: The predicted decrease in Sea level and increase in exposed area (50,000 acres compared to the Baseline) would increase the potential for dust suspension. Spatial variations in sediment characteristics and soil erodibility, temporal variations in wind conditions, and variation in factors contributing to the formation of salt crusts prevent any reasonable quantitative estimate of emissions and associated impacts from the exposed shoreline. Therefore, a qualitative assessment of the potential for dust suspension is provided in this Draft EIR/EIS. To be conservative, this analysis concludes that windblown dust from exposed shoreline may result in significant air quality impacts. (Details provided in Section 3.7 Impact AQ-7.)	**Mitigation Measure AQ-7:** To mitigate this impact, selection of HCP (Salton Sea Portion) Approach 2 would be the only effective measure. This approach would include additional conservation, via fallowing or other measures in the IID water service area, to allow drain water to continue to flow to the Sea at a rate equal to the Baseline, thereby avoiding impacts to the Sea and shoreline associated with the reduced flow. Additional details of Approach 2 can be found in Chapter 2, Description of the Proposed Project and Alternatives. With implementation of this approach, this impact would be avoided; without it, this impact would remain potentially significant and unavoidable.	Significant and unavoidable.	16,000 acres of exposed shoreline predicted for 2077.	Same as AQ-7 except that 22,000 acres of exposed shoreline predicted.	Same as AQ-7 except that 39,000 acres of exposed shoreline predicted.	Same as AQ-7 except that 16,000 acres of exposed shoreline predicted.

EXHIBIT C-11