

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION**

**MEETING OF NOVEMBER 29 2007  
LANCASTER, CALIFORNIA**

**ITEM NO. 14**

**SUBJECT: *Public Hearing - Consideration of Amended Cease and Desist Order No. R6V-2004-0038-A01 for County Sanitation District No. 14 of Los Angeles County – Lancaster Water Reclamation Plant for Discharge and Threatened Discharge of Waste in Violation of Waste Discharge Requirements Contained in Board Order No. R6V-2002-053***

**CHRONOLOGY:**

September 11, 2002	Revised Waste Discharge Requirements
October 13, 2004	Cease and Desist Order
July 13, 2005	Amended Waste Discharge Requirements
March 8, 2006	Master Recycling Permit
September 14, 2006	Waste Discharge Requirements
November 8, 2006	Waste Discharge Requirements
March 14, 2007	Waste Discharge Requirements

**DISCUSSION:** In October 2004 the Water Board adopted a cease and desist order (CDO) against District No. 14. The CDO required District No. 14 to eliminate threatened violations of Waste Discharge Requirements (WDRs). The CDO is now the subject of a Petition for Writ of Mandate in Superior Court. The Water Board also issued a CDO against County Sanitation District No. 20 of Los Angeles County (Palmdale) and this CDO is also subject to similar Petition for Writ of Mandate in Superior Court

The Water Board's prosecution team and District No. 14 have reached a revised proposed settlement (in conjunction with a settlement of the litigation over a CDO for District No. 20 - please see Item No. 13 on the November 2007 Water Board agenda) of the Districts' petitions. The proposed settlement would provide additional time for District No. 14 to come into compliance with its WDRs. The Water Board prosecution team retained the services of an independent engineer to review the compliance schedules proposed by the District. The consultant's report is included as Enclosure 2. The compliance schedules in the proposed amended cease and desist order were developed through negotiations with the District utilizing input from the independent engineer. The settlement would be implemented through the Water Board adoption of the proposed Cease and Desist Order (Enclosure 1), an amended cease and desist order for District No. 20 (please see Item No. 15 on the November 2007 Water Board agenda) and an Administrative Civil Liability Order (please see Item No. 13 on the November 2007 Water Board agenda).

**14-0001**

The settlement provides for adoption of all three orders as proposed, or with changes that are agreed to by the prosecution team and the Districts. If the Water Board determines that the proposed orders are not acceptable, then the prosecution team respectfully withdraws these proposed orders from consideration. In that event, the prosecution team will propose modified orders for Water Board consideration at a later date. The prosecution team is not prepared to present these orders as anything other than a proposed settlement.

The Water Board received a number of comments on the initial settlement (all of the comments were on the proposed administrative civil liability order). The proposed amended cease and desist order that will be considered at this meeting was distributed on October 18, 2007 for comment. As of November 9, 2007, no comments have been received. The comment period closes on November 19, 2007.

**RECOMMENDATION:**

The prosecution team recommends that the Water Board adopt the proposed Amended Cease and Desist Order.

**Enclosures:**

1. Proposed Amended Cease and Desist Order No. R6V-2004-0038-A01
2. Technical Review of County Sanitation Districts of Los Angeles County Lancaster and Palmdale Project Schedules

# **ENCLOSURE 1**

14-0003

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LAHONTAN REGION

PROPOSED – OCTOBER 2007 VERSION

AMENDED CEASE AND DESIST ORDER NO. R6V-2004-0038-A01  
WDID NO. 6B190107017

COUNTY SANITATION DISTRICT NO. 14 OF LOS ANGELES COUNTY  
VIOLATIONS OF WASTE DISCHARGE REQUIREMENTS  
BOARD ORDER NO. R6V-2002-053  
FOR  
LANCASTER WATER RECLAMATION PLANT

Los Angeles County

The California Regional Water Quality Control Board, Lahontan Region (Water Board) finds:

1. Cease and Desist Order (CDO)

On October 13, 2004, the Water Board adopted Cease and Desist Order No. R6V-2004-0038 (original CDO) requiring County Sanitation District No. 14 of Los Angeles County (District 14 or Discharger) to cease and desist discharging waste, according to a compliance schedule, that threatened to violate its Waste Discharge Requirements (WDRs) prescribed in Board Order No. R6V-2002-053. This order amends CDO No. R6V-2004-0038. All Findings of Order No. R6V-2004-0038 that are consistent with the Findings and Requirements in this Amendment, remain in effect. In the event of any inconsistencies, the language in this Amendment controls.

2. Reasons for Action

The Discharger has taken actions to comply with the provisions of the original CDO. These actions have resulted in the Discharger achieving compliance with some of the provisions of the original CDO. However, the Discharger has not complied with other provisions. Additionally, the Discharger will not achieve final compliance with waste discharge requirements as required by the schedules in the original CDO.

The purpose of this amended cease and desist order is to establish revised compliance schedules by which the Discharger must achieve compliance with waste discharge requirements. It also establishes interim standards that the Discharger must achieve to minimize the threatened violation pending compliance with waste discharge requirements. This amended order does not relieve the Discharger from existing liability for violations of the original CDO or from violations of waste discharge requirements. This Amendment does not relieve District 14 from either existing liability due to violations of the original CDO, or from existing or future violation of waste discharge requirements. The existing liability for such violations, and specified liability for future violations of waste discharge requirements, are resolved by an administrative civil liability order adopted by the Water Board.

14-0004

3. Description of Facilities Proposed by the Discharger

The Discharger prepared and adopted a facilities plan titled: *Lancaster Water Reclamation Plant 2020 Facilities Plan (Final)*, May 2004 (2020 Facilities Plan); and Environmental Impact Report (EIR) titled: *Lancaster Water Reclamation Plant 2020 Facilities Plan Final Environmental Impact Report*, May 2004, which was certified on June 16, 2004.

a. Existing Facilities

Since adoption of the original CDO in October of 2004, the Discharger has implemented portions of its Facilities Plan, including:

- i. Completed construction of a pressurized pipeline to convey treated wastewater 18.3 miles to the Eastern Agricultural Site; and
- ii. Preparation and use of a portion (1920 acres) of the land at the Eastern Agricultural Site to grow crops. For irrigation, the Discharger is using tertiary treated wastewater from the newly constructed Membrane Biological Reactor (MBR) treatment plant and its existing Antelope Valley Tertiary Treatment Plant (AVTTP).

b. Proposed Facilities

Since adoption of the original CDO in October of 2004, the Discharger has begun implementing additional facilities described in its Facilities Plan, including:

- i. A new activated-sludge tertiary treatment plant that will expand the treatment capacity and upgrade the level of treatment, so that the quality of effluent, which will be generated at the Lancaster Water Reclamation Plant, will be disinfected tertiary treated wastewater;
- ii. Four new storage impoundments with a surface area of 283 acres and a capacity to store 1,299 million gallons of treated wastewater; and
- iii. Expansion of the Eastern Agricultural Site from the current 1,920 acres to 3,200 acres and requesting a permit to allow for the discharge of effluent from the new activated-sludge tertiary treatment plant described above at the Eastern Agricultural Site through 2020.

4. Evaluation of the Time to Construct New Facilities

The Water Board retained the services of a professional engineer to independently evaluate schedules proposed by District 14 for incorporation into this amended Order. These schedules cover the design and construction of the storage reservoirs, pump station and upgrades to the wastewater treatment facility. The consultant was hired to compare District 14's proposed implementation schedules to "industry standards."

Table 1 compares

- 1) The schedule that the Discharger is currently proposing;
- 2) The schedule that the Discharger originally proposed in 2004 (rejected by the Water Board);
- 3) The schedule that was adopted by the Water Board in the 2004 cease and desist order; and
- 4) The engineer's estimate of industry standards.

Table 1 - Times to Complete New Facilities

Facility	Time to Complete (months) and Completion Date				
	District's Current Proposal	Discharger's Proposal for the 2004 CDO	Schedule in adopted 2004 CDO	Independent Engineer's Estimate	
<b>18 MGD Treatment Facility</b>					
Design	28.5 9/29/06	63 4/1/09	57 10/1/08	23-33	
Bidding <sup>1</sup>	5 9/12/07			5-8	
Construct	37.5 11/1/10			32-43	
Total	71	63	57	60-84	
<b>Storage Impoundments No. 1 - 2</b>					
Design	22 5/9/07	56 9/1/08	16 5/1/05	12.6	
Bidding	4.5 9/17/07			3 8/1/05	N/A
Construct	24 9/21/09			14 10/1/06	18.4
Total (not including time for bidding)	46	56	30	31	
<b>Pump Station</b>					
Construct	Not specified 3/22/10	Not specified	Not specified	12	

<sup>1</sup> The Board's consultant engineer's analysis did not account for the time needed to prepare and submit complete applications and obtain requirements from the Board upon which to base the final design of the 18 MGD treatment plant. That process required an additional seven (7) months that is not accounted for in the table, but did occur and, when added to the five (5) months noted for "Bidding", accounts for the 12 month period (9/29/06 - 9/12/07) between end of Design to end of Bidding.

The engineer's analysis indicates that the schedule that was adopted by the Water Board in the original CDO for design and construction of the 18 MGD treatment facilities is shorter than the range of industry standards for this type of facility. The compliance schedule proposed in 2004 and rejected by the Water Board and the schedule currently proposed by the Discharger are within the range of industry standard.

The final compliance date in this Amendment to the CDO is November 1, 2010, which is two years and one month beyond the final compliance date of October 1, 2008 that was in the original CDO.

The engineer's analysis also indicates that the schedule for design and construction of the storage impoundments that was adopted by the Water Board in the original CDO is shorter than the industry standard for this type of facility. The Discharger's schedule for constructing the impoundments is longer than would be expected based on industry standards. However, this facility along with the pump station cannot be used until the new treatment facility is on-line since the storage impoundments and reuse site are only permitted to receive tertiary treated wastewater. Completion of these facilities is not on the critical path for compliance and therefore this additional time does not affect the final compliance date.

5. Basis for Changes to Interim Standard

a. Modification of the Diversion Requirements

The effluent-induced overflows have primarily been caused by the volume of winter wastewater discharges to Paiute Ponds. Using facilities that are currently available the Discharger has the ability to divert a portion of the effluent that historically was discharged to Paiute Ponds to other permitted disposal locations. Therefore, it is appropriate to require the Discharger to reduce the volume of its discharge to Paiute Ponds in order to reduce the threat of violations until final compliance is achieved.

The Discharger, in late 2006, received waste discharge requirements allowing it to dispose of tertiary treated wastewater at the Eastern Agricultural Area. The Discharger operates two tertiary treatment facilities: the AVTTP facility and the MBR facility. The Discharger historically operated the AVTTP facility, which is capable of producing effluent at a rate of 0.5 MGD, during the spring, summer and fall to supply recycled water to users. However, there wasn't any demand for recycled water during the winter so it was not used. The MBR facility, which is capable of producing effluent at a rate of 1.0 MGD, was recently completed. Neither facility can continuously produce effluent at the rates stated above because they were not designed with the necessary redundant features typical of facilities that must be operated continuously.

The Discharger is capable of achieving the following new diversions of effluent from being discharged to Paiute Ponds:

MBR Facility

The Discharger has the capability to divert 0.9 MGD year-round (329 MG annually) to the East Agricultural Area.

AVTTP Facility

The Discharger has the capability to divert 0.4 MGD (60 MG) during the November – March period to the East Agricultural Area. This diversion was partially implemented during the 2006-07 winter season. As indicated above, during the remainder of the year, flows from this facility have historically been reused at Apollo Lakes County Park and, the Discharger is expected to continue to operate the AVTTP facility between April 1<sup>st</sup> and October 31<sup>st</sup> of each year and to provide this recycled water to users.

b. Elimination of the Diversion Requirement Associated with Storage Impoundments

The original CDO established an interim diversion requirement based on the premise that the Discharger would store secondary effluent in new impoundments. Based on the current schedule, these new impoundments will not be available before the 2009-10 winter. Additionally, these impoundments are intended and permitted to store tertiary effluent, the level of treatment consistent with agricultural use at the Eastern Agricultural Area. Storing secondary effluent in these impoundments could hamper their use during the 2010-11 winter to store tertiary effluent once the new tertiary treatment facility is complete, thus delaying final compliance. Therefore, the interim diversion requirement associated with using storage impoundments is being rescinded.

6. Final Compliance

As indicated in Finding No. 4 above, the final compliance date in the original CDO does not provide the Discharger with sufficient time to complete the necessary treatment facility. The Discharger's proposed compliance date of November 1, 2010 provides the time, which is consistent with industry standards, for completion of this type of facility. In addition, the proposed compliance date falls immediately before the start of the winter season when discharges to Paiute Ponds contributes to effluent-induced overflows to Rosamond Dry Lake.

7. Submission of Technical Reports

Pursuant to California Water Code (CWC) section 13267, subdivision (a), the Water Board may investigate the quality of any waters of the state within its region "in connection with any action relating to any plan or requirement authorized by this division." The need for a technical report pursuant to CWC section 13267, subdivision (b) must bear a reasonable relationship to the benefits to be obtained from the report. In compliance with CWC section 13267, subdivision (b), the Water Board is required to provide a written explanation with regard to the need for the report and shall identify the evidence that supports requiring the person to provide the report. In this case:

- a. The Discharger is in violation of its waste discharge requirements and the required information is needed to evaluate the Discharger's interim compliance efforts.
- b. The Water Board needs periodic reports to track the progress of the Discharger in implementing the facilities it needs to comply with waste discharge requirements.

8. California Environmental Quality Act

This enforcement action is being taken to enforce provisions of the California Water Code and, as such, it is exempt from the provisions of the California Environmental Quality Act (Public Resources Code, Section 21000 et seq.) in accordance with Section 15308, Chapter 3, Division 6, Title 14, California Code of Regulations.

9. Notification of Interested Parties

The Water Board notified the Discharger and interested parties of public hearings scheduled for the Regional Board meetings on March 14, 2007, May 23 and 24, 2007, and November 29, 2007. During the public hearings conducted during these meetings, the Water Board heard and considered all comments related to the proposed Order.

10. Petitions

Any person adversely affected by this action of the Water Board may petition the State Water Resources Control Board for review of this action. The State Water Resources Control Board, Office of Chief Counsel, P.O. Box 100, Sacramento, CA 95812-0100 (e-mail or facsimile copies acceptable) must receive the petition within 30 days of the date on which this action was taken. Copies of the law and regulations applicable to filing petitions will be provided on request.

**IT IS HEREBY ORDERED** that, in accordance with Section 13301 of the California Water Code, the Discharger shall cease and desist from threatening to discharge waste in violation of Discharge Specifications I.E.6 and Provision II.B.4 of Waste Discharge Requirements prescribed in Board Order No. R6V-2002-053 according to the following schedule, and shall comply with interim requirements. Additionally, the Discharger shall, in accordance with Section 13267 of the California Water Code, submit technical reports as required.

I. Relationship of this Order with Cease and Desist Order No. R6V-2004-0038

- A. Interim Standards - Sections I.B. - I.H. (diversion of specific volumes of effluent that would otherwise have been discharged to Piute Ponds to alternative legal points of disposal) are rescinded.
- B. Interim Standard - Section I.I. (investigate use of existing pipeline capacity to provide effluent to additional lands for legal means of disposal) is rescinded.

- C. Final Compliance - Section II. (final date for eliminating effluent-induced overflows) and Reporting – Section III (quarterly status reports) are rescinded.
- D. Time Extensions for Compliance Section V is rescinded.
- E. The remainder of Order No. R6V-2004-0038 remains in effect.

II. Interim Standards

- A. The Discharger must divert 192 MG of effluent between April 1<sup>st</sup> and October 31<sup>st</sup> of each year (214 days at 0.9 MGD) that would otherwise be discharged to Paiute Ponds and dispose of this volume at an alternative legal point of disposal.
  - (i) The discharger may demonstrate compliance with this requirement by operating the MBR tertiary treatment facility (90% use) and diverting this effluent to a permitted location other than Paiute Ponds.
  - (ii) If the Discharger chooses, it may demonstrate compliance with this requirement by implementing another method that achieves an equivalent reduction in the amount of effluent discharged to Paiute Ponds.
- B. The Discharger must divert 156 MG (90 days at 1.3 MGD and 61 days at 0.65 MGD) of effluent between November 1<sup>st</sup> and March 31<sup>st</sup> of the following year that would otherwise be discharged to Paiute Ponds and dispose of this volume at an alternative legal point of disposal.
  - (i) The discharger may demonstrate compliance with this requirement by constructing and operating the MBR facility (90% use) and by operating the AVTTP facility (80% use) (consistent with WDRs requiring the Eastern Agricultural Area to be operated at agronomic needs, crop needs during November and December are one-half of the available recycled water) and diverting this effluent to a permitted location other than Paiute Ponds.
  - (ii) If the Discharger chooses, it may demonstrate compliance with this requirement by implementing another method that achieves an equivalent reduction in the amount of effluent discharged to Paiute Ponds.
  - (iii) If the actual total monthly precipitation, as measured at Edwards Air Force Base, is more than the average monthly precipitation for any month, the required volume of effluent to be diverted from Paiute Ponds is reduced by the volume of rainfall over the average that fell on the portion of the Eastern Agricultural Site under cultivation during the month.

$$\text{Reduction (gal)} = [(R_a - R_{ave})] [27,170 \text{ gallons/inch/acre}] [A]$$

Where

$R_a$  = actual monthly rainfall (inches)

$R_{ave}$  = average monthly rainfall (inches)

A = acreage under cultivation during the month (acres)

### III. Final Standard

By **November 1, 2010** eliminate the effluent-induced overflows from Piute Ponds to Rosamond Dry Lake by implementing the projects described in the Discharger's 2020 Facilities Plan or by some alternate means that achieves compliance.

### IV. Time Extensions for Compliance

The compliance dates required in this Order reflect schedules that incorporate best case assumptions regarding funding, land acquisition, equipment delivery and quality, weather, permitting, and other related issues. The schedules do not account for delays reasonably outside the Discharger's control, or for unforeseen obstacles that might cause delays for the Discharger. Despite the Discharger's efforts to comply, a number of factors may affect the Discharger's ability to achieve compliance within the required schedule. Furthermore, actions reasonably outside the Discharger's control, or unforeseen obstacles, might also prevent the Discharger from complying with interim standards, even though those measures already account for varying rainfall.

If the Discharger faces circumstances which are not reasonably within its control that will delay final compliance, the discharger may request from the Water Board additional time to achieve final compliance. Similarly, if the Discharger faces circumstances which are not reasonably within its control that will interfere with the Discharger's compliance with the interim standards required in this Order, the Discharger may request partial or complete relief from compliance with interim standards. If additional time for compliance, or relief from interim standards is requested by the Discharger, the Water Board Executive Officer and the Discharger will meet and confer to discuss the Discharger's request. Thereafter, if requested by the Discharger, the Water Board Executive Officer will place the Discharger's request(s) on the agenda for the next regularly scheduled meeting in the southern portion of the region (or a later meeting if the Discharger agrees) for consideration by the Water Board. The Water Board will consider the Discharger's request(s) based, at a minimum, upon the facts contained in the request(s), and whether and to what extent the delay or other circumstance was reasonably outside the Discharger's control.

V. Reporting

Pursuant to Section 13267 of the California Water Code, beginning February 1, 2008, quarterly status reports must be submitted to the Water Board by the 1<sup>st</sup> day of the second month following each quarterly monitoring period until final compliance is achieved. The reports must include, but not be limited to:

- A. A description of the progress made to date implementing the requirements of Sections II. and III. of this Order, including a detailed schedule containing start and end dates for tasks (both completed and incomplete tasks);
- B. The results of all actions the Discharger has taken to comply with Section II. of this Order. If the Discharger identifies a project or projects that it intends to implement to achieve compliance with this Order, other than the projects identified in this order, the report must include the submittal of an implementation time schedule and each following report must describe progress towards implementation of the project;
- C. The status of planning, design, construction and implementation of any other measures that are necessary or that the Discharger proposes to achieve compliance with this Order;
- D. The identification of any compliance dates that the Discharger anticipates will be missed, along with the rationale for the delay in accomplishing the specific task and projected new compliance dates;
- E. The estimated monthly volumes of treated wastewater discharged from Paiute Ponds to Rosamond Dry Lake. This data is supplemental to the data required in Monitoring and Reporting Program No. R6V-2002-053.
- F. The measured daily and monthly volumes of treated wastewater discharged to authorized disposal/recycling sites, which consist of:
  - 1. Paiute Ponds,
  - 2. Nebeker Ranch,
  - 3. Eastern Agricultural Site,
  - 4. Apollo Park,
  - 5. Division Street Recycled Water Project (only monthly volumes required), and
  - 6. Recycling areas located at the Lancaster Water Reclamation Plant site.

Failure to comply with the terms or conditions of the Order may result in additional enforcement action by the Water Board. The Executive Officer is authorized to initiate, as needed, referral of this matter to the Attorney General of the State of California for the imposition of Civil Liability for failure to comply with this Order, injunctive relief, or for any other legal action as he or she may deem appropriate.

COUNTY SANITATION DISTRICT NO. 14 - 10-  
OF LOS ANGELES COUNTY  
Lancaster Water Reclamation Plant

OCTOBER 2007 PROPOSED  
AMENDED CEASE AND DESIST ORDER  
NO.R6V-2004-0038-A01  
WDID No. 6B190107017

I, Harold J. Singer, Executive Officer, do hereby certify that the foregoing is a full, true, and correct copy of an Order adopted by the California Regional Water Quality Control Board, Lahontan Region, on November 29, 2007.

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HAROLD J. SINGER  
EXECUTIVE OFFICER

Proposed

# **ENCLOSURE 2**

State of California  
California Regional Water Quality Control Board  
Lahontan Region

Technical Review of  
County Sanitation Districts of  
Los Angeles County  
Lancaster and Palmdale Project  
Schedules

9 April 2007

0053956

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# **1 INTRODUCTION**

## **1.1 BACKGROUND**

Los Angeles County Sanitation Districts Nos. 14 and 20 (Districts) have two projects for construction or expansion of two wastewater treatment projects in the cities of Lancaster and Palmdale. The objectives for each project are similar: to receive municipal sanitary wastewater, treat to tertiary levels, store in reservoirs during specific times of the year, and then pump for irrigation on agricultural lands.

The two projects have distinctly different activity groups and will be discussed separately in this report.

## **1.2 OBJECTIVE**

ERM was retained to conduct a technical review of the schedules for the two projects. The review primarily focused on the technical activities related to the completion of the projects, with a view to assessing the reasons for, and the reasonableness of, the differences in the length of time necessary for completion of the projects as initially proposed by the District compared to the completion dates currently scheduled.

## **DISCUSSION OF PALMDALE PROJECT AND DESIGN-AWARD-CONSTRUCTION SCHEDULE**

The Palmdale Water Reclamation Plant Project Phase V includes the expansion of an additional 15 million gallons per day (MGD) treatment system (incorporating nitrification/denitrification) to meet the demands of a growing population in the District No. 20 service area. It is projected that population growth in the area will increase by as much as 84% by 2025. Additionally, the project includes construction of tertiary filters and associated chlorination. The Palmdale project also includes an enhanced Effluent Management System (EMS) project phase. The Palmdale service area is considered to be a closed basin; meaning that there is no river or outlet from the area. Therefore, District No. 20 must rely solely on effluent management methods to handle the treated wastewaters from the Palmdale Wastewater Reclamation Plant (PWRP). These methods would include reuse, evaporation, and percolation. As part of the effluent management, the project includes construction of storage reservoirs, force main piping and associated pump stations.

Effluent management for PWRP is currently accomplished through agricultural irrigation above agronomic rates and agricultural reuse operations located northeast of the plant property on land leased from Los Angeles World Airports (LAWA). LAWA acquired this land for an airport (not yet constructed) during the 1970s. This resulted in the PWRP sites being completely surrounded by LAWA property. From 1981 to 2002, LAWA contracted with the District to be the primary user of all plant effluent as a source of irrigation water for farmers that leased its land. In 2000, the Regional Water Quality Control Board, Lahontan Region (Regional Board), revised the Waste Discharge Requirements (WDRs) for the PWRP. The District was ordered to take action on suspected groundwater nitrate contamination attributed to past land application and agricultural practices. Specifically, the District was required to submit a Farm Management Plan (FMP), Effluent Disposal Plan (EDP), and Corrective Action Plan (CAP) by January 2001. These three plans proposed measures that would lessen the impact of nitrogen to the groundwater. In meeting the recommendations made by the FMP, the District entered into a 20-year lease agreement with LAWA in 2002, making the District primarily responsible for the 2,680-acre EMS. This arrangement has facilitated the expansion of agricultural operations and reduced the amount of nitrogen reaching the groundwater.

The FMP also recommended that agronomic rates be used for crop irrigation, a strategy that cannot be fully implemented without adding reservoir capacity for winter storage for recycled water. Thus, the proposed construction of storage reservoirs is a necessary component of the current project. Land application and agricultural irrigation above

agronomic rates are no longer acceptable under the revised WDRs and are being phased out.

The primary objective of the Cleanup and Abatement Order (CAO) and Cease and Desist order (CDO) was for the District to address the excess nitrogen in the treated water from the facility, and the winter storage of treated water, and to develop a program to maximize effluent management and minimize land spreading.

In response to these issues and quality concerns, the Regional Board adopted CAO No. R6V-2003-056, November 2003, and CDO No. R6V-2004-039 (CDO), October 2004. The CAO requires the District and LAWA to clean up and abate the elevated nitrate levels identified in the groundwater beneath the Effluent Management System (EMS). The CDO supersedes the abatement portion of the CAO and imposes a timeline for implementing various abatement measures. Specifically, the CDO requires the District to eliminate land application and agricultural irrigation above agronomic rates of treated effluent by October 15, 2008. It also requires that, by November 15, 2009, the District must comply with requirements to prevent the discharge of nitrogenous compounds to the groundwater at levels that create a condition of pollution or violate the 1994 Water Quality Control Plan for the Lahontan Region (1994 Basin Plan) water quality objectives.

Abatement will be achieved in two phases. The first phase involves expanding agricultural reuse operations at the EMS to fully utilize the currently leased site and interim improvements to the treatment process to remove additional nitrogen compounds. In addition, by the end of 2005, all land application areas were planted with a crop when effluent is applied. These areas will be irrigated at agronomic rates wherever possible, but will exceed agronomic rates when necessary. This will significantly reduce the amount of nitrates potentially reaching the groundwater, since the nitrates remaining in the recycled water will act as a fertilizer and be taken up by the crops as nutrients. This is a key component of the groundwater remediation effort.

The second phase, which includes the construction of wastewater treatment and effluent management facilities necessary to reduce nitrates that may potentially reach groundwater to acceptable levels, is part of the current project.

Primarily, the CDO requires the plant to limit the concentration of nitrogen in the effluent to 28 milligrams per liter (mg/L) and terminate land spreading of treated wastewater containing nitrogen.

The Palmdale project is partially funded by the state of California. Release of the funds is contingent upon approval of the final approved

environmental permit by the Regional Board. Advertising of bids for construction can not be initiated until the funds are approved.

### Schedule Evaluation

The proposed sequence of events is somewhat complicated, but essentially the District submits a permit request and design to the Regional Board for review. Assuming approval, essentially the District then acquires a loan commitment from the state for funding. The project is then advertised, bids reviewed, and contracts awarded. Construction of the facility is then completed and startup occurs.

The sequence of events after permit approval is fairly straightforward. Extracted from the Palmdale Gantt chart (Feb 07) are the following.

Design Phase - Treatment Plant Expansion				
1210	Preliminary Design Assessment	53	0	21MAR05 A 12MAY05 A
1216	Final Design Stage Five Plant Expansion	517	212	27OCT05 A 30OCT07
1215	Stage Five Plant Expansion Design Complete	0	0	30OCT07
1220	SWRCS Review/Approve Final Design	20	20	31OCT07 27NOV07
1224	District's Board - Submit Agenda Item	0	0	14NOV07
1225	District Board Approval to Advertise	0	0	28NOV07
1230	Advertise and Receive Bids	46	46	29NOV07 28JAN08
1235	Review Bids	12	12	26JAN08 13FEB08
1236	SWRCS Issues ATA	15	15	26JAN08 19FEB08
1239	District's Board - Submit Agenda Item	0	0	13FEB08
1240	District Board Award -Contract	0	0	27FEB08
1255	Contract/Bond/Insurance	12	12	26FEB08 17MAR08
1250	Baseline Schedule Preparation	40	40	27FEB08 23APR08
1255	Issue Notice to Proceed (Stage Five)	0	0	23APR08
Regulatory Permits - TP Expansion / Eff. Mgmt.				
1520	Prepare ROWD (TP Expansion & Eff. Mgmt)	55	0	22OCT06 A 04JAN07 A
1525	Submit ROWD to RWQCB	0	0	05JAN07
1530	RWQCB Review	100	85	18DEC06 A 10MAY07
1535	RWQCB Issue Revised WDR for TP Exp & Eff. Mgmt	0	0	10MAY07
1539	Secure Environmental Permits - Effluent Mgmt	90	90	06FEB08 11JUN08
Construction - Treatment Plant Expansion				
1730	Construction of Treatment Plant	775	775	24APR08 25APR11
1740	Treatment Plant Startup	0	0	25APR11
1750	Testing Period	63	63	25APR11 25JUL11
1770	Treatment Plant Fully Operational	0	0	25JUL11

Design Phase - Effluent Management					
1810	Prepare RFP for Geotechnical Investigation	30	0	29DEC05 A	08FEB06 A
1815	Release RFP and Receive Bids	20	0	09FEB06 A	03MARC06 A
1820	District Board - Submit Agenda Item to Award	0	0		08MARC06 A
1823	District Board - Approve Award of Contract	3	0		02MARC06 A
1826	Secure Right of Entry (RDE)	85	0	08DEC05 A	01JUL06 A
1829	Contracting for Geotechnical Investigation	28	0	03MARC06 A	01MAY06 A
1830	Geotechnical Investigation	130	0	02MAY06 A	02NOV06 A
1835	Design Effluent Management	515	255	29DEC05 A	01DEC07
1840	Effluent Management Design Complete	0	0		01DEC07
1845	SWROS Review/Approve Final Design	20	20	02JAN06	09JAN06
1850	District Board - Agenda Item	3	0		09JAN06
1855	District Board Approval to Advertise	0	0		03JAN06
1858	Advertise and Receive Bids	40	40	23JAN06	19MARC06
1859	Review Bids	12	12	19MARC06	04APR06
1870	SWROS issues ATA	15	15	19MARC06	09APR06
1875	District Board - Submit Agenda Item	0	0		09APR06
1880	District Board Award -Contract	0	0		23APR06
1885	Contract Bonds Insurance	12	12	23APR06	09MAY06
1890	Baseline Schedule Preparation	40	40	23APR06	18JUN06
1895	Issue Notice to Proceed (Effluent Management)	0	0		18JUN06
Construction - Effluent Management					
1900	Construction for Force Main	375	375	18JUN06	01DEC09
1910	Complete Force Main	0	0		01DEC09
1920	Construction for Pump Stations	375	375	18JUN06	01DEC09
1930	Complete First Pump Station	3	0		01DEC09
1940	Construction for First Storage Reservoir	375	375	18JUN06	01DEC09
1941	Tie-in Pump Station, Force M and First Stor Res	41	41	01DEC09	29JAN10
1943	Begin Filling First Storage Reservoir	0	0		01FEB10
1944	Continued Construction of Second Pump Station	120	120	01DEC09	20MAY10
1945	Continued Construction of Rem Stor Reservoirs	140	140	01DEC09	15JUN10
1950	Complete Remaining Storage Reservoir	0	0		15JUN10
1960	Complete Second Pump Station	3	0		20MAY10

Palmdale Treatment Plant Expansion Phase & Effluent Management Phase contains the following summary timelines, as contained in the Feb 07 version of the schedule.

- Advertise Bids / Review Bids ..... 3.2 months
- Contract Set ..... 2.5 months
  
- Construction of Treatment Plant..... 36 months
- Startup of Treatment Plant..... 3 months
  
- Construction of Force Mains ..... 17.5 months
- Construction of First Pump Station ..... 17.5 months
- Construction of First Storage Reservoir ..... 17.5 months

ERM researched a number of sources to verify the typical durations or timelines for the various activities comprising a municipal wastewater treatment plant project. For example in 1998, the American Society of Civil Engineers and Water Environment Federation published "Design of Municipal Wastewater Treatment Plants – WEF Manual of Practice No. 8". This publication sets forth the range of typical durations of the various activities comprising the design and construction of the typical wastewater project. Additionally, ERM has 64 offices in North America and contacts with a number of large and small municipal groups that conduct similar projects. The schedule of Representative Durations set forth below was provided to these groups for comment. Generally, the response was that the durations are representative of municipal wastewater projects.

ERM also is involved with a large number of industrial wastewater projects worldwide. Industrial projects are not constrained by some of the facility planning, multiple bidding or contract award requirements, but the technical (design and construction) element durations are very similar.

The following is a summary of those timelines:

Representative Durations for Activities within Municipal Wastewater Treatment Projects. (These times can vary depending upon the complexity of the project.)

<i>Activity</i>	<i>Duration, Months</i>
Facilities Planning	8 - 12
Regulatory Approval	2 - 3
Preliminary Design	5 - 6
Value Engineering	1 - 2
Final Design	7 - 10
<b>Total Design</b>	<b>23 - 33</b>
Regulatory Approval	2 - 3
Bidding	2 - 3
Contract Award	1 - 2
Construction	30 - 38
Start-Up	2 - 5
<b>Total Construction/Startup</b>	<b>32 - 43</b>

The Feb 07 schedule outlines a completion date of July 2011 for treatment facilities. The October 2004 schedule outlines a completion date of November 2009. This is a difference of 20 months.

Analysis of the two Palmdale schedules highlights the following major differences.

	Oct 04 Schedule	Feb 07 Schedule
Design	28 months	33 months
Construction & Startup	24 months	39 months
Total	52 months	72 months

The Palmdale schedules for the treatment facilities illustrate a difference of approximately 20 months for the design and construction/startup activity sets, which is nearly the difference in the completion schedules (20 months). The "industry standard" for the activity sets on similar municipal wastewater treatment projects is 55 – 76 months.

The design time sets take into account the activities for permit request, review and approval. The difference is 5 months for these activities on the schedules.

Other project activity sets could be examined, but the majority of the activities are contained within the design and construction activity sets time frames.

Please note the following pages for comparison of the extractions from the two schedules.

# Palmdale Wastewater Reclamation Plant Project Schedules

## Oct 04 Schedule

Design Phase		
1200	Preliminary Design Assessment	70d
1210	Environmental Survey / Mitigation	80d
1220	Geotechnical Investigation	80d
1230	Preliminary Design	80d
1240	50% Design	80d
1250	90% Design	80d
1260	Final Design	80d
1270	Final Design Submitted to Regional Board	0
1280	Regional Board Review of Final Design	40d
1290	Comments on Final Design from Regional Board	0
1300	Revisions to Final Design	80d
1310	Preparation of Plans	80d

Permitting		
1500	Revised WDRs Issued by Regional Board	0
1510	Groundwater Monitoring Plan Issued by R.B.	0
1520	Anti Degradation Analysis	250d
Advertise, Bid, and Award Construction Contract		
1600	Board Approval to Advertise	0
1610	Advertise and Receive Bids	20d
1620	Review Bids	15d
1630	SWRCB Review of Bids	20d
1640	SWRCB Authorization to Award Contract	0
1650	Board Award of Contract	10d
Construction and Startup		
1700	Baseline Schedule	40d
1710	Contract/Bonds/Insurance	30d
1720	Prepare Land	80d
1730	Construction	310d
1740	Testing	80d
1750	Startup	0

## Feb 07 Schedule

Design Phase - Treatment Plant Expansion					
1220	Preliminary Design Assessment	53	0	31MAR05 A	32MAY06 A
1210	Final Design Stage Five Plant Expansion	517	212	27OCT05 A	30OCT07
1215	Stage Five Plant Expansion Design Complete	0	0		30OCT07
1220	SWRCB Review/Approve Final Design	20	20	31OCT07	27NOV07
1224	District's Board - Submit Agenda Item	0	0		14NOV07
1225	District Board Approval to Advertise	0	0		28NOV07
1230	Advertise and Receive Bids	40	40	29NOV07	28JAN08
1235	Review Bids	12	12	28JAN08	13FEB08
1236	SWRCB Issues ATA	15	15	28JAN08	13FEB08
1239	District's Board - Submit Agenda Item	0	0		13FEB08
1240	District Board Award -Contract	0	0		27FEB08
1255	Contract/Bonds/Insurance	12	12	28FEB08	17MAR08
1250	Baseline Schedule Preparation	40	40	27FEB08	23APR08
1255	Issue Notice to Proceed (Stage Five)	0	0		23APR08
Regulatory Permits - TP Expansion / Eff. Mgmt.					
1520	Prepare ROWD (TP Expansion & Eff. Mgmt)	55	0	32OCT05 A	04JAN07 A
1525	Submit ROWD to RWQCB	0	0		05JAN07
1530	RWQCB Review	100	69	18DEC05 A	10MAY07
1535	RWQCB Issue Revised WDR for TP Exp & Eff. Mgmt	0	0		10MAY07
1599	Secure Environmental Permits - Effluent Mgmt	90	90	06FEB06	11JUN06
Construction - Treatment Plant Expansion					
1730	Construction of Treatment Plant	775	775	23APR06	25APR11
1740	Treatment Plant Startup	0	0		25APR11
1750	Testing Period	53	63	25APR11	25JUL11
1770	Treatment Plant Fully Operational	0	0		25JUL11

ERM was asked to examine the specific time schedules for the District's design and construction of the pump stations and the force main on the Palmdale Project.

The pump station and force main design times were not separately outlined in the latest District schedule. It is presumed that they were included in the 515 days (103 weeks or 24.5 months) for the design of the Effluent Management. It is difficult to imagine that the design effort for force mains, pumps stations and storage reservoirs would require over two-year time. There may have been integration of geotechnical investigations into the design and that might contribute to some of the extended schedule. Since the design was not segregated, assumptions had to be made.

The District's construction of the force mains was outlined to be 17.5 months. Construction of the pumps stations was outlined to be 17.5 months.

ERM contacted several construction firms to get their estimation of the time required to construct the Palmdale force mains and pump stations. In both cases it was difficult to determine why the construction would require 17.5 months. It would have been expected that 12 months construction time would be the maximum time required for either the force mains or pumps stations.

### **DISCUSSION OF LANCASTER PROJECT AND DESIGN-AWARD-CONSTRUCTION SCHEDULE**

The Lancaster Water Reclamation Plant Project (LWRP) Stage V includes the expansion to 18 million gallons per day (MGD) treatment system capacity (incorporating nitrification/denitrification) to meet the demands of growing population in the service area. The Lancaster project also includes construction of tertiary filters and associated chlorination, and the construction of storage reservoirs, piping and associated pump stations.

It is projected that population growth in the District No. 14 service area will increase by as much as 105% by the year 2020. The Lancaster project also includes an enhanced Effluent Management System project phase.

Effluent from the LWRP that is not used for agricultural irrigation or conveyed to Apollo Park is discharged to Amargosa Creek which flows into Piute Ponds behind a constructed dike, upstream of Rosamond Dry Lake.

Discharges of effluent from the LWRP to Piute Ponds cause seasonal (winter) effluent-induced overflows to Rosamond Dry Lake.

The primary objective of the CDO was for the District to eliminate the effluent-induced overflows from Piute Ponds to Rosamond Dry Lake by October 1, 2008. The CDO also outlined "Interim Standards" which were and are intended to gradually reduce the treated wastewater to Piute Ponds. The Interim Standards outlined the objectives and potential actions to be taken by the District to achieve compliance.

Part of the Interim Standards was the integration of a 1 MGD Membrane Bioreactor (MBR) tertiary wastewater treatment plant. The District had funded the evaluation of the technology for application on District-wide wastewater reuse systems. It was decided to place the evaluation system at the LWRP. The 1 MGD MBR plant was completed and started up in late 2006 is now being integrated into the Interim Standards compliance plan.

The District had contracted for the design and build (D/B) of the MBR system by the equipment vendor. The District struggled with getting the required design and equipment information from the vendor, which contributed to the schedule delays. Since the MBR system was integral to compliance with the Interim Standards, the District should have applied more pressure on the vendor to submit the required information and accelerate the completion schedule. In my experience in working with equipment vendors for over 30 years, they are great at building their equipment, but the installation of the system on-site and integration into a

complex schedule are not their strength. In retrospect, the District should have controlled the project, purchased the equipment from the vendor, conducted the required engineering, and contracted the installation. This would have saved them the resulting heartache and potentially made the MBR available to integrate into the treatment and diversion of tertiary wastewaters.

Additionally, the construction of the permanent ponds (storage reservoirs) and integration into the planning and management of the wastewater under the Interim Standards could have been a more prominent focus. While there were delays due to factors out of the District's control (i.e. Mohave Squirrels), the design and construction could have been advanced.

### Schedule Evaluation

The proposed sequence of events is somewhat complicated, but essentially the District submits a permit request and design to the Regional Board for review. Assuming approval, the District then acquires a loan commitment from the state for funding. The project is then advertised, bids reviewed, and contracts awarded. Construction of the facility is then completed and startup occurs.

As with the Palmdale Project, the sequence of events after permit approval is fairly straightforward. Extracted from the Lancaster Gantt chart (Jan 07) are the following for the CAS and Tertiary Facilities, which would represent the 'heart' of the project for completion.

CAS, TERTIARY FACILITIES & AG SITE						
Activity	Start	End	Duration	Start	End	Duration
0210 Cultural Resources Survey	5/0	5/0	0	20/JUN/05 A	21/AUG/05 A	62
0215 Prepare Submittal Preliminary ROW/AD to RWQCB	20	20	0	21/AUG/05 A	18/MAY/06 A	26
0218 RWQCB Review Preliminary ROW/AD	22	22	0	18/MAY/06 A	27/JUN/06 A	26
0220 Prepare Addendum	28	28	0	27/JUN/06 A	06/JUL/06 A	10
0221 Prepare Addendum 1	27	27	0	27/JUN/06 A	11/AUG/06 A	22
0222 Prepare Addendum 2	27	27	0	27/JUN/06 A	25/AUG/06 A	29
0240 RWQCB Review Addendums & Reissue ROW/AD	31	45	14	05/OCT/06 A	12/MAR/07	28
0250 RWQCB Issues Revised ROW/AD	0	0	0	14/MAR/07	0	0
<b>Design</b>						
0260 Estimate/Prepare Item 300M/30R	21	21	0	08/JUN/06 A	05/APR/07 A	28
0210 Final Design (ad 70% V/C)	27	27	0	20/MAR/05 A	20/SEP/06 A	17
0220 Submit Final Design to SWRCB	20	20	0	02/OCT/06 A	30/OCT/06 A	28
0230 SWRCB Review/Approve Final Design	26	26	0	03/OCT/06 A	13/APR/07	45
0230 District Board - Submit Agenda Item	0	0	0	11/OCT/06 A	0	0
0240 Board Approval to Advertise	0	0	0	26/OCT/06 A	0	0
0250 Advertise & Receive Bids	40	45	5	02/FEB/07	08/JUN/07	6
0250 Review Bids/Submit Bids to SWRCB	12	12	0	01/JUN/07	26/JUN/07	0
0260 SWRCB Issues ROW/AD	15	15	0	27/JUN/07	16/JUL/07	0
0260 District Board - Submit Agenda Item	0	0	0	16/JUL/07	0	0
0270 Board Award of Contract	0	0	0	16/JUL/07	0	0
0270 Engineer Schedule Procurement	40	40	0	03/JUL/07	12/SEP/07	0
0280 Contract Through Insurance	12	12	0	16/JUL/07	06/AUG/07	0
0280 Issue Notice to Proceed	0	0	0	12/SEP/07	0	0
<b>Construction</b>						
0400 Construction (36 Months)	75	75	0	03/SEP/07	10/SEP/10	0
0410 CAS & Tertiary Facilities Completed	0	0	0	10/SEP/10	0	0
0420 Start-Up Period	36	36	0	11/SEP/10	01/MAY/11	0
0420 Tertiary Diverted to Ag Storage	0	0	0	01/MAY/11	0	0

Lancaster Treatment Plant Expansion Phase & Effluent Management Phase contains the following summary timelines, as contained in the Jan 07 version of the schedule.

Advertise Bids / Review Bids .....	3.2 months
Contract Set .....	2.5 months
Construction of Treatment Plant.....	36 months
Startup of Treatment Plant.....	2.9 months

ERM researched a number of sources to verify the typical durations or timelines for the various activities comprising a municipal wastewater treatment plant project. For example, in 1998 the American Society of Civil Engineers and Water Environment Federation published "Design of Municipal Wastewater Treatment Plants – WEF Manual of Practice No. 8." This publication sets forth the range of typical durations of the various activities comprising the design and construction of the typical wastewater project. Additionally, ERM has 64 offices in North America and contacts with a number of large and small city and municipal groups that conduct similar projects. The schedule of Representative Durations set forth below was provided to these groups for comment. Generally, the response was that the durations are representative of municipal wastewater projects.

ERM also is involved with a large number of industrial wastewater projects worldwide. Industrial projects are not constrained by some of the facility planning, multiple bidding or contract award requirements, but the technical (design and construction) element durations are very similar.

The following is a summary of those timelines:

Representative Durations for Activities within Municipal Wastewater Treatment Projects. (These times can vary depending upon the complexity of the project.)

<i>Activity</i>	<i>Duration, Months</i>
Facilities Planning	8 - 12
Regulatory Approval	2 - 3
Preliminary Design	5 - 6
Value Engineering	1 - 2
Final Design	7 - 10
<b>Total Design</b>	<b>23 - 33</b>

Regulatory Approval	2 - 3
Bidding	2 - 3
Contract Award	1 - 2
Construction	30 - 38
Start-Up	2 - 5

Total Construction/Startup 32 - 43

The January 07 schedule outlines a completion date of November 2010. The October 2004 schedule outlines a completion date of October 2008. This is a difference of 25 months.

Analysis of the two schedules highlights the following major differences.

	Oct 04 Schedule	Jan 07 Schedule
Design	22 months	26 months
Construction & Startup	24 months	39 months
Total	46 months	65 months

The Lancaster schedules illustrate a difference in approximately 19 months for the design and construction/startup activity sets, which is nearly the difference in the completion schedules (25 months). The 'industry standard' for the activity sets on similar municipal wastewater treatment projects is 55 - 76 months.

The design time sets take into account the activities for permit request, review and approval. The Oct 04 schedule outlines 6 months for the permit application, review, and approval. The Jan 07 schedule outlines 17 months for the same permit activity. This is a difference of 11 months.

Other project activity sets could be examined, but the majority of the activities are contained within the design and construction activity sets time frames.

Please note the following pages for comparison of the extractions from the two schedules.

# Lancaster Wastewater Reclamation Plant Project Schedules

## Oct 04 Schedule

CAS & TERTIARY TREATMENT FACILITIES		
8000	PERMITS (DFG)	120d
8010	ENVIRONMENTAL STUDIES (SQUIRRELS)	80d
8030	PREPARE ROWD (PROCESS CHANGE DESIGN)	20d
8040	SUBMIT ROR/ROWD TO RWQCB	1d
8050	RWQCB RWW ROWD & REVISE WDR	93d
8060	RWQCB ISSUES REVISED WDR	1d
DESIGN		
8070	PRELIMINARY DESIGN (INCL. 30% VE)	185d
8080	FINAL DESIGN (INCL. 70% VE)	275d
8090	SUBMIT FINAL DESIGN TO SWRCB (BY 4-1-06)	1d
8100	SWRCB Rvw/APPROVE FINAL DESIGN	20d
8110	BOARD APPROVAL TO ADVERTISE	1d
8120	ADVERTISE & RECEIVE BIDS	20d
8130	SWRCB REVIEW OF BIDS	19d
8140	SWRCB AUTHORIZATION TO AWARD	1d
8150	BOARD AWARD OF CONTRACT (BY 7-1-06?)	1d
8160	CONTRACT/BONDS/INSURANCE	15d
8170	ISSUE NOTICE TO PROCEED (BY 7-1-06?)	1d
CONSTRUCTION		
8180	CONSTRUCTION/STARTUP	493d
8190	STAGE 6 LANCASTER WRP EXPANSION COMPLETE	0

## Jan 07 Schedule

CONSTRUCTION SCHEDULE						
8200	Notify Grand County Survey	131	0	01MAY05 A	31AUG05 A	131
8210	Preparation of Preliminary ROWD to RWQCB	20	0	21APR05 A	18MAY05 A	20
8215	RWQCB Review Preliminary ROWD	22	0	28MAY05 A	27JUL05 A	29
8220	Prepare Addendum	268	0	27JUN05 A	06LUL05 A	267
8225	Prepare Addendum 2	270	0	27JUN05 A	11AUG05 A	263
8230	Prepare Addendum 3	270	0	27JUN05 A	25AUG05 A	253
8240	RWQCB Review Addendums & Revise WDR	51	42	01DEC05 A	13MAY07	22
8250	RWQCB Issues Revised WDR	0	0		14MAY07	0
CONTRACTS						
8260	Final Contract (incl. 30% VE)	210	0	05JUN05 A	05SEP05 A	210
8270	Final Design (incl. 70% VE)	275	0	20APR05 A	20SEP05 A	275
8280	Submit Final Design to SWRCB	20	0	02JUL05 A	30OCT05 A	21
8290	SWRCB Review/Approve Final Design	05	72	10OCT05 A	13APR07	45
8300	Contract Award - Submit Agenda Item	0	0		11OCT05 A	0
8310	Board Approval to Advertise	0	0	28OCT05 A		0
8320	Advertise & Receive Bids	40	42	16APR07	06JUN07	0
8330	Review Bids/Submit Bids to SWRCB	12	12	17JUN07	09JUL07	0
8340	SWRCB Issues A&A	15	15	27JUN07	16JUL07	0
8350	Contract Award - Submit Agenda Item	0	0		16JUL07	0
8360	Board Award of Contract	0	0		16JUL07	0
8370	Reschedule Schedule Negotiation	40	42	17JUL07	12SEP07	0
8380	Contract/Insurance	12	12	17JUL07	06AUG07	0
8390	Issue Notice to Proceed	0	0		12SEP07	0
CONSTRUCTION						
8400	Construction (56 Months)	775	775	12SEP07	10SEP10	0
8410	CAS & Tertiary Facilities Completed	0	0		10SEP10	0
8420	Construction Period	36	36	12SEP10	01NOV10	0
8430	Tertiary Effluent to 4g Storage	0	0		01NOV10	0

14-0030

ERM was asked to examine the specific time schedules for the District's design and construction of the storage reservoirs and the 1 MGD Membrane Bioreactor (MBR) system.

The storage reservoirs design times, as outlined in the Jan 07 schedule, are:

Preliminary Design ..... 8.8 months  
Final Design ..... 13.8 months  
Redesign based on RWQCB Order ..... 6 months

The total time outlined by the District for design of the storage reservoirs was 28.6 months.

Construction of the storage reservoirs, as outlined in the Jan 07 schedule, is:

Stage 5 Construction (Reservoirs 1 & 2) ..... 24 months  
Stage 5 Construction (Reservoirs 3 & 4) ..... 30 months

The total construction time for the four (4) storage reservoirs was outlined to be 30 months.

ERM has an internal group which provides remediation and construction services. Additionally, an external environmental construction firm that provides design and support services for remediation and others projects was queried about the design and construction times for storage reservoirs. Both groups design and construct retention or reservoir ponds in multiple states in the southeast and U.S. They were given the typical size of the storage reservoirs and design specifics from the District's drawings (i.e. height of berm, concrete slope details, etc.) It was also assumed that these reservoirs would be lined, as perhaps a worse case. While there may be issues that are included and addressed in the design stage, it is still the basic design of a retention pond. Once the design for one is completed, the variables for the others can be easily integrated for the design of the others and producing design documents. In fact the details for one will be relatively the same for the others.

A time estimate for the design of the storage reservoirs (excluding any times for review, permitting, etc.) would be 12.6 months. An estimate for the construction of the storage reservoirs (excluding any times for review, permitting, etc.) would be 18.4 months. This assumes that ponds 1 & 2 (or 3 & 4) construction activities would be concurrent. Also added was some contingency into these times for the normal unexpected delays due to weather, etc.

ERM was asked to examine the specific time schedules for the District's design and construction of the 1 MGD Membrane Bioreactor (MBR) system.

The MBR system design times, as outlined in the Jan 07 schedule, are:

Prepare/Submit Design and District's Review	183 days (36.6 weeks)
District Review and approval of Design	10 days (2 weeks)
Completed MBR Design/submittals	17 days(3.4 weeks)
Construction of MBR	152 days (30.4 weeks)

The total time outlined by the District for design/construction of the MBR system was 17.2 months.

These are timelines provided by Siemens (USFilter) for a similar 1 MGD Design/Build Project:

1. Engineering design ..... 8 to 10 weeks from PO
2. Fabrication drawings ..... 10 to 14 weeks
3. Equipment orders ..... 1 week
4. Equipment delivery ..... 16 weeks
5. Construction supervision/installation .. 20 to 24 weeks
6. Start-up and commission ..... 4 weeks

ERM acquired information from one source (USFilter) that estimated approximately 59 to 69 weeks, depending on the project specifics, would be required for the design and construction of a similar size MBR system (including 16 weeks for equipment delivery). According to USFilter the total time for design/construction schedule would be 48 weeks. This compared to the District's outlined schedule of 72 weeks for the same activity.

## **SUMMARY & CONCLUSIONS**

The Palmdale and Lancaster project schedules have significantly shifted after nearly two years of work on the projects. It appears that the major change is the extension of the construction activities schedule projection, with the design activities schedule also contributing to the delay.

### Palmdale Project

The Palmdale treatment facilities project was originally projected to have a design activity time frame of 28 months. In the Feb 07 schedule, the design time frame is 33 months. The "industry standard" for design (assuming all activities) is 23 - 33 months. Therefore the projected times in both schedules would be considered reasonable.

The Palmdale treatment facilities project was originally projected to have a construction activity time frame of 24 months. In the Feb 07 schedule, the construction time frame is 39 months. The "industry standard" for construction/ startup is 32 - 43 months. The original time frame of 24 months would be an under-estimate, while the later projected 39 months would be more representative.

The Palmdale project could not have been designed and constructed (along with all related and required activities) within the original projected schedule. Most projects of this magnitude would have had a number of delays occur as work progressed, but the schedule did not allow for these; it was an unrealistically optimistic project schedule. The revised schedule reflects more appropriate time durations for the required activities.

The entire Palmdale completion schedule has been extended for 20 months. It appears that under-estimation of the construction time required accounts for the majority of that time.

With regards to the construction of the Palmdale force mains and pump stations, the District outlined previous construction times appeared to be excessive. Not more than 12 months should be required for the force mains and 12 months for the pump stations. The District has since determined that these activities can be completed concurrently, as indicated in the most recent schedule.

### Lancaster Project

The Lancaster treatment facilities project was originally projected to have a design activity time frame of 22 months. In the Jan 07 schedule, the design time frame is 26 months. The "industry standard" for design

(assuming all activities) is 23 -33 months. Therefore, the projected times in both schedules would be considered reasonable.

The Lancaster project was originally projected to have a construction activity time frame of 24 months. In the Jan 07 schedule, the construction time frame is 39 months. The "industry standard" for construction/startup is 32 – 43 months. The original time frame of 24 months would be an under-estimate, while the later projected 39 months would be more representative.

The entire Lancaster completion schedule has been extended for 25 months. It would appear that under-estimation of the construction time required accounts for the majority of that time.

As with the Palmdale Project, the Lancaster Project could not have be designed and constructed (along with all related and required activities) within the original projected schedule. Most projects of this magnitude would have had a number of delays occur as work progressed, but the schedule did not allow for these; it was unrealistically optimistic. The revised schedule reflects more appropriate time durations for the required activities.

While there may be related activity sets which complicated the compliance with the CDO's interim standards for the Lancaster project, these activity sets do not appear to have contributed significantly to the overall completion schedule. The District could have better planned and executed aspects and activities of the overall project to accommodate the Interim Standards (i.e. MBR plant and permanent ponds).

Within the Lancaster Project, two major milestones were defined: the first being the completion of the 21 MGD tertiary treatment plant and compliance with defined discharge standards, and the second being the compliance with the Interim Standards to alleviate discharge of wastewater during the winter months. The Interim Standards would have assisted in approaching the ultimate solution.

Based on our review and analysis, we have concluded that the construction schedules for the Palmdale and Lancaster Projects as initially proposed were unreasonably optimistic, and that the proposed extensions of those specific task activities within the schedules are not unreasonable, especially since they now fall within the industry standards of duration for similar municipal wastewater treatment projects.

With regard to the activities within the project that could have assisted with compliance with the Interim Standards, the District could have provided better management and execution of the MBR and the design and construction of the permanent ponds.

The 1 MGD MBR system was defined as integral to the Interim Standards. The District could have completed the construction and startup of that system within a more reasonable period of time, with appropriate planning and execution. With 183 days for design and 152 days for construction (based on District schedule), both activity sets for the MBR system are of longer duration than would normally be expected. Depending on the project specifics, 59 to 69 weeks would be required for the design and construction of a similar size MBR system (including 16 weeks for equipment delivery). Therefore, according to USFilter, the total time for design/construction schedule for a similar capacity MBR system would be 48 weeks. This compared to the District's outlined schedule of 72 weeks for the same activity set.

The construction of ponds was also defined as integral to the Interim Standards. With 297 days for design and 650 days for construction (based on District schedule), both activity sets for the permanent ponds are of longer duration than would normally be expected.

A time estimate for the design of the storage reservoirs (excluding any times for review, permitting, etc.) would be 270 days (54 weeks or 12.6 months). An estimate for the construction of the storage reservoirs (excluding any times for review, permitting, etc.) would be 396 days (79.2 weeks or 18.4 months). This assumes that ponds 1 & 2 (or 3 & 4) construction activities would be concurrent. Also added was some contingency into these times for the normal unexpected delays due to weather, etc.

It is clear that there are distinct differences of interpretation of probable schedules for specific task activities within the Palmdale and Lancaster projects. It was attempted to understand the rationale for the District's schedule. ERM gathered information on 'industry standards' and actual similar project experience in the technical evaluation of the two project's schedules. The Lancaster and Palmdale Projects have very specific compliance deadlines and requirements. The Lancaster project had interim project deadlines as well.

The intent of this evaluation was to provide guidance on the District's project schedules and specific task activities. It would appear that initially the Districts liberally extended the schedules for the Lancaster MBR plant and storage reservoirs, Palmdale storage reservoirs, and force mains without examining the planning approaches and options to minimize delay. ERM had pointed out that specific task activities could have been completed concurrently or segregated for completion to attempt to meet the compliance requirements. The District's most recent schedules reflect some integration of concurrent schedules tasks.