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October 12, 2009

383194.AP.PM

Ms. Felicia Miller
California Energy Commission
1516 Ninth Street
Sacramento, CA 95814-5512

Subject: Almond 2 Power Plant (09-AFC-02)
Data Response Set 1B, Responses to CEC Staff Data Request 19 and Workshop Queries 1 through 6

Dear Ms. Miller:

Attached please find 13 hard copies and 1 electronic copy on CD-ROM of the Almond 2 Power Plant's Data Response Set 1B. This Data Response Set was prepared in response to California Energy Commission Staff Data Request 19 for the Application for Certification for the Almond 2 Power Plant (09-AFC-02) dated August 13, 2009. Workshop Queries 1 through 6 (WSQ 1-6) are also being provided. WSQ 1 through 6 address additional questions Staff had during the September 22, 2009 Data Response Workshop. Both are being submitted to respond to the Staff's requests for additional information.

If you have any questions about this matter, please contact me at (916) 286-0249 or contact Susan Strachan at (530) 757-7038.

Sincerely,

CH2M HILL

Sarah Madams
AFC Project Manager

Attachment
cc: S. Strachan, Strachan Consulting
R. Baysinger, TID

APPLICATION FOR CERTIFICATION




SUBMITTED TO

California Energy Commission

FOR

TID Almond 2 Power Plant

SUBMITTED BY

TID

Turlock Irrigation District

TECHNICAL ASSISTANCE BY

CH2MHILL

October 2009

Data Responses, Set 1B

Responses to Data Request 19 and Workshop Queries 1 through 6

Almond 2 Power Plant

(09-AFC-02)

Data Responses, Set 1B

(Response to Data Request 19 and Workshop Queries 1 through 6)

Submitted to

California Energy Commission

Submitted by

WATER & POWER
Serving Central California since 1887

With Assistance from

CH2MHILL
2485 Natomas Park Drive
Suite 600
Sacramento, CA 95833

October 2009

Contents

Attachments

Figures

Introduction

Attached are Turlock Irrigation District's (TID or the Applicant) responses to the California Energy Commission (CEC) Data Request Set 1, Data Request 19, as well as Workshop Queries numbers 1 through 6 regarding the Almond 2 Power Plant (A2PP) (09-AFC-02) Application for Certification (AFC). The Workshop Queries were discussed during the CEC Data Response and Issue Resolution Staff Workshop that was held on September 22, 2009.

A background discussion for each Workshop Query is provided, followed by the Applicant's response. The Workshop Queries have been given a unique Workshop Query (WSQ) number. Any future Workshop Queries will be assigned sequential numbers. New or revised graphics or tables are numbered in reference to the WSQ number. For example, the first table used in response to WSQ 36 would be numbered Table WSQ36-1. The first figure used in response to WSQ42 would be Figure WSQ42-1, and so on.

Additional tables, figures, or documents submitted in response to a Data Request or Workshop Query (supporting data, stand-alone documents such as plans, folding graphics, etc.) are found at the end of each discipline-specific section and are not sequentially page-numbered consistently with the remainder of the document, though they may have their own internal page numbering system.

Cultural Resources, Data Request 19

Background

According to the AFC's paleontology section, the uppermost 10-20 feet of undisturbed sediments in the proposed project vicinity are Tuolumne River alluvial fan deposits known as the Modesto Formation, dating from 75,000 to 10,000 years before the present. The proposed project's two alternative natural gas pipeline routes, extending south to the floodplain of the San Joaquin River, traverse the same Modesto Formation deposits and cut across the toe of the fan (p. 5.8-5).

As noted in the previous Background, fill on the A2PP project site extends to approximately 6.5 feet below the surface across the entire site, and soils disturbed by agriculture extend to 4.0 feet below the surface along the project's proposed linear facilities (p. 5.8-9). So the proposed project's potential to impact buried archaeological deposits, which would date no earlier than 14,000 years ago, depends on how much geologic time is represented by the displaced 6.5 feet on the project site and the disturbed 4.0 feet along the linear facility routes.

Data Request

19. Please have the author of the Paleontological section of the AFC provide an assessment, along with the evidence on which the assessment is based, on whether the sediments below 6.5 feet (from the ground surface) at the project site and below 4.0 feet (from the ground surface) along the linear facility routes and at the end of the natural gas line routes are of a geologic age young enough to contain archaeological deposits.

Response:

The Quaternary Geology of the Tuolumne and Merced River Alluvial Fans

The project area lies between the courses of the Tuolumne and Merced rivers, and the geological history of each of these is intimately tied to the Sierra Nevada to the east. The major rivers leading out of the Sierra Nevada and flowing from east to west follow courses that are markedly eroded into their alluvial fans. The Tuolumne River, for example, is incised more than 70 feet into the surface of its alluvial plain about 2 miles north of the A2PP site.

Unlike many other parts of the American west where the Quaternary geological record has received little attention, that of the San Joaquin Valley has been the subject of a number of studies. Its agricultural importance as well as the associated significance of its groundwater basins and tectonic behavior has attracted a number of geological studies. References to the principal studies consulted are provided at the end of this Data Response, and are included by reference into the description of the context and stratigraphy of the subsurface of the A2PP area and its laterals. Individual citations are limited to documentation of the widespread distribution of the data discussed.

Stratigraphic and Paleoclimatic Context

The axis of the San Joaquin Valley is offset to the west and, as marked by the San Joaquin River, lies close to the piedmont of the Coast Ranges. From the river's axial stream to the piedmont of the Sierra Nevada, however, is a distance of well over 20 miles. The lower two-thirds of this bajada extending from the Sierra Nevada west to the San Joaquin River is a low-gradient alluvial plain composed of arkosic (quartz rich) sands and gravels. The gradient is less than 20 feet per mile from the floodplain to the first uplifted terraces east of the U.S. 99 corridor, and although the current skyline is broken by development and agriculture, geological mapping and historical accounts describe a vast, largely featureless plain with perennial bunchgrass on the upper slopes giving way to salt scrub closer to the current floodplain.

Understanding the subsurface archaeological potential of the project area is enhanced because of the general understanding of the mode of deposition of the alluvial fan comprising not only the project area but the entire eastern flank of the San Joaquin Valley. The alluvium that comprises substrate of the project area comes from the Sierra Nevada, and is thought to accrete episodically. Periods of alluvial deposition are punctuated by long periods of relative stability when little deposition happens but soil formation is marked. These episodes of Sierran erosion are thought to relate to times of widespread slope instability, although periods of increased montane erosion may relate to episodes of glaciation, or to periods of deglaciation and ice sheet melting. All things considered, it would appear more likely that major depositional episodes on the alluvial fans of the principal rivers issuing from the Sierra Nevada are more likely related to ice sheet melting and the transport of enormous quantities of gravel, sand and silt from the mountains to the alluvial fans after release from the ice.

Most works concur that the Modesto Formation, the youngest and topmost of the widespread Late Quaternary stratigraphic units of the San Joaquin Valley, dates to the last glacial age (the Wisconsinan, or Oxygen Isotope Stages [OIS] 4 through 2). Deglaciation occurred early in the Sierra Nevada, by 16 to 20 kA (thousand years ago). However, erosion of the sedimentary load created by ice sheet growth and collapse over the previous 50 kA (roughly 70 to 20 kA), may have taken 10,000 years or so. If that is the case, then deposition of the Modesto Formation was largely complete by about 10 kA. And, away from the major river channels (the Tuolumne to the north, the Merced to the south, and the San Joaquin to the west), negligible deposition occurred after the end of the Pleistocene at 10 kA. Recently, however, there has been a growing appreciation that some of the eolian deposits previously mapped as Late Pleistocene (the eolian facies of the Modesto Formation) may include early Holocene facies. The transition from a cold, semi-arid climate of the last glacial age to a climate evidently more arid than the historic period occurred during deglaciation, and considerable mobilization of sediment no doubt occurred in some areas especially with the newly lain blanket of Sierran outwash in the valley. Thus, the upper-most eolian facies of the Modesto Formation, consisting of a widespread sand sheet through much of the area, may include early Holocene strata and, perhaps, even middle Holocene facies. However, the eolian facies of the Modesto Formation has been widely disrupted by agricultural activities and it would be exceedingly rare to encounter intact upper Modesto sediments anywhere in this intensely farmed region. Accretionary features such as dunes are not usually mapped on the fans of the Tuolumne and Merced rivers.

Stratigraphy of the Project Area

The Walnut Energy Center (WEC) is an electrical generation facility about 1 mile west of Turlock and about 8 miles southeast of the A2PP. It began operation in February 2006, and prior to that excavations for its construction yielded a limited Pleistocene vertebrate fauna as well as paleobotanical material. It also provided the opportunity for a close look at the Late Quaternary stratigraphy over a relatively large area. Additional data points on the subsurface geology of the current project area have come from well-core records (Burow et al., 2004), paleontological records reviewed for the A2PP and the WEC, and field reconnaissance observations.

Burow et al. (2004) largely follow the lead of Marchand and Allwardt (1981) and describe three stratigraphic units in the study area relevant to this analysis. The topmost and therefore youngest is the Modesto Formation. The thickness of the Modesto Formation is usually not directly addressed, but it is mapped as largely surficial deposits by Atwater and others (1986). The WEC excavations revealed that it normally ranged from about 6 to 7 feet up to 10 feet deep due principally to paleotopographic variability at the base of the Modesto Formation. The upper 4 feet of the Modesto Formation was inevitably disturbed by agriculture, and consists of a homogenous dark grey-brown sandy silt with a high organic content. Rodent bioturbation (appearing chiefly attributable to the pocket gopher *Thomomys*) was abundantly evident and continued into the lower portion of the Modesto Formation (Figure DR19-1). The lower portion of the Modesto Formation, at depths generally exceeding 5 feet, exhibits a notably higher pedogenic clay content as well as distinct reddening (Figure DR19-1).

The Riverbank Formation lies below the Modesto Formation, and is commonly thought to date to the Illinoian Glacial Age, or prior to about 130 kA (OIS 6). The contact is typically abrupt, and frequently unconformable, indicating erosion of the upper Riverbank before deposition of the overlying Modesto Formation. A very well-developed, compound soil is developed into the top of the Riverbank Formation. The soil grades from light gray above to dark gray below, and from a sandy, silty clay above to silty ferruginous sand below. Krotovinas are common in this soil and are much more diverse in shape and orientation than those in the Modesto Formation (Figure DR19-2). They range from large, rare rodent burrows to smaller, relatively abundant root casts and molds and insect burrows. This soil is well developed and up to 3 feet thick, with vesicular structure and laminations visible under magnification. Other than its distinct gray color (which dries to an off-white) this soil is distinguished as a widespread caliche—a calcium carbonate hardpan. Its development was found to be somewhat variable at the WEC site, ranging from ringing hard to soft and lacking cementation. Detailed excavation revealed several imbricated horizons below the main hardpan.

The features of the Riverbank Formation's paleosol indicate that it is a compound soil that reflects different environmental conditions during different times since the deposition of the Riverbank. The dense gray clay (a classically "gleyed" horizon) suggests the persistence of comparatively moist, temperate conditions. The caliche on the other hand, indicates prolonged aridity. The krotovina are among the most interesting features of this paleosol. They are often cored with a fine, clean, white to pinkish (when wet) sand and posses a distinct white carbonate rind (Figure DR19-2). This is "feeder sand" and shows that these cavities acted as conduits for emergent, artesian waters at a time characterized by considerably more recharge to the local aquifer than at present.

Finally, below the Riverbank Formation at depths usually exceeding 120 feet, is an organic- and clay-rich stratum locally known as the "blue clay," which has been correlated with the Corcoran Clay member of the Tulare Formation (Burow et al., 2004; Marchand and Allwardt, 1981). It is thought to represent a widespread freshwater lake and/or system of lakes and marshes during a time of tectonically induced blockage of the San Joaquin River drainage, presumably at the Carquinez Strait (Atwater et al., 1986). Its age is thought to be in excess of 500 kA.

Implications for Archaeological Sensitivity

Holocene-age (post-glacial) sediments overlying the Modesto Formation and dating to the last 10 kA have rarely been described in the area, and their contact with the Modesto Formation in most cases "is difficult to distinguish" (Burow et al., 2004). The most detailed geologic maps show Modesto Formation sediments at the surface (for example, Birkeland, 1974; Atwater et al., 1986), represented by the eolian facies of this unit. Wind-blown, cross-bedded sand sheet deposits were found to be present below the plow zone in the WEC project area and their assignment to the Modesto Formation seems clear.

The continuity of the geological framework described above is reflected in the regional geological maps (for example, Birkeland, 1974; Atwater et al., 1986; Burow et al., 2004), as well as widespread field evidence consisting primarily of records of occurrence of the Riverbank Formation paleosol in excavations as far south as Hilmar in Merced County (where, like the WEC, it also yielded a limited Pleistocene faunal record), and as close as the other side of Crows Landing Road less than a half-mile to the west of the A2PP site itself.

While there no doubt was some topographic variability, and with it some chance for post-glacial (post-Modesto Formation) sedimentation, in the region, these features have not been recorded. Nor have they been encountered in excavations of which the author is aware. Therefore, the probability that excavations for the A2PP will encounter Holocene-age archaeological material at depth on the Tuolumne River or Merced River alluvial plains is negligible in the absence of site-specific evidence to the contrary.

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FIGURE DR19-1
MODESTO FORMATION
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

CH2MHILL

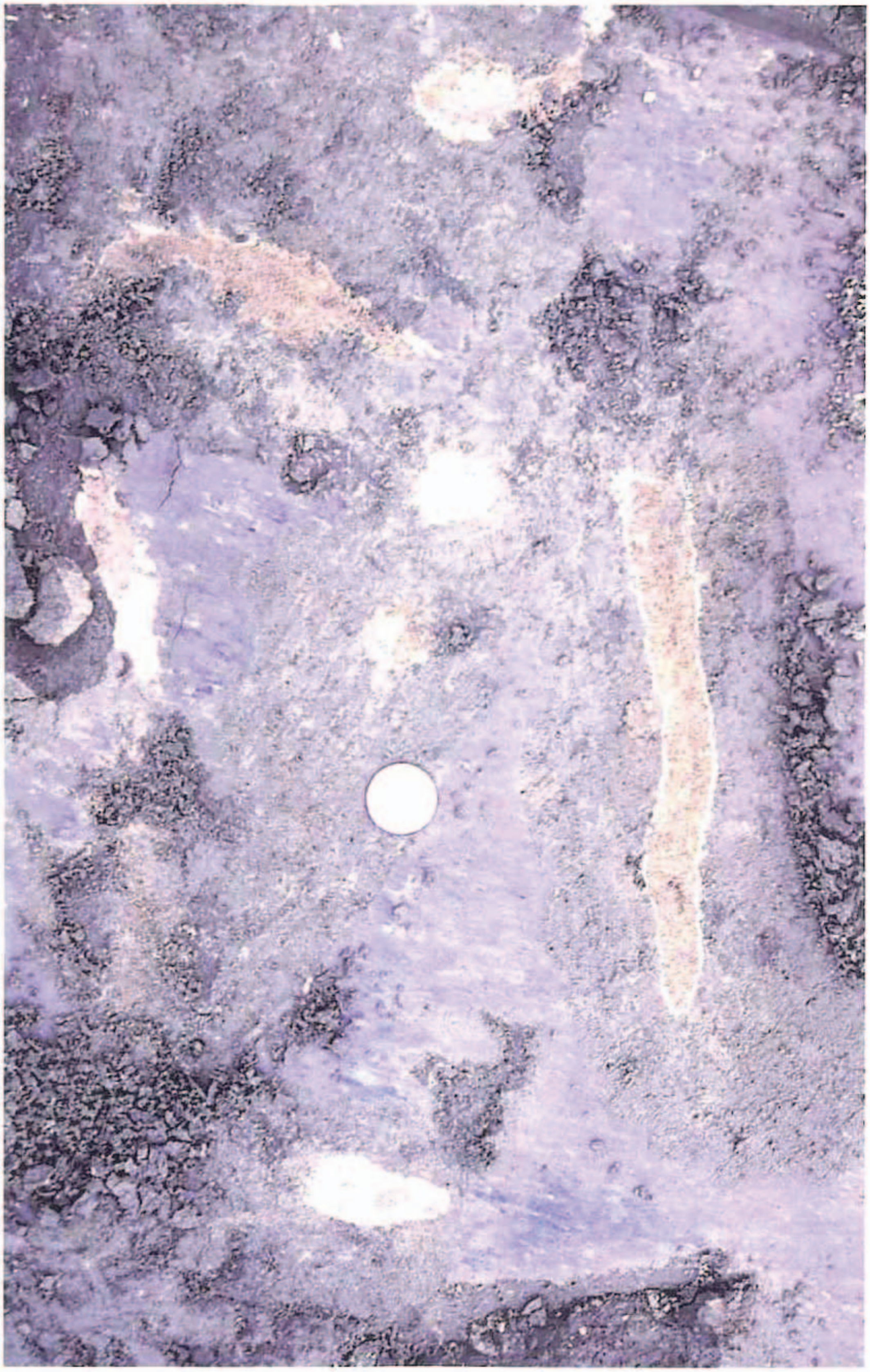


FIGURE DR19-2
KROTOVINAS IN THE MODESTO FORMATION
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

Workshop Queries (1–6)

Background

During the CEC Data Response and Issue Resolution Staff Workshop on September 22, 2009, Staff requested additional clarification on several responses provided in Data Response Set 1A. Applicant has provided responses below as Workshop Queries (WSQ) 1 through 6.

Nearby School Bus Stops

WSQ-1 Please formally docket the figure showing the nearest school bus stop to A2PP.

Response: Please see Figure WSQ1-1.

PSD Permit

WSQ-2 Staff asked the Applicant what was done to confirm Prevention of Significant Deterioration (PSD) nonapplicability for the project. When the Air District determined the air permit application to be complete, the District sent the Applicant a form letter indicating that the District did not have authority to issue PSD permits so any project requiring PSD review would have to be submitted to EPA. The Applicant indicated that a copy of the AFC had been provided to EPA with cover letter explaining why the project was not expected to be subject to PSD review requirements, and that no response to the contrary had been received. Please follow up with the EPA to see if they have a response on PSD applicability.

Response: In response to the staff's request, the Applicant contacted the EPA again via email on September 22, 2009, and followed up with a telephone call on October 7, 2009. At this time, the Applicant has not yet received a response. The lack of response is not surprising, given that these types of requests are not typically given priority by EPA. A copy of the email request is provided as Attachment WSQ2-1. The Applicant will continue to attempt to contact EPA regarding this request and will notify CEC staff with any response from the EPA.

Cumulative Modeling Analysis

WSQ-3 Staff asked for clarification on Data Response 9, which requested the cumulative modeling analysis within 6 miles of the A2PP site as promised in the modeling protocol in AFC Appendix 5.1B. Please provide the rationale for why each item from the cumulative impacts was removed. Please also explain why a radius of 5 km was used instead of 10 km.

Response: Detailed rationale for eliminating specific projects from the cumulative impacts modeling analysis can be found in Attachment WSQ3-1.

Groundwater Model

WSQ-4 Staff requested an estimated quantification of how much fresh water was being drawn up by the extraction well on site. Staff was also concerned with the water balance and possible hydraulic issues relating to whether the capacity of the percolation ponds is adequate to support A2PP. Please provide a groundwater model to provide more information on how the extraction well draw-down of fresh sources may affect adjacent users' water.

Response: At the September 22, 2009, Data Request Workshop, the CEC requested that a groundwater model be developed to provide additional support for the position that the additional water proposed to be pumped from the Extraction Well for the A2PP water supply would originate from the Ceres Wastewater Treatment Plant (WWTP) ponds. A project-level, steady-state, 3-dimensional, finite-element groundwater model was developed using information from the regional Turlock Basin Groundwater Model (Durbin, 2008) and information provided by both the City of Ceres and TID. The project groundwater model focused on the physical area of the WWTP ponds as the primary source of local recharge to the shallow aquifer and the four wells that operate near the ponds. Attachment WSQ4-1 summarizes the development and findings of the groundwater modeling effort conducted to address the CEC's Data Request.

There are three agricultural drainage wells in the immediate vicinity of the WWTP, owned by TID, but operated by City's WWTP. These wells were installed in the western portion of the Turlock Groundwater Basin to lower and maintain groundwater levels below the root zone of sensitive crops and plants. Operating records from 2006–2008 show that these high-volume wells (1,100 to 1,500 gpm) were operated by the WWTP about 80 percent of the time. The Extraction Well (550 gpm) operates 40 to 50 percent of the time (based on 2006–2008 records) and is proposed to increase to 100 percent operation. Although the A2PP will be operated as a peaking facility, the Extraction Well was nevertheless modeled at 100 percent operation to address the CEC's concern about the origin of the additional water to be pumped at the Extraction Well.

Modeled inflow to the WWTP ponds originated from three sources: the WWTP effluent, return flow from power plant operation at maximum Extraction Well pumping, and precipitation. Review of the 2006–2008 WWTP effluent shows low daily variability over time. Return flow from the power plants is predicted to be at a constant rate also, because of expected continuous well operation to meet plant demands (except during routine maintenance and scheduled power plant downtime). The return flow was modeled at 50 percent of the pumped water, based on the 2006–2008 return flows. The portion of precipitation that directly recharges groundwater was input into the entire model area as 10 percent of the estimated 11 inches of annual rainfall.

Particle tracking, to show the flow lines of groundwater entering the operating Extraction Well, shows that 19 of the 20 flow paths showing water entering the well originate from the pond immediately to the north of the well (Figure DR38-1 from Data Response Set 1A and Figure 6 in Attachment WSQ4-1). These flow lines assume that the Extraction Well is continuously operating at 550 gpm and the agricultural drainage wells continue to pump 80 percent of the time at their current flow rates. Therefore, increasing the pumping at the existing Extraction Well will have minimal effect on the surrounding aquifer and will support capture of the treated water infiltrated at the WWTP ponds.

Hydraulic Water Balance

WSQ-5 Please provide a water balance model and hydraulics analysis including peak demands between A2PP and Ceres WWTP.

Response: At the September 22, 2009 Data Request Workshop, the California Energy Commission (CEC) requested additional information to show that the return flow from the A2PP has the potential to impact local groundwater quality. The groundwater model developed to address Data Response #38 of Data Response Set 1A was used to assess the groundwater impacts potentially resulting from the addition of the A2PP return flow to the Ceres WWTP holding ponds. Attachment WSQ4-1 summarizes the development and findings of the groundwater modeling effort conducted to address the CEC's Data Request #38 Data Response Set 1A.

As discussed in the response to Response to WSQ-4, inflow into the ponds was considered to occur from three sources: treated water from the WWTP that is not conveyed to the City of Turlock, power plant return flow estimated at 50 percent of the Extraction Well operating at full capacity, and precipitation.

Output from the groundwater model shows that when the four wells in the vicinity of the ponds (the three agricultural drainage wells operated by the City and the Extraction Well) pump at the rates expected during A2PP operation, groundwater from the ponds is captured at the wells (Figure DR53-1 from Data Response Set 1A, which is also Figure 7 in Attachment WSQ4-1). This is shown by tracking particles originating from the five WWTP ponds and then monitoring their flow paths. The groundwater model shows that each of the 10 particles "released" from the center of each of the ponds is captured by one of the four wells. Therefore, the additional return flow from A2PP to the ponds is shown to be captured by the existing operation of the agricultural drainage wells and the increased operation of the Extraction Well.

Cost Estimate for Construction of New Pipeline

WSQ-6 Please provide a cost estimate for the construction of a pipeline to and acceptance of water by the Turlock WWTP, including any mitigation costs.

Response: Assuming the pipeline follows along main roads from the Turlock WWTP to the project site, the total length of the pipeline would be approximately 13.1 miles. A 10-inch-diameter pipeline with capacity for 1,000 gpm water delivery and a 250 gpm ZLD would be approximately $23,535,307. A breakdown of these costs is provided in Table WSQ6-1. Additionally, preconstruction surveys (biological, cultural, and paleontological) of a 13.1-mile-long pipeline route would be an additional $100,000. Costs for biological, cultural and paleontological monitoring, as well as possible biological mitigation fees were not included in this estimate as it is unknown at this time if these will be needed. In addition, if the pipeline were not located within the county road right-of-way, a private easement would have to be obtained. The estimated per mile cost for acquiring private easements is $36,363.00 per mile.[1] This amount was not included in the total since it is not known whether private easements would be required. The cost of water from the

[1] ([30 foot permanent easement width x 5,280 feet per mile] / 43,560 square feet per acre) x $10,000 per acre = $36,363 per mile. The $10,000 per acre is an estimated easement cost based on TID's experience acquiring easements in its service territory.

Turlock WWTP is estimated to be approximately $600 per acre-foot per year[2]. Maximum water use, assuming a 100% capacity factor would be 514 acre-feet per year, for a total of $308,400 per year during operations.

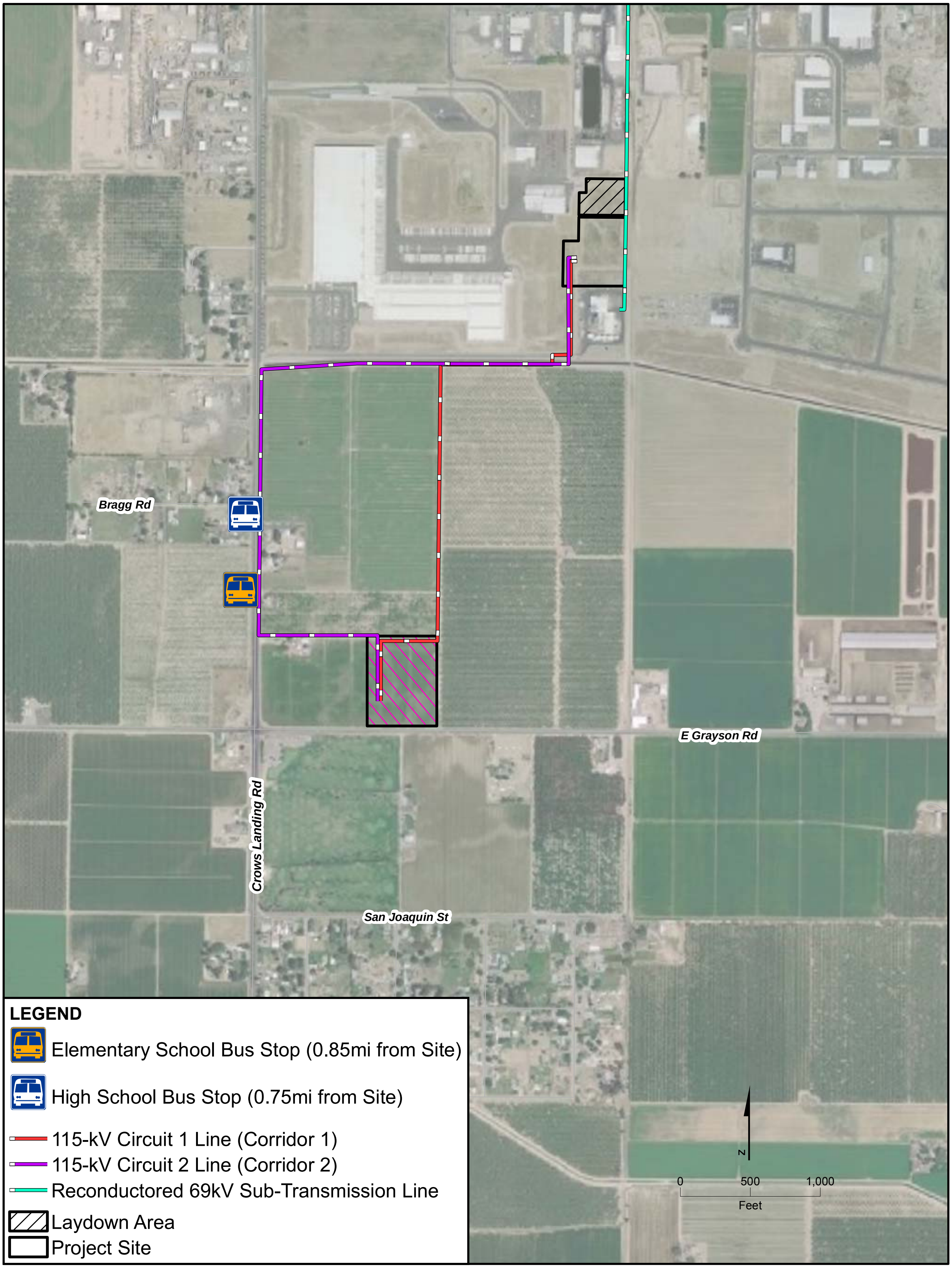
TABLE WSQ6-1
Cost Estimate to Construct a 13.1 Mile-Long Pipeline

Equipment	Cost
Pumps/Piping/Electricity	$225,038
Pipeline Construction (13.1 miles)[a]	$9,225,629
Installation of ZLD EPC[b]	$10,000,000
20% Contingency	$4,084,640
TOTAL	**$23,535,307**

[a] Pipeline construction estimate includes both labor and materials, as well as potential roadway and canal crossings

[b] A Zero Liquid Discharge System (ZLD) is included as process wastewater cannot be sent to the Ceres WWTP or the Turlock WWTP and instead would need to be treated onsite in the event water is procured from the Turlock WWTP.

[2] The Turlock WWTP has not been contacted regarding the possibility of providing water to the Almond 2 Power Plant, therefore the $600 per acre-foot per year was estimated using a recent amount approved between the City of Lodi (White Slough Water Treatment Facility) and the Northern California Power Agency for the Lodi Energy Center at the September 2, 2009 City Council Meeting.



This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE WSQ-1
SCHOOL BUS LOCATIONS
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

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ATTACHMENT WSQ2-1

Email to EPA for Prevention of Significant Deterioration Applicability

From: Nancy L. Matthews [NMatthews@sierraresearch.com]
Sent: Tuesday, September 22, 2009 2:47 PM
To: Gerardo Rios
Cc: Nancy L. Matthews; Jeff Adkins
Subject: determination of PSD nonapplicability for Turlock Irrigation District Almond 2 Power Plant project

Attachments: Turlock Irrigation District (2).pdf

Gerardo--

In June we provided you with a copy of our application for an authority to construct for Turlock Irrigation District's Almond 2 Power Plant project, which is a proposed simple cycle gas turbine project to be constructed next to TID's Almond Power Plant in Ceres, Stanislaus County. In the transmittal letter (copy attached), we explained why we had determined that the proposed project was not subject to PSD requirements. We also indicated that the project is under review by the California Energy Commission.

The CEC staff has asked the applicant to obtain EPA's concurrence in our determination of PSD nonapplicability. Would you provide us with written concurrence in this determination?

Thank you very much for your assistance in this matter. If you have any questions regarding this or any other aspect of the project, please feel free to contact Jeff Adkins or me.

Nancy Matthews
Sierra Research
1801 J Street
Sacramento, CA 95811
916-444-6666 x 124
916-273-5124 (direct)
916-444-8373 (fax)

ATTACHMENT WSQ3-1

Cumulative Analysis Tables

New Emission Sources Located within 6 Miles of the TID Almond II Power Plant Project

				Emission Increase (lb/year)				
Facility ID	**Project #**	**Facility Name**	**Permit Issued Date**	**NOx**	**SOx**	**PM10**	**CO**	**VOC**
1680	N-1090191	STANISLAUS FOOD PRODUCTS	Pending	132	0	5	24	9
1683	N-1090522	STANISLAUS COUNTY BLDG. MAINT.	Pending	418	1	7	98	29
1787	N-1081108	CONAGRA FOODS	7/1/2008	1,087	85	227	442	164
1804	N-1084279	CERES MEMORIAL PARK	1/23/2009	1,478	1,779	4,252	6,753	2,025
1919	N-1081277	FRITO-LAY NORTH AMERICA INC	7/1/2008	0	0	73	0	0
3434	N-1084169	BILLINGTON WELDING & MFG.	5/27/2009	0	0	37	0	0
4813	N-1090653	BURGER KING #9761	3/2/2009	37	0	219	0	36
4814	N-1090656	BURGER KING #9762	3/2/2009	37	0	219	0	36
4818	N-1090650	BURGER KING #11062	3/2/2009	37	0	219	0	36
5367	N-1081297	WINCO FOODS	9/2/2008	130	0	5	24	9
5367	N-1081297	WINCO FOODS	9/2/2008	602	1	9	70	11

TID Almond 2 Power Plant
Additional Information for Sources Considered in the Cumulative Impacts Analysis

Facility ID	Project #	Distance [1]	Degrees	Facility Name	*Additional Information*	Issued Date
1662	N-1083250	6310.231	76.157	GALLO GLASS COMPANY	*These ATC permits were issued to rebrick glass melting furnaces #2 and #3, which did not result in an increase in emissions for any pollutant.*	N-1662-2-10: 12/28/06; N-1662-3-10: 3/4/08
1662	N-1082526	6310.231	76.157	GALLO GLASS COMPANY	*a modification to issue an ATC permit N-1662-1-11 to rebrick glass melting furnace #1, which did not result in an increase in emissions for any pollutant.*	9/29/2008
1662	N-1080708	6310.231	76.157	GALLO GLASS COMPANY	*Minor modification is N-1662-8-8 and N-1662-14-5. ATC permit N-1662-8-8 was issued to increase the melt area of the furnace, which results in an increase in emissions for NOx, SOx, PM10, and CO. ATC Permit N-1662-14-5 was issued to establish a daily emission limit and did not result in an increase in emissions for any pollutant*	2/22/2008
1680	N-1081077	5836.934	86.95814	STANISLAUS FOOD PRODUCTS	*A modification to issue an ATC permit N-1680-1-8 to replace the burner on a boiler, which did not result in an increase in emissions for any pollutant*	7/2/2009
1680	N-1090191	5836.934	86.95814	STANISLAUS FOOD PRODUCTS	*An application to issue ATC permit N-1680-15-0 to install a 480 hp emergency standby diesel-fired IC engine. There will be an increase in emissions*	
1683	N-1083139	1695.751	89.94965	STANISLAUS COUNTY BLDG. MAINT.	*Cancelled by the applicant on 3/24/09.*	
1683	N-1090522	1695.751	89.94965	STANISLAUS COUNTY BLDG. MAINT.	*An application to issue ATC permit N-1683-5-0 to install a 900 hp Caterpillar Model C27 diesel-fired emergency standby IC engine. There will be an increase in emissions*	
1758	N-1082540	7320.208	107.3499	BERRY SEED & FEED COMPANY	*Modification of the railcar grain receiving and storage operation #2 to install three additional baghouses to capture any fugitive particulate matter (PM) emissions during the conveying and storage of grain into the two 650,000 cu.ft. storage silos. There are no increases in emissions due to this project*	11/20/2008
1758	N-1080120	7320.208	107.3499	BERRY SEED & FEED COMPANY	*An application to issue ATC permits N-1758-8-4, -10-5, -11-4, & -16-4 to increase the processing rates of these grain milling operations. There is only an increase in PM10 emissions due to this project for each ATC Permit of 8.4 lb/day and 3,066 lb/year. The total PM10 emissions for each permit unit is 25.1 lb/day and 9,162 lb/year.*	5/22/2008
1787	N-1081108	2574.407	78.19309	CONAGRA FOODS	*An application to issue ATC permit N-1787-15-0 for a new vegetable branding and roasting operation consisting of a conveyorized branding/roasting chamber served by one 0.576 MMBtu/hr natural gas fired ribbon burner (brander unit) and five 0.576 MMBtu/hr natural gas fired ribbon burners (roaster unit). There will be an increase in emissions*	7/1/2008
1804	N-1084279	3763.94	42.01234	CERES MEMORIAL PARK	*An application to issue ATC permit N-1804-4-0 for a new Hartwick Combustion Technologies, Inc. Model APEX-250 crematory incinerator consisting of a 0.6 MMBtu/hr primary burner and a 1.2 MMBtu/hr secondary burner (afterburner). The new crematory unit that will replace the crematory unit covered by permit N-1804-1-0*	1/23/2009
1838		8002.196	353.468	INDALEX WEST INC.	*This facility is now shut down and all active permits were cancelled on 10/02/08*	
1910	N-1084001	8186.208	348.7981	FOSTER FARMS	*An application to issue ATC permit N-1910-4-2 for the modification of the 12 MMBtu/hr milk evaporator served by a Flex-Kleen baghouse to: Establish NOx and CO emission limits, install and maintain an alternate emissions monitoring plan for Rule 4309 compliance; consolidate permits N-1910-4-0 and N-1910-5-1 into one permit.*	3/22/2009

TID Almond 2 Power Plant
Additional Information for Sources Considered in the Cumulative Impacts Analysis

Facility ID	Project #	Distance [1]	Degrees	Facility Name	Additional Information	Issued Date
1919	N-1084600	8001.969	353.4823	FRITO-LAY NORTH AMERICA INC	*An application to issue ATC permit N-1919-6-7 for the modification of the 50.5 MMBtu/hr Nebraska Model NS-C-58 boiler with a Natcom Ultra Low NOx burner and FGR to only use LPG as a curtailment fuel (no longer use LPG as a primary fuel). There were no increases in emissions for any pollutant due to this proposed project*	
1919	N-1080543	8001.969	353.4823	FRITO-LAY NORTH AMERICA INC	*An application to issue ATC permits N-1919-1-5 and -2-5 to modify the tortilla chip line #3 and #4 to replace the existing burners with new IET Ultra Glo Infra Red burners. There were no increases in emissions for any pollutant due to this project*	
1919	N-1081277	8001.969	353.4823	FRITO-LAY NORTH AMERICA INC	*N-1919-7-5 (Sun Chip Manufacturing Line #5) - This modification will result in a decrease in emissions due to the removal of the existing dryer and installation of a Rotoclone emissions control system on the existing hammermill. N-1919-11-2 (Potato Starch Drying Operation) - Even though the applicant is proposing an increase in the hourly processing rate, the replacement of the existing cyclone with a baghouse will result in a decrease in emissions. N-1919-13-2 (Potato Starch Transfer and Storage Operation) - Modification to increase the quantity of potato starch transferred from 24,000 lb/day to 36,000 lb/day. The proposed modification will result in an increase in PM10 emissions.No stack parameters information were available for this permit unit*	7/1/2008
2051	N-1080196	9283.347	344.0762	MODESTO IRRIGATION DISTRICT	*The proposed modification did not result in an increase emissions for any pollutant*	
2307	N-1082026	6481.908	358.0934	WH BRESHEARS INC	*An application to issue ATC permit N-2307-8-0 to install a soil and groundwater remediation system served by activated carbon canisters connected in series. This project will only result in the increase in VOC emissions.*	
2338	N-1080199	8001.969	353.4823	CITY OF MODESTO, PUBLIC WORKS	*An application to permit their **existing** onsite organic waste processing operation (land application of biosolids). As of this date the project is pending and no emissions information are available at this time*	
3233	N-1083510	9252.185	344.0695	MODESTO IRRIGATION DISTRICT	*An application to issue ATC permits for six 11,667 hp natural gas fired IC engines powering electric generators (ATC Permits N-3233-6-0 through -11-0), one 302 hp emergency standby diesel-fired IC engine powering an electric generator (ATC Permit N-3233-12-0), and one 62 hp emergency standby diesel-fired IC engine powering a fire water pump (ATC Permit N-3233-13-0). This is a pending project and as of this date the ATC permits have not been issued. Therefore, emissions information and stack data are not available at this time.*	
3332	N-1080050	8049.201	46.68797	GILTON RESOURCE RECOVERY	*An application to permit their **existing** onsite organic waste processing operation (green waste composting operation). As of this date the project is pending and no emissions information are available at this time*	
3386	N-1083686	7339.547	83.61918	E & J GALLO WINERY	*A minor modification to the facility's Title V permit to convert and issue permit unit N-3386-23-5. ATC permit related to this minor modification is N-3386-23-4, which was issued on 6/23/08. This ATC permit was issued to add a PM10 emission rate limit as well as provisions of District Rule 4702 and the state Airborne Toxic Control Measure (ATCM) to the current permit. The project will result not result in an increase in daily emissions, but will result in an increase in annual emissions. S **ince the ATC related to this minor modification were issued before 7/1/08, please let me know if you still need the stack parameters for ATC permit N-3386-23-4.***	6/23/2008

TID Almond 2 Power Plant
Additional Information for Sources Considered in the Cumulative Impacts Analysis

Facility ID	Project #	Distance [1]	Degrees	Facility Name	*Additional Information*	Issued Date
3386	N-1082242	7339.547	83.61918	E & J GALLO WINERY	*A minor modification to the facility's Title V permit to convert and issue permit unit N-3386-469-1. The Authority to Construct (ATC) permit related to this minor modification is N-3386-469-0. This ATC permit was issued for the installation of a new metal parts and products coating operation served by a paint booth. The project results in an increase in emissions.* ***Since the ATC related to this minor modification were issued before 7/1/08, please let me know if you still need the stack parameters for ATC permit N-3386-469-0.***	6/2/2008
3386	N-1080395	7339.547	83.61918	E & J GALLO WINERY	*An application to issue ATC permit N-3886-23-4 to modify their 240 hp diesel-fired emergency standby engine powering an electric generator for compliance with District Rule 4702 and the state ATCM as discussed above under project #N-1083686. This ATC was issued on 6/23/08*	6/23/2008
3386	N-1090282	7339.547	83.61918	E & J GALLO WINERY	*An application to issue a PEER for an* ***existing*** *4.5 MMBtu/hr Ajax natural gas fired boiler with a low NOx burner. This an existing boiler which is being issued a PEER for compliance with District Rule 4307. The boiler is exempt from District Rule 2201 and it's emissions are not included as part of the stationary source under Rule 2201.* ***Please let me know if you will need the emissions information for this unit***	
3434	N-1084169	9711.894	340.9724	BILLINGTON WELDING & MFG.	*An application to issue ATC permit N-3434-7-0 to install a new plasma cutting operation served by a shared baghouse. The new plasma cutting operation will only result in the emissions of PM10*	5/27/2009
3606	N-1084578	9468.595	42.87316	PACIFIC SOUTHWEST CONTAINER	*An application to issue a PEER for an* ***existing*** *4.082 MMBtu/hr Clayton natural gas fired boiler with a low NOx burner and FGR. This an existing boiler which is being issued a PEER for compliance with District Rule 4307. The boiler is exempt from District Rule 2201 and it's emissions are not included as part of the stationary source under Rule 2201.*	
3606	N-1080685	9468.595	42.87316	PACIFIC SOUTHWEST CONTAINER	*An application to issue ATC permit N-3606-27-0 to install a new folder-gluer for a new corrugated box manufacturing line. The unit will only result in VOC emission*	6/18/2008
4813	N-1090653	9134.228	54.44823	BURGER KING #9761	*An application to issue ATC permit N-4813-1-2 to replace the existing charboiler and catalytic oxidizer with a new 0.126 MMBtu/hr Nieco natural gas-fired charbroiler and catalytic oxidizer along with increasing the daily meat processing rate limit from 260 lbs to 700 lbs. The modification will result in the following increase in emissions*	3/2/2009
4814	N-1090656	5345.677	28.28049	BURGER KING #9762	*An application to issue ATC permit N-4814-1-2 to replace the existing charboiler and catalytic oxidizer with a new 0.126 MMBtu/hr Nieco natural gas-fired charbroiler and catalytic oxidizer along with increasing the daily meat processing rate limit from 250 lbs to 700 lbs. The modification will result in the following increase in emissions*	3/2/2009
4818	N-1090650	9181.936	338.6273	BURGER KING #11062	*An application to issue ATC permit N-4814-1-2 to replace the existing charboiler and catalytic oxidizer with a new 0.126 MMBtu/hr Nieco natural gas-fired charbroiler and catalytic oxidizer along with increasing the daily meat processing rate limit from 275 lbs to 700 lbs. The modification will result in the following increase in emissions*	3/2/2009
5367	N-1081297	3120.333	178.4423	WINCO FOODS	*An application to issue ATC permits N-5367-6-0 for a 480 hp Caterpillar Model C9 Tier 3 certified diesel-fired emergency standby IC engine powering an electric generator.* *An application to issue ATC permits N-5367-7-0 for a 1,372 hp Caterpillar Model C32 Tier 2 certified diesel-fired emergency standby IC engine powering an electric generator*	9/2/2008

Notes:
1. "Distance To Location" indicates the distance from 4500 Crows Landing Road to the indicated facility in meters

TID Almond 2 Power Plant
Additional Information for Sources Considered in the Cumulative Impacts Analysis

Facility ID	Project #	Distance [1]	Degrees	Facility Name	*Additional Information*	Issued Date

2. Definitions of the abbreviations listed on the "Status" column

ATC = Authority to Construct applications
COMPLE = Application Complete
DENY PE = Project denial pending
FINAL = Project finalized and ATC permit issued.
FR-ASSI = Assigned for final review.
FR-IN PR = Final review in process.
NEW PR = New project
PR-ASSI = Preliminary review assigned.
PR-INCO = Project under preliminary review and is incomplete.
PR-IN PR = Preliminary review in process.
SUPRV R = Project under supervisor review

The project will not result an increase in emissions
Application received and issued before 7/1/08.
The project only involves VOC
Issue a PEER for an existing unit
Minor modification to an ATC Permit that was issued before 7/1/08
Replacement Unit
Pending Application. Not emission information available

ATTACHMENT WSQ4-1

A2PP Groundwater Modeling Results

A2PP Groundwater Modeling Results

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Lisa Porta/CH2M HILL

DATE: October 9, 2009

Summary of Findings

The development of a project-specific groundwater model for the Almond 2 Power Plant (A2PP) provided additional documentation to support the earlier conclusions presented in response to specific California Energy Commission (CEC) data requests. Specifically, the model showed the following:

- The proposed increased Extraction Well production to support the A2PP water supply demands originates from the southwest portion of the City of Ceres Wastewater Treatment Plant (WWTP) percolation basins.
- The return flow from the plants is captured by the existing operation of the three agricultural drainage wells (owned by TID but operated by the Ceres WWTP) and the proposed increased production at the Extraction Well.

Background

This technical memorandum summarizes the findings of the groundwater modeling effort requested by the CEC. The purpose of this effort is to provide additional information supporting Data Request #38 (CEC, 2009) responses to the A2PP Application for Certification (AFC;TID, 2009). This groundwater model was developed to provide additional information on the following:

- The potential groundwater effects resulting from increasing the annual pumping at the existing Almond Power Plant to also provide water to the A2PP. This includes documenting that the additional pumped water would primarily originate from the infiltrated water at the adjacent Ceres WWTP.
- The potential groundwater effects resulting from the A2PP process water being returned to the Ceres WWTP percolation ponds.

It was determined that developing a groundwater model could provide supporting information for these two water issues.

The Turlock Groundwater Basin Users have developed an established and calibrated basin-wide groundwater model (Basin model) to support the 2008 groundwater management plan and other groundwater planning activities (Turlock Groundwater Users Association, 2008; Durbin, 2008). The basin-wide model was not able to be used to assess the detailed local groundwater changes that could occur as a result of the A2PP project. Because the model elements were large[1] and the Basin model is not able to utilize "particle tracking" modeling techniques[2], input from the basin-wide model was used for the A2PP groundwater model developed to respond to the CECs Data Request. This is discussed further in the modeling sections below.

Existing Groundwater Conditions

As discussed in the AFC, the A2PP site is located in the Turlock Groundwater Subbasin (Figure 1), which is part of the larger San Joaquin Groundwater Basin. Groundwater conditions in the subbasin are highly variable; however, generally groundwater flows west from the Sierra Nevada foothills to the San Joaquin River (Figure 2). Groundwater in the western portion of the subbasin, where the proposed A2PP site is located, is shallow and can range from 0 to 20 feet below grade (Figure 2). As a result of the shallow groundwater conditions in the subbasin's western portion, a series of shallow groundwater wells—referred to as agricultural drainage wells—operate to maintain groundwater conditions below the root zone of sensitive crops and plants. This extracted water is piped to concrete-lined laterals, which moves the extracted groundwater to other portions of the District located within the subbasin. Three existing agricultural drainage wells (Wells 119, 151, and 190) are located near the WWTP. Although these three agricultural drainage wells are owned by TID, the wells are operated by the Ceres WWTP to manage local groundwater associated with the WWTP.

The TID Extraction Well, on the south side of the WWTP ponds, currently supplies the Almond Power Plant. This well operates at a rate of 550 gpm. The well operates during only a portion of the time the plant is online, because the pumping rate of the well is greater than the Almond Power Plant water demands.

Existing 2006 through 2009 groundwater level data from the City's three shallow WWTP monitoring wells[3] and from California Department of Water Resources semiannual groundwater level measurements from two of the agricultural drainage wells located near the WWTP show that groundwater levels vary seasonally (are higher during the winter when precipitation locally recharges groundwater). The data also shows that groundwater levels are sensitive to local groundwater pumping (Figure 3). As expected, the pumping at Well 151 most directly affects groundwater levels at Morgan North #1 (see Figure 4 for well locations). As shown in Figure 3, pumping at the other wells affects local groundwater conditions.

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[1] Because the Basin model covers the entire groundwater basin, the model elements are required to be large to enable the model to work. The inability of the Basin model to be used to assess the groundwater changes associated with the A2PP project should not be considered a criticism; however, it is a statement of fact regarding the logistics of developing and calibrating a regional model and regarding the finer detail needed to assess local A2PP project impacts.

[2] Particle tracking was the most efficient way to determine the origin of the additional water pumped at the Extraction Well with the high A2PP operating rates.

[3] The City monitors water levels in these wells and collects quarterly groundwater quality samples for reporting purposes as part of its permit with the Central Valley Regional Water Quality Control Board.

Well information for the monitoring and production wells in the immediate vicinity of the WWTP is included in Table 1.

TABLE 1
Information for the Operating Wells within the Project-Specific Model

Parameter	Extraction Well	Well 119	Well 151	Well 190
Year Installed	2000	1934	1940	1952
Depth Drilled	263	182	214	277
Well Depth (feet below grade)	90	147	195	198
Screen Interval (feet below grade)	30-70 & 80-90	0 to 147	0 to 195	0 to 198
DWR Well Completion Record or TID Well Record?	State only	TID only	TID only	State and TID
Estimated Pumping Rate (gallons per minute)	550	1,500	1,200	1,100
Groundwater Elevation Measurements?	no	no	1982 to present	1987 to present
Model Layers Pumping	1 and 2	1, 2, and 3	1, 2, and 3	1, 2, and 3

Model Development

MODFLOW-2000 (Harbaugh, et al., 2000), the three-dimensional finite difference groundwater model code developed by the United States Geological Survey (USGS), was used to simulate the impacts of the added pumping by the Extraction Well. The particle tracking package MODPATH Version 3 (Pollock, 1994) was used to assess the migration of water from the ponds and the source of the water to the Extraction Well. The graphical user interface application Groundwater Vistas Version 5 (Environmental Simulations, Inc., 2007) was used as a pre- and post-processor for these two model packages to generate the model domain and view the results.

The model’s focus was the area near the ponds and the Extraction Well. It was determined that the project-specific groundwater model would focus on the WWTP ponds area but would cover a larger area to reduce boundary effects. This determination was made because of the specific questions to be answered by the project-specific groundwater model and the proximity of the WWTP-operated agricultural drainage and the TID Extraction Well) to the WWTP ponds, as well as because of the high pumping rate of these wells. Only the pumping at the agricultural drainage wells and the Extraction Well was considered in the model because the high rate of pumping at these wells would override more distant pumping effects. Furthermore, pumping at the three identified local residential wells was not included because there was no pumping rate information for the wells; also, residential well pumping was estimated to most likely be an order-of-magnitude smaller than that of each of the three agricultural drainage wells and the Extraction Well.

The model grid was set up as an approximately 4-mile-by-3-mile rectangle centered on the infiltration ponds and the three agricultural wells and the Extraction Well. The model cells in the central area measured 20 feet on each side. The depth of the model was set to 170 feet to represent the subsurface thickness between the ground surface and the Corcoran Clay in this region. The model's three layers represent the surficial Modesto Formation (Layer 1) and the Riverbank Formation (Layers 2 and 3). The Riverbank Formation was divided into two layers only to enable pumping to occur in different intervals of the aquifer; this is because the Extraction Well is shallower and has a shorter well screen than the agricultural drainage wells. Figure 3 shows the model layering, the pumping for each model layer, and the aquifer parameters for each layer. The Corcoran Clay (the regional low-permeability clay interval) represents the bottom of the model.

The regional groundwater flow field as presented in the regional groundwater model (Durbin, 2008) was replicated with two constant head boundaries on each side of the model limits: 70 feet upgradient and 60 feet downgradient. The horizontal and vertical hydraulic conductivities of each layer were taken directly from the calibrated regional groundwater flow model (see Figure 3 for details).

Model Inputs

Steady-state conditions for this effort were modeled to address the overall objective of assessing the long-term effects from the power plant operation. This steady-state condition allowed the model to simulate the general effects on the groundwater flow by the five modeled factors influencing groundwater (four pumping wells and one recharge area).

Four pumping wells were simulated in the model: the Extraction Well and the agricultural drainage Wells 151, 119, and 190. Pumping at the three agricultural wells was divided among the three model layers and at the Extraction Well in the two top layers to approximately represent the actual screened intervals in the wells. The agricultural drainage wells do not operate year round; therefore, the production rate was considered to be 80 percent of the pumping rate, based on the known average operation of these wells between 2006 and 2008.

The percolation ponds were considered as a single pond and were roughly represented by an irregular-shaped 130-acre recharge area in the model (see Figure 4) based on aerial photographs and historic pond use. The daily pond inflow into the model consists of flow directly from the WWTP and return flow from Almond Power Plant. The WWTP inflow of 280,000 ft^3/day (2.1 mgd) is based on the average plant outflow between 2006 and 2008, reduced by the flow to Turlock. The return flow from the power plants (0.4 mgd) assumed full-scale operation of the Extraction Well and a 50 percent return rate (consistent with the 2006-2008 return rate). The estimated recharge to groundwater from precipitation was also added over the entire model area.

Model Results and Discussion

The model was run to assess groundwater conditions under the proposed pumping operations; results are shown in Figure 5. The results of this simulation compare favorably to the known 2006-2008 groundwater levels at the three WWTP monitoring wells (Figure 3), indicating the model well approximates local groundwater conditions.

As shown on Figure 5, groundwater pumping at each of the modeled wells has wide-reaching effects on the overall groundwater flow field. However, as indicated earlier, other pumping wells outside of the immediate vicinity of the WWTP were not input into the model and so actual groundwater flow patterns away from the WWTP will be different from those simulated in this project-specific model. The basin-wide model more accurately represents larger-scale groundwater conditions.

Particle tracking was performed to evaluate both the origin of the proposed groundwater pumping at the Extraction Well and the migration of the percolated water from the WWTP ponds.

To assess the origin of the water produced by the Extraction Well, a "reverse" particle tracking analysis was performed by simulating the origin of 20 particles that would be captured by the Extraction Well. The results (Figure 6) show that 19 out of the 20 particles originate from the percolation ponds. Therefore, the majority of the groundwater flow captured from the Extraction Well originates from the percolated wastewater below the ponds. Only 5 percent of water produced at this well originates from other areas in the aquifer.

The question of capture of the return flow from the percolation area was addressed by performing a "forward" particle tracking analysis to simulate the flow paths from the five major percolation ponds. The results (Figure 7) show that the three agricultural wells capture most of the percolated water because of their high pumping rates. Additionally, the majority of the water captured by the Extraction Well originates from the most southwestern pond.

References

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Harbaugh, A.W., et al. 2000. MODFLOW-2000, The U.S. Geological Survey Modular Ground-Water Model – User Guide to Modularization Concepts and the Ground-Water Flow Process. USGS Open-File Report 00-92.

Pollock, D.W. 1994. User's Guide for MODPATH/MODPATH-PLOT, Version 3: A particle tracking post-processing package for MODFLOW, the U. S. Geological Survey finite-difference ground-water flow model. USGS Open-File Report 94-464.

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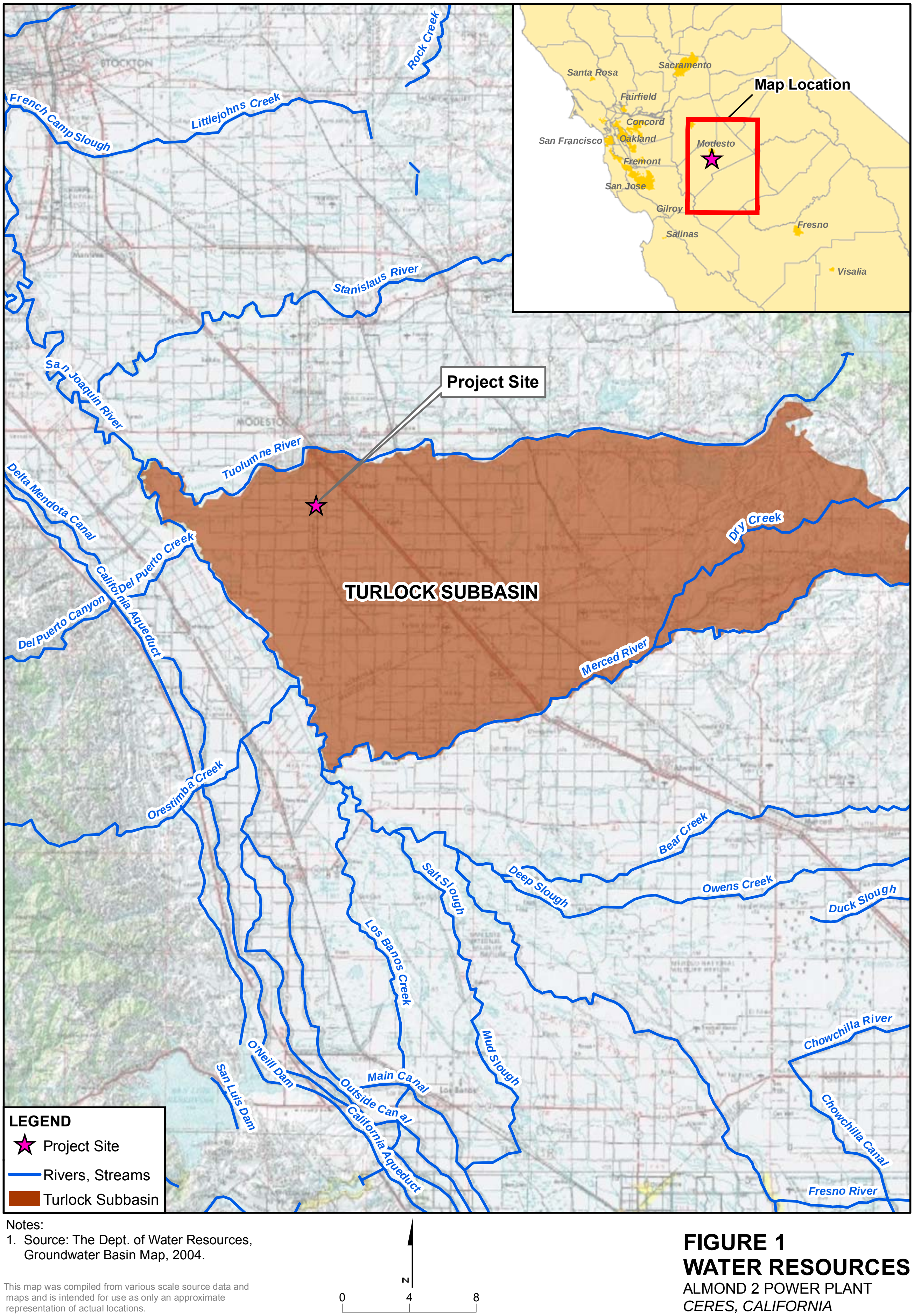
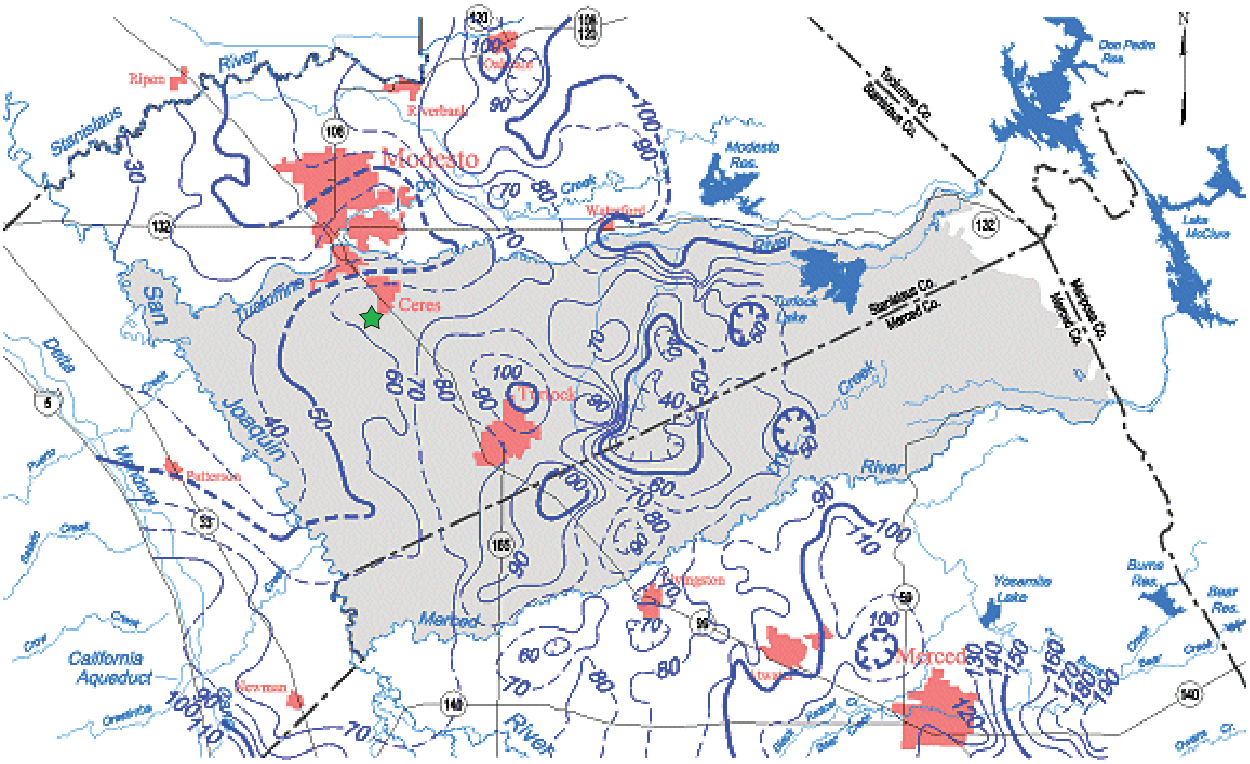
Turlock Irrigation District. 2009. Application for Certification for the TID Almond 2 Power Plant. Submitted to the California Energy Commission. Technical assistance by CH2M HILL. May.



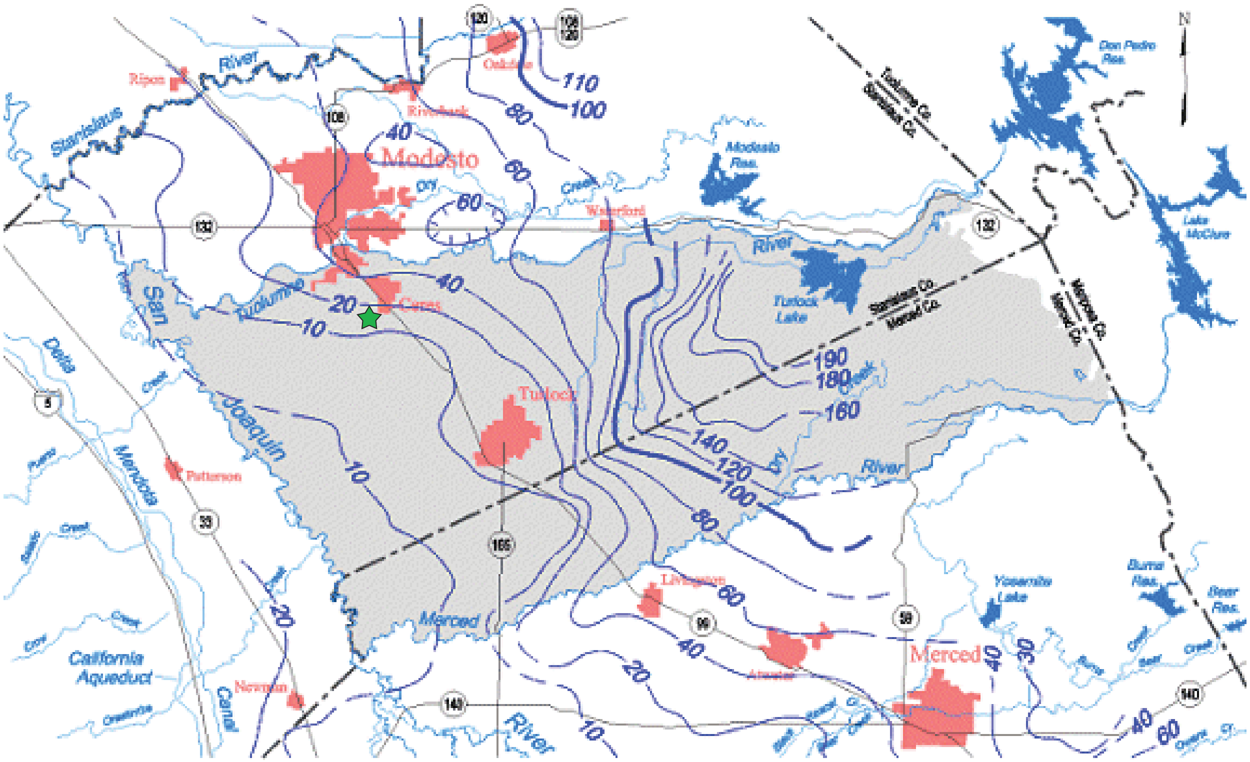
Notes:
1. Source: The Dept. of Water Resources, Groundwater Basin Map, 2004.

This map was compiled from various scale source data and maps and is intended for use as only an approximate representation of actual locations.

FIGURE 1
WATER RESOURCES
ALMOND 2 POWER PLANT
CERES, CALIFORNIA



Spring 2006 Groundwater Elevation



Spring 2000 Equal Depth to Groundwater

LEGEND

★ A2PP Site

Scale of Miles

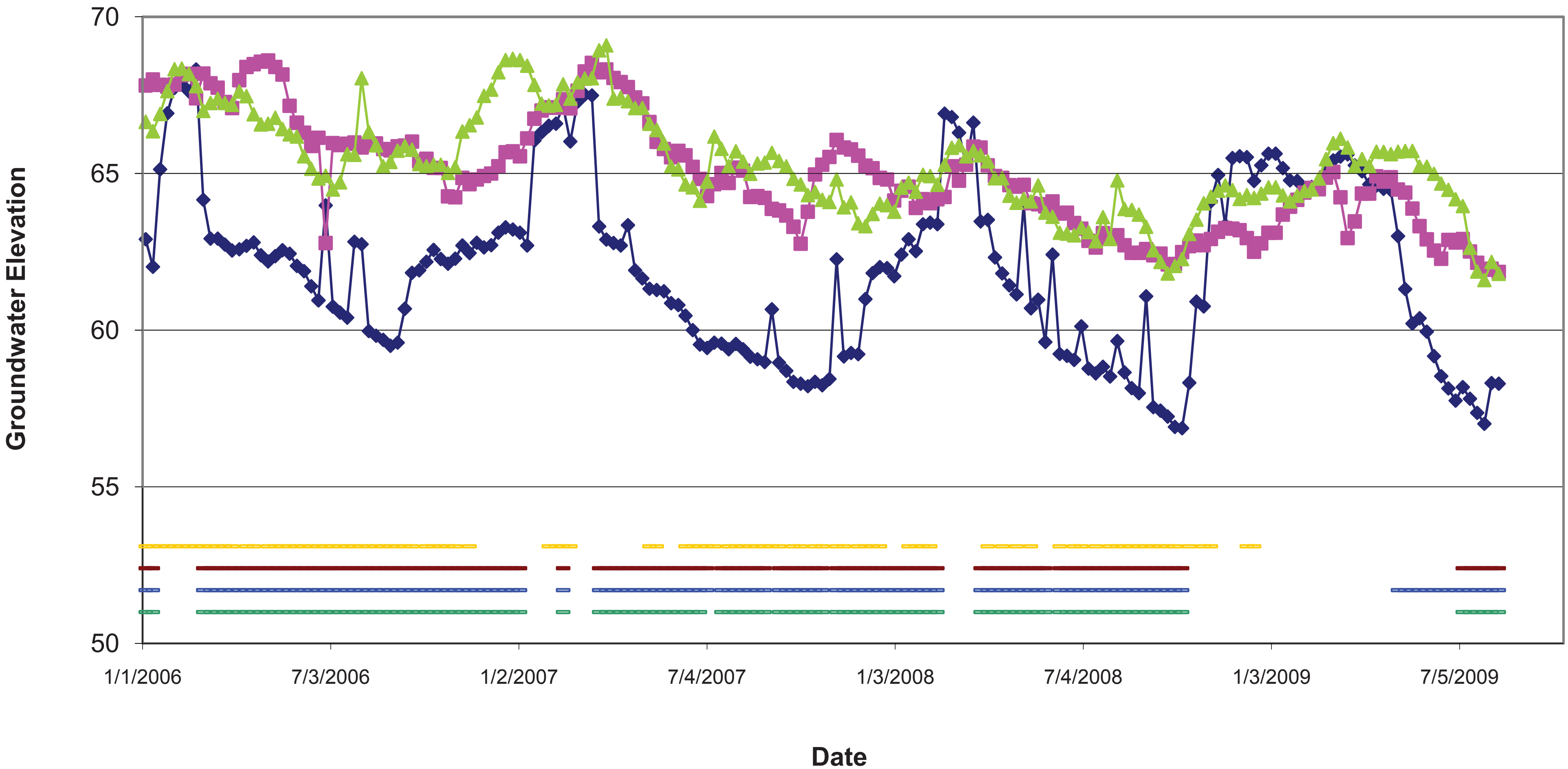
2 0 2 4 6 8 10

Source: http://www.water.ca.gov

FIGURE 2
TURLOCK SUBBASIN REGIONAL GROUNDWATER CONDITIONS
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

EY012009003SAC Figure_2.ai 10.07.09 tdaus

CH2MHILL



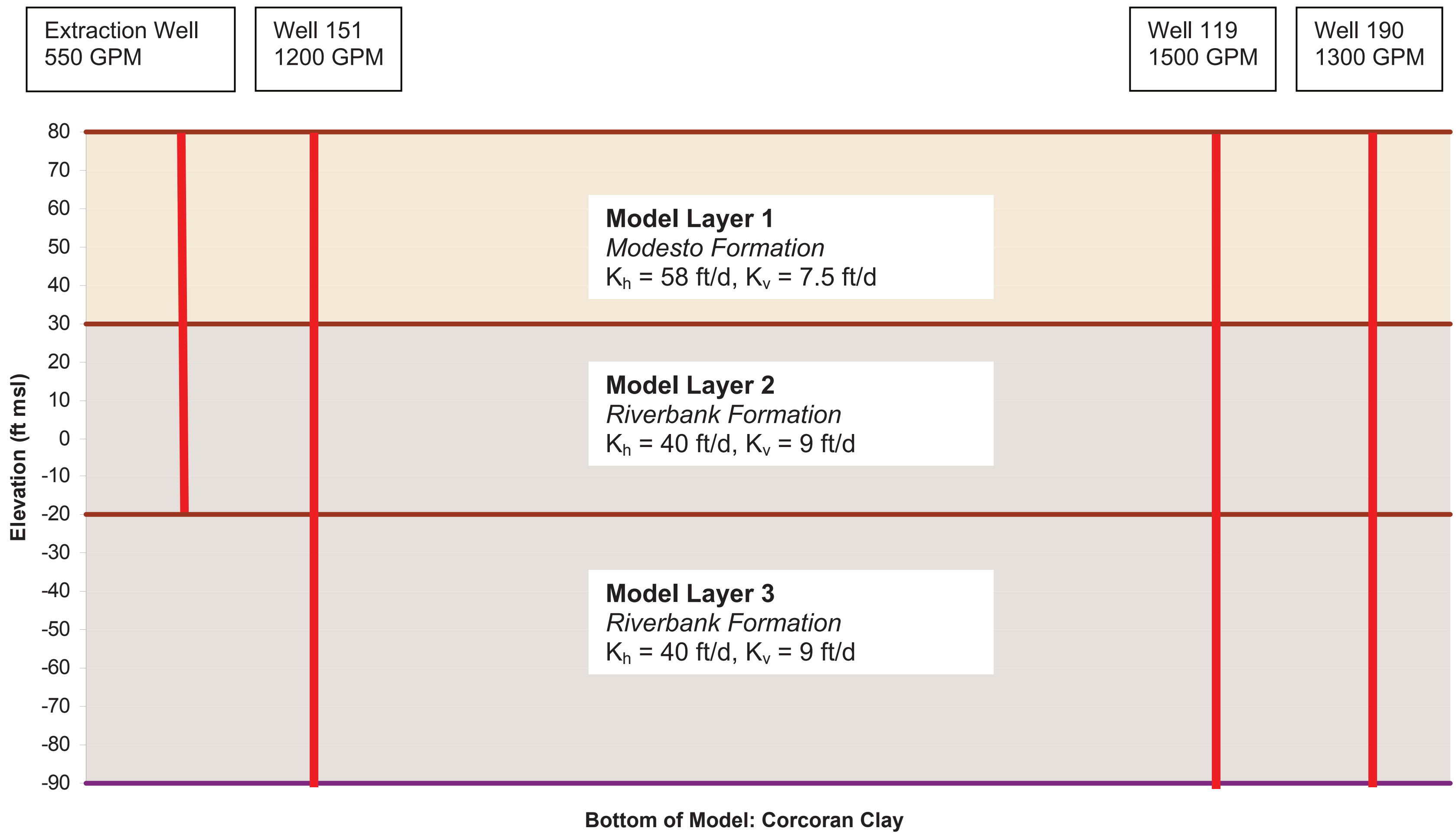
LEGEND

- Well 119 Operating
- Well 151 Operating
- Well 190 Operating
- Extraction Well Operating
- Morgan North #1
- Morgan South #2
- Blaker #3

Note: Data provided by the City of Ceres.
See Figure 5 for monitoring well locations.

FIGURE 3
2006–2009 GROUNDWATER ELEVATIONS AT THE CERES WWTP MONITORING WELLS
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

CH2MHILL

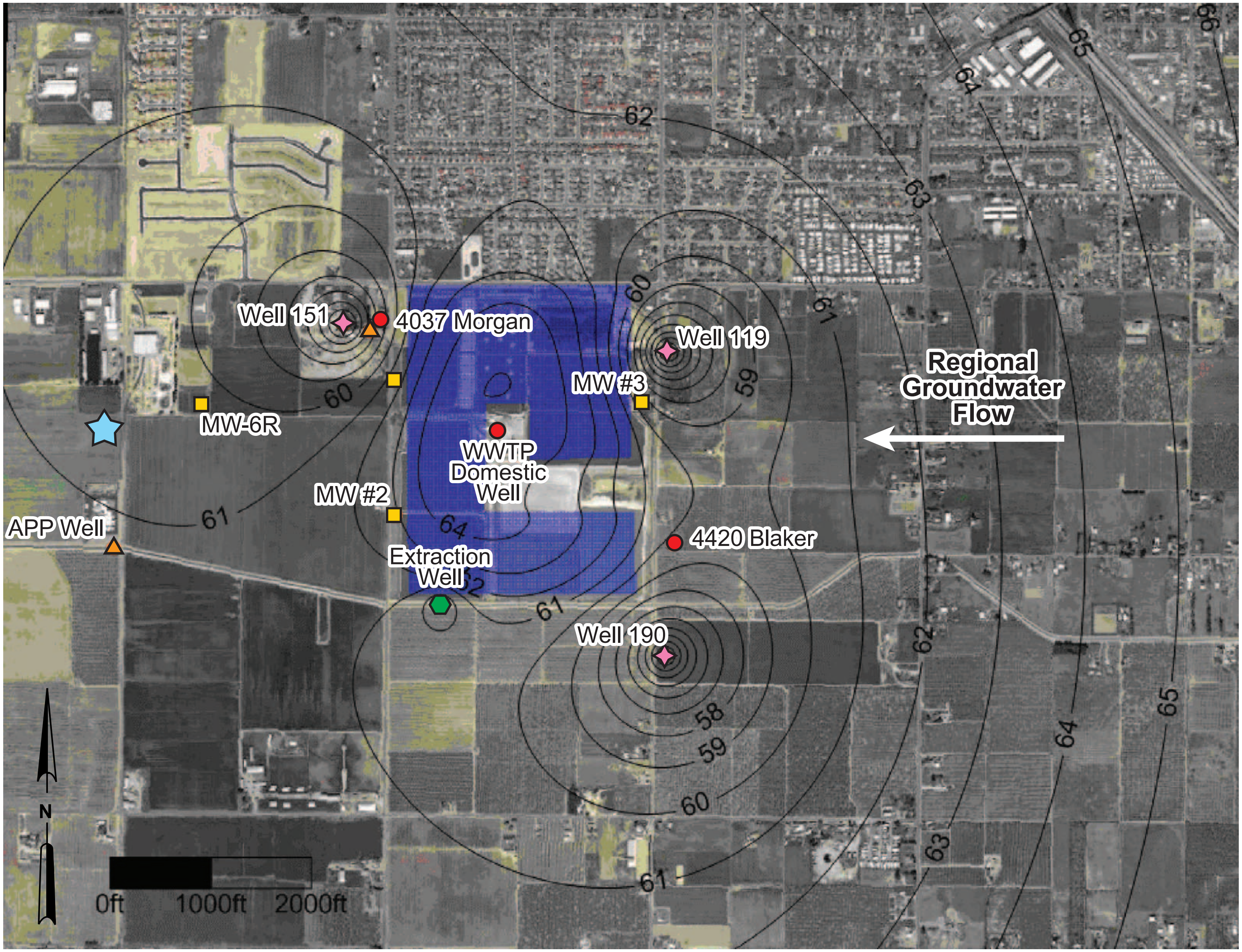


Note: Wells are shown in the model layers in which they are active.
See Table 1 for actual well depths and screen intervals.

FIGURE 4
MODEL LAYERING
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

CH2MHILL

EY012009003SAC Figure_4.ai 10.09.09 tdaus



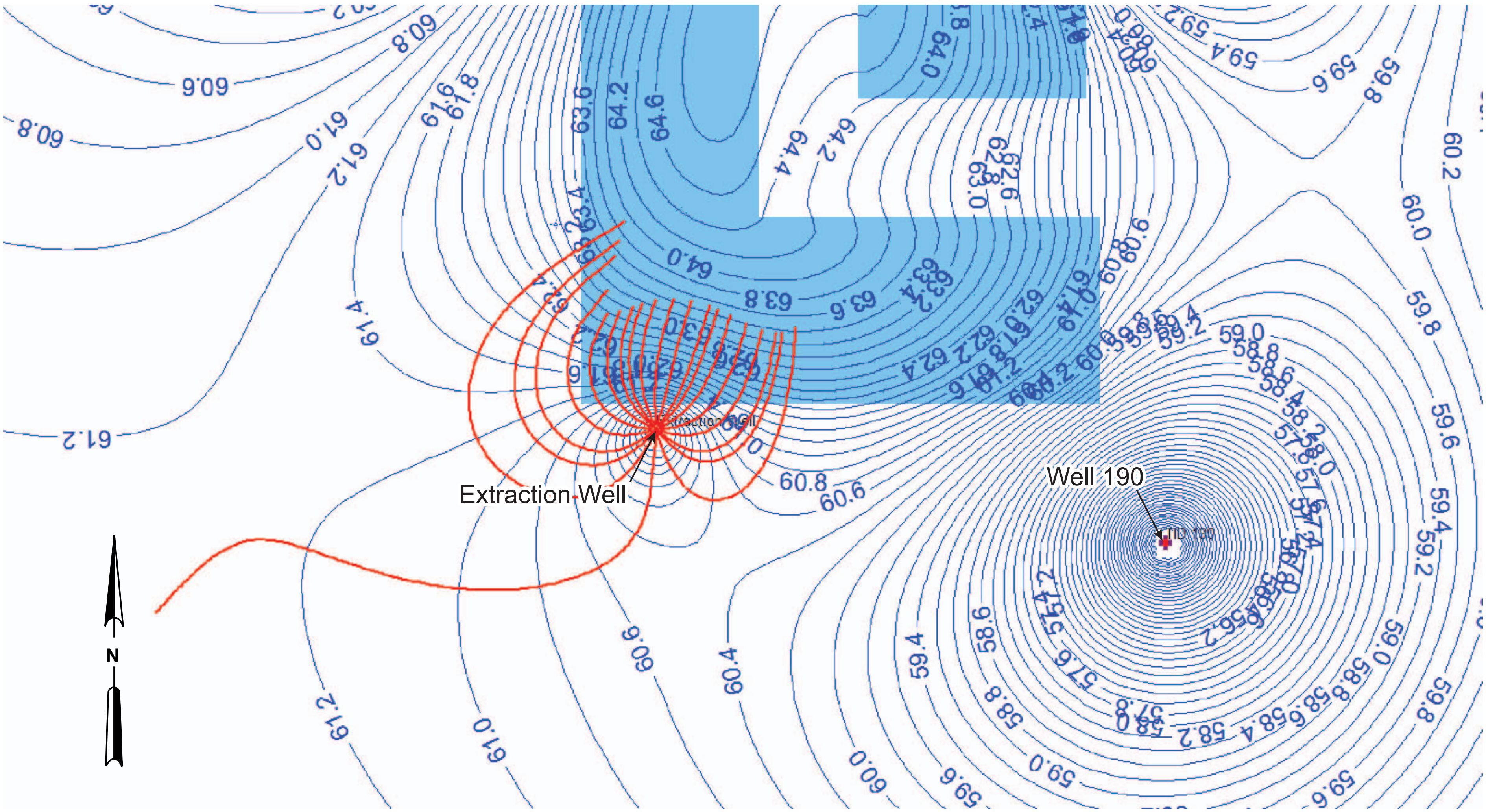
LEGEND

Proposed Facility Location
TID APP Extraction Well
Domestic Well
Irrigation Well
Drainage Well
Monitoring Well
63 Steady-state Groundwater Elevation (contour interval = 1foot)
Ceres WWTP Basin

FIGURE 5
A2PP SIMULATED GROUNDWATER CONDITIONS
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

CH2MHILL

EY012009003SAC Figure_5.ai 10.09.09 tdaus



LEGEND

Ceres WWTP Basin

60.6 Steady-state Groundwater Elevation (contour interval = 0.2 feet)

Particle tracking, where 20 particles originate at the Extraction Well in Layers 1 and 2

FIGURE 6
ORIGIN OF SIMULATED PARTICLES CAPTURED BY EXTRACTION WELL
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

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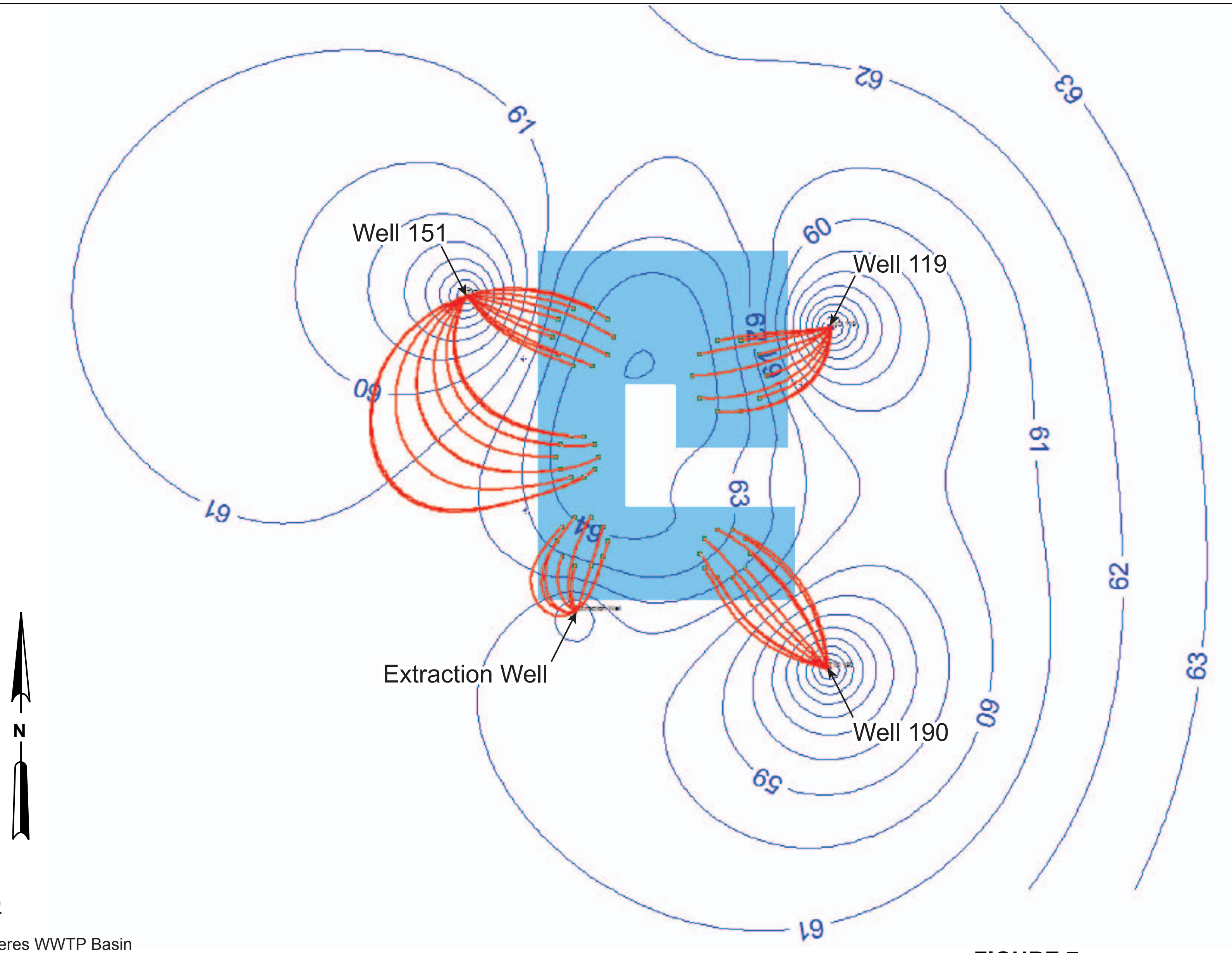

LEGEND

Ceres WWTP Basin

Steady-state Groundwater Elevation
(contour interval = 1 foot)

Particle tracking, where particles originate in the WWTP basins

FIGURE 7
SIMULATED PARTICLE PATHLINES FROM PERCOLATION PONDS
ALMOND 2 POWER PLANT
CERES, CALIFORNIA

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