

TO: BOARD OF DIRECTORS
FROM: BRUCE BUEL *BBB*
DATE: JUNE 8, 2007

**AGENDA ITEM
E-9
JUNE 13, 2007**

**AUTHORIZE RETENTION OF FUGRO TO ASSIST IN EVALUATION OF DISPOSAL
OF WASTEWATER FROM SOUTHLAND WWTF UPGRADE PROJECT**

ITEM

Authorize execution of agreement with Fugro West, Inc. to evaluate hydro-geologic impacts of disposal of treated wastewater from the Southland WWTF [RECOMMEND APPROVAL].

BACKGROUND

Staff previously released Boyle's April 2, 2007 "Evaluation of Southland WWTF Ground Water Monitoring Data" and May 10, 2007 "Southland WWTF Recharge/Disposal Action Plan" which document the water quality and water hydrology problems associated with discharge of treated wastewater from the existing Southland WWTF percolation ponds. Based on this evaluation and consultation with RWQCB staff, District Staff believes that significant additional work will be needed to determine the quantity of disposal possible with the existing percolation ponds; the wastewater treatment upgrades necessary to achieve compliance with the conditions set forth in NCSD's existing Discharge Order; and the options for off-site disposal. Until these additional evaluations are complete, it will not be possible to "Scope" the Upgrade Project or to complete the Southland WWTF Upgrade Master Plan.

Attached is a proposal for Fugro West, Inc. describing the geo-hydrological services that are likely to be required from a geo-hydrologic firm to define the proposed disposal impacts and options. It should be noted that this proposal assumes that the District also hires Boyle Engineering to work with Fugro West (See Agenda Item E-8). As detailed in the attached proposal, Fugro West is willing to perform this work on a time and materials basis for phase 1 of this work with a not to exceed expenditure limit of \$28,860. Should your Honorable Board approve phase 1, staff would bring back to your Honorable Board the results and a more detailed proposal of phase 2 scope and cost.

Paul Sorensen from Fugro West is scheduled to present this proposal to the Board and answer questions regarding each section.

It should be noted that staff also solicited a quote to perform this work from SAIC and SAIC declined to quote given their workload.

RECOMMENDATION

Staff recommends that your Honorable Board authorize execution of an agreement with Fugro West, Inc. to perform the services set forth in phase 1 of the attached proposal on a time and materials basis with a not to exceed expenditure limit of \$28,860.

Staff further recommends that the Southland WWTF Upgrade Project Committee meet with Fugro to discuss the scope and the timeline for this work.

ATTACHMENTS

- Fugro Southland WWTF Disposal/Recharge Proposal

FUGRO WEST, INC.



660 Clarion Court, Suite A
San Luis Obispo, California 93401
Tel: (805) 542-0797
Fax: (805) 542-9311

June 4, 2007
Project No. 2007.172

Nipomo Community Services District
PO Box 326
148 S. Wilson Street
Nipomo, California 93444

Attention: *Mr. Bruce Buel*
General Manager

**Proposed Scope of Work and Fee Estimate
Southland WWTF Discharge Study
Nipomo, California**

Dear Mr. Buel:

Fugro is pleased to submit this proposal for a comprehensive hydrogeologic investigation of Nipomo Community Services District's Southland Wastewater Treatment Facility (WWTF). This proposal, and our understanding of the project, is based on a meeting with you and representatives from Boyle Engineering on May 24, 2007.

Based on the discussions we had at our meeting and our understanding of the District's overall needs, we believe that this proposal addresses the specific requests as well as looking at the District's needs from a greater perspective. To that end, there are a few tasks, particularly related to the drilling of new monitoring wells and testing of the hydraulic connection between aquifers and across faults, that are not fully defined herein, and will be defined as the study proceeds.

This proposal package presents our understanding of the project, a scope of work, fee estimate, and schedule to complete the work. Following the section on technical approach, we have also included a brief description of Fugro and a statement of qualifications.

PROJECT UNDERSTANDING

The District is in the process of planning for the expansion of the wastewater disposal facilities, and has identified an initial need to assess the groundwater conditions beneath the existing WWTF site. The primary objective of the assessment is to develop a baseline understanding of local groundwater conditions to minimize potential impacts of plant expansion on the area's water resources.

A member of the Fugro group of companies with offices throughout the world





The current facility began discharging treated wastewater and disposing of effluent in 1985, at a plant capacity of 0.36 million gallons per day (MGD). Effluent disposal is accomplished through a series of percolation ponds. As required by the Regional Water Quality Control Board, groundwater monitoring was conducted via three monitoring wells (wells A, B, and C). However, after several years of monitoring and assessment of the sample results, it was concluded that the monitoring wells were perhaps separated by a fault and were likely monitoring different geologic formations and/or aquifers. Further evaluation suggested the presence of two aquifers – a shallow aquifer and a deep aquifer – and a review by the RWQCB concluded that the monitoring data was inconclusive in identifying the potential impacts of the effluent on the receiving groundwater.

In 1997, the WWTF expanded to 0.90 MGD, at which time updated WDR's were adopted and three new monitoring wells were installed to sample the shallow aquifer and monitor the effects of WWTF discharge.

As the District plans for and prepares to expand the WWTF to 1.3 MGD, it is important to understand the dynamic hydraulic conditions at the site and assess the potential impacts of plant expansion on the effluent mound. Furthermore, the development of a conceptual understanding of the site conditions will allow for a proactive approach in the formulation of new Waste Discharge Requirements by the RWQCB.

The salient details of current conditions at the facility include:

- A clay layer (aquitar) apparently exists beneath the site at a depth between 25 feet and 135 feet below ground surface, which seemingly prevents vertical percolation of the discharged effluent and has resulted in the creation of a shallow effluent mound beneath the site. The lateral extent of the aquitar is incompletely known, and there appears to be conflicting data on the continuity and extent of the aquitar, which has implications for the continuity of the vertical barrier effect.
- The groundwater gradient in the shallow aquifer beneath the site is apparently away from the center of the pond facility in all directions, at a 1% to 3% slope.
- The effluent mound is apparently growing. Water levels in monitoring wells are five to 25 feet higher in 2006 than when they were installed in 2000. Given this and the depth of the aquitar, there appears that there is a potential capacity issue of the shallow aquifer to effectively store and dispose of the WWTF effluent, particularly as the facility is expanded to 1.3 MGD.
- The hydraulic relationship between the shallow and deep aquifers is incompletely understood, as is the extent, thickness, hydraulic characteristics, and significance of the aquitar between the aquifers.
- Water quality in the monitoring wells, particularly monitoring well MW-3, has become poorer with respect to total dissolved solids, chlorides, sodium, and



boron since 2000. The water quality of the shallow aquifer now appears to consist of treatment plant effluent.

PROJECT ISSUES AND ANTICIPATED ACTION

Based on the discussion above, it appears to us that the primary issues include:

- The presence of an aquitard creates a dual aquifer system whereby the WWTF effluent is mounding in the shallow aquifer. The growth of the effluent mound has resulted in poorer water quality of the shallow aquifer. This is based on groundwater samples collected from monitoring wells located in the shallow aquifer, which likely samples the mounded WWTF effluent.
- The incompletely defined aquitard beneath the WWTF has caused the effluent mound to grow, at least vertically. Anecdotal information also suggests a lateral expansion of the shallow mound is occurring, although insufficient data exist to quantify the lateral extent of the mound.
- It is not known if, and to what extent, the WWTF effluent is affecting the deep aquifer. It would appear that only the shallow aquifer is being sampled with the current monitoring network.

Anticipated actions to evaluate the issues outlined above include:

- Conduct a hydrogeologic investigation to characterize the two aquifers, and assess the fate of effluent in the shallow aquifer.
- Evaluate the potential impacts of the WWTF on the deep aquifer.
- Assess whether the deep aquifer may be utilized as a disposal source for the effluent, and how that may be accomplished.
- Evaluate the effectiveness of the existing monitoring network, the ability of existing nearby wells to add to the network, and the locations and design of new potential monitoring wells.

SCOPE OF WORK

Based on the discussion above, the following scope of work will be conducted. The scope as detailed below can be completed as a single phase. We anticipate, however, that subsequent tasks will be necessary, particularly related to detailed characterization of the aquifers through the drilling and testing of additional monitoring wells. The field related work of drilling and testing is not scoped in detail here. A more accurate assessment could be made after the initial assessment and investigation of the site geology and hydrogeology is conducted.



PHASE 1 – ASSESSMENT BASED ON AVAILABLE DATA

Task 1 – Data Review

We will collect, compile, and review available reports, geologic maps, well logs, boring logs, water quality data, and other related data for the area. Some of the most important documents, such as the work conducted recently by Boyle, previous reports by Cleath and Associates, and boring logs of the monitoring wells installed in 2000, have previously been provided to us. Additional data, such as well logs of nearby private domestic wells and geologic information compiled as part of the recent Santa Maria Basin litigation, will be collected and incorporated into this study, as appropriate.

Task 2 – Geologic and Hydrogeologic Characterization

On the basis of well logs and geologic reports of the area, we will develop a three-dimensional picture of the site and vicinity to allow for a detailed geologic and hydrogeologic characterization of the area. Of particular focus will be the identification and characterization of the shallow and deep aquifers, and the clay layer/aquitard/perching layer that separates the two aquifers. Several cross sections will be drawn across the site (both east-west and north-south), and will extend laterally a sufficient distance to incorporate the Santa Maria River and Oceano faults to the west, and the Wilmar Avenue Fault, as well as Nipomo Creek, to the east.

Based on the available information, we may incorporate the data into GIS in order to build a three dimensional conceptual model of the aquifer systems beneath and in the vicinity of the site. We can make that decision once the data is collected and compiled, and assessed with respect to volume, areal distribution, and accuracy.

Characterization of the geologic layers will concentrate on evaluating the following: the existence of the shallow and deep aquifers and the intermediate aquitard; hydrogeologic character and parameters of all three units; thickness of the shallow aquifer and the aquitard; lateral continuity or extent of the shallow aquifer and aquitard; water quality of the shallow and deep aquifers; usability of both aquifers as a receiving source for the effluent; and production capability of the shallow aquifer for potential use as a irrigation supply source.

We will also assess the potential impacts of the nearby faults on groundwater movement and groundwater quality, as the available data will allow. The Santa Maria River Fault is generally interpreted to run northwest-southeast just west of the site; the Wilmar Avenue Fault is generally believed to run northwest-southeast just east of Highway 101.

The viability of using existing nearby private water wells, both shallow and deep, to monitor for water level and water quality will also be assessed. We will survey several nearby well owners, with the assistance of District staff, for cooperation and participation in the study. It is unlikely that the use of private existing wells will be an adequate long-term solution for the monitoring network, however the data gained during this short-term study may be invaluable.



Task 3 – Technical Memo, and Recommendations for Monitoring Well Installation and Testing

At the completion of the site characterization task, we will prepare a technical memo that documents the work, summarizes the results of the study, and provides recommendations for field work associated with continuation of the investigation. If appropriate, the recommendations will include locations for installation of paired monitoring wells to evaluate the characteristics of the deep and shallow aquifers, hydraulic communication between the aquifers, and hydraulic communication across the Santa Maria River and/or Wilmar Avenue faults.

PHASE 2 – FIELD INVESTIGATION

Task 1 – Monitoring Well Drilling and Testing

The field investigation will be defined throughout Phase 1 and proposed in detail in the technical memo prepared at the conclusion of the Phase 1 efforts. We anticipate that the work will include the drilling, installation, and testing of at least several paired monitoring wells, with one well completed in the shallow aquifer and the other in the deep aquifer. These would be used to evaluate the characteristics of the deep and shallow aquifers as well as the aquitard. Understanding the hydraulic parameters and characteristics of the aquitard is potentially of critical importance in understanding the communication between the aquifers, the ability to utilize the deep aquifer as a source of effluent disposal, and the potential long-term impacts of the WWTF on the deep aquifer.

The significance and potential impacts of the nearby faults on groundwater and mound movement will be of particular focus during the testing of the new monitoring wells.

PHASE 3 – FINAL REPORT

The final task of work will include the preparation of a draft and final report, in which we will present the findings and conclusions, and provide appropriate recommendations.

ISSUES ANTICIPATED TO BE RESOLVED DURING STUDY

Several important issues will be addressed throughout the study, and are listed below. This list was developed in part from correspondence to the District from Boyle (May 10, 2007), and expanded on by Fugro during preparation of this proposal. The issues include:

- Evaluation of the extent of the shallow groundwater mound beneath the WWTF;
- Assessment of trends and growth of the mound over time;
- Identification of direction of flow, gradient, and travel time of the mound to various locales, such as Nipomo Creek and the deep aquifer;



- Assessment of the feasibility of installing production wells in the mound to reduce the mound, prevent offsite flow, and produce water for irrigation;
- Calculation of the maximum effluent loading of the pond and WWTF, with and without pumping of effluent for irrigation use;
- Proposal of a recommended monitoring program;
- Assessment of the hydraulic communication of the deep aquifer and shallow effluent mound;
- Evaluation of the potential for the effluent mound to reach the deep aquifer, and potential impacts;
- Evaluation of the feasibility, and mechanics, of utilizing the deep aquifer to dispose the effluent, and;
- Investigation of the water quality of and depth to the deep aquifer.
- Lastly, consideration will be given throughout the study of the value and effectiveness of developing a numerical flow model of the site vicinity in order to better understand the flow dynamics, the fate and transport of the effluent constituents, the long-term impacts on the deep aquifer, and the effects of the faults on effluent and groundwater movement. Development of a model is not appropriate at this time, but may prove to be a valuable tool once the drilling and testing is completed and a conceptual understanding of the system is attained.

SCHEDULE

We can begin upon receiving a Notice to Proceed (NTP). We understand that time is of critical importance for all these activities, so we are prepared to begin immediately on the Phase 1 efforts. Assuming that no difficulties are encountered with data acquisition, we will work towards submittal of the Phase 1 technical memo within three to four weeks of beginning work. Completion of the Phase 2 efforts are more difficult to forecast, because completion of the work is dependent on the number of wells to be drilled, land position, contractor availability, etc.

FEE

We will provide our services on a time and expense basis according to the attached fee schedule rates. Our anticipated fee for the Phase 1 efforts described in this proposal is approximately \$28,860. This fee was prepared based on our understanding of the project described in this proposal and our experience with similar projects.

Expected cost of the Phase 2 work is not possible at this time. The bulk of the Phase 2 cost will be for the drilling contractor, and could easily be in the range of \$50,000 to \$100,000. A detailed anticipated Phase 2 cost estimate will be included in the Phase 1 Technical Memo.



Additional services for the project will be provided according to fee schedule rates. Invoices will be submitted at monthly intervals based on the amount of work completed and fee schedule rates in effect at the time of the work.

QUALIFICATIONS

Following this section is a brief description of Fugro and the services that the company can provide to the District. It is important for District staff to have confidence in the abilities of their consultants, and these descriptions are important in trying to impart that level of confidence. However, the reality is that successful projects like this one are built on a solid professional working relationship between the people doing the work. It is with this in mind that we want to take a brief moment to discuss our philosophy of client/consultant relationships. Projects like this one are dependent on developing a close working relationship between District staff and your consultant. Many projects require "an answer" and can be accomplished in a vacuum by the consultant. Not this one.

We concentrate on developing a few long-term client relationships, not developing a history of chasing individual projects. We want to be available for District staff to be comfortable calling us on unrelated issues, answering questions related to all aspects of the District's water supply, and working with the District to solve problems, not just complete projects. Furthermore, we also realize that the District has different levels of consulting assistance, and it is imperative that we work closely with your other consultants, as necessary, to advance the causes of the District. To that end, we have worked closely with Boyle Engineering in the past, and fully expect to be able to work closely with them on relevant issues and questions that may come up as part of this project. Furthermore, because SAIC is your primary consultant for water rights issues and large-picture water supply concerns, it is important that we keep Mr. Robert Beeby and his staff aware of and a part of the work that we do here.

Our project manager is Paul Sorensen, who will service this project from our office in San Luis Obispo:

FUGRO WEST, INC.
660 Clarion Court
San Luis Obispo, CA 93401

Attention: Paul A. Sorensen

Tel. 805-542-0797, ext. 15
Fax. 805-542-9311
Email: psorensen@fugro.com

Individuals that will join Mr. Sorensen on the project all have had direct prior experience on local percolation pond and infiltration studies. David Gardner, Senior Vice President of Fugro and head of the Water Resources Group, will be actively involved throughout the project to provide technical oversight and guidance. Dr. Shawn Roberts, Project Hydrogeologist, will lead the data compilation and review, and site characterization efforts. Messrs. Sorensen,



Gardner, and Roberts will be supported on this project by six full-time staff and two part-time staff in the San Luis Obispo office, and the full Water Resources group in Ventura and Oakland.



We appreciate the opportunity to be of service and look forward to being able to work with you. We would be more than happy to sit down with you to discuss any aspect of this proposal, and would be pleased to be meet with your Board of Directors on June 13 to answer questions. Please contact us if you have questions or require additional information.

Sincerely,
FUGRO WEST, INC.

A handwritten signature in black ink that reads "Paul A. Sorensen".

Paul A. Sorensen, PG, CHg
Principal Hydrogeologist
California Professional Geologist
California Certified Hydrogeologist

A handwritten signature in black ink that reads "D Gardner".

David Gardner, PG, CHg
Senior Vice President
Principal Hydrogeologist



FUGRO WEST INC., SAN LUIS OBISPO

Select a consultant based on the technical, professional, and administrative competence of principals and staff who will serve you.

Fugro has a qualified team of geologists, engineers, and technicians that can provide responsive professional and construction services for your project. The people within our organization will work with you to innovatively solve problems, collect data, and manage a variety of professional service needs. Fugro is a local hydro-geological and geotechnical firm that has had offices in San Luis Obispo for more than 15 years. Our office and laboratory are located at:

Fugro West, Inc.

660 Clarion Court, Suite A

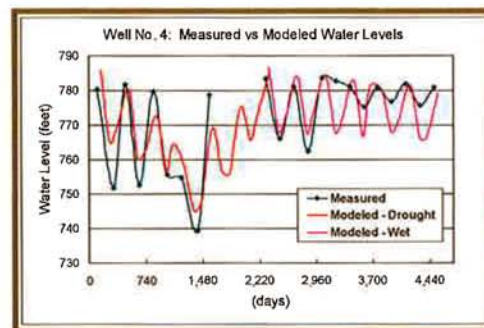
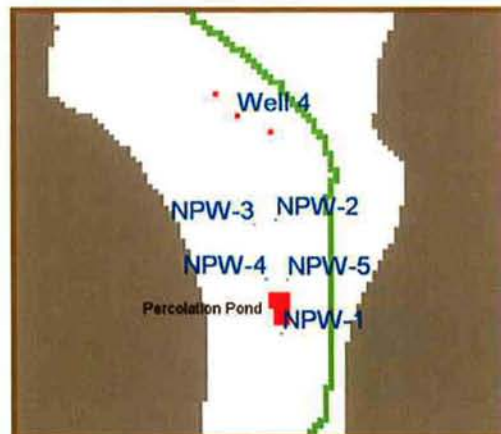
San Luis Obispo, California 93401-8177

Tel. (805) 542-0797

Fax. (805) 542-9311

Fugro's professional capabilities encompass water resources, geotechnical engineering, engineering geology, marine survey, environmental engineering, earthquake engineering, construction materials testing, construction management, pavement engineering, marine surveying, and geographic information systems. Our office is supported by the Fugro staff of over 180 personnel assigned to ten California offices.

This package provides a summarized presentation of our capability primarily within groundwater percolation pond and infiltration studies. If you would like more detailed information on our other capacities please contact us.



WATER RESOURCES

Water has become a highly precious resource, it needs to be managed wisely. When the well is dry, we know the worth of water....

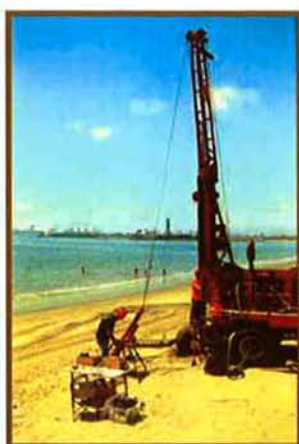
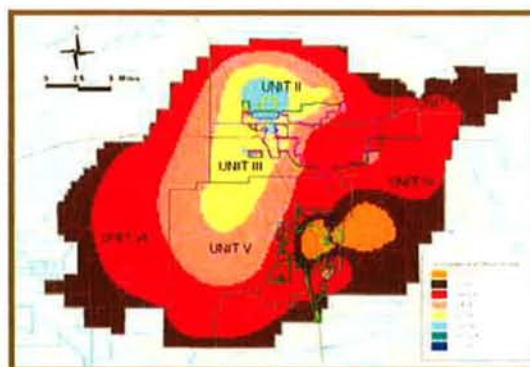
Water resource management requires a team of technical, legal, institutional, and financial experts. This team provides the knowledge to establish consensus between water users, purveyors, and environmental interests. The hydrogeologists, soil scientists, geophysicists, and regulatory specialists at Fugro offer a comprehensive approach to water resource management.

Our project experience includes the development and management of groundwater and surface water supplies and conjunctive use plans that integrate surface water and groundwater supplies. These projects have included basin safe-yield investigations, aquifer storage and recovery projects, groundwater modeling, basin management studies, individual well design, and well field development investigations. Additionally, we are experts in desalination project feasibility studies and seawater intake feasibility and design assessments.

We are a group focused on delivering a quality solution that matches your needs. This is made possible with both local presence and expertise, combined with the backing of the staff and resources of a global sized organization.

WATER RESOURCES SERVICES

- *Regional Groundwater Basin Analysis*
- *Water Well Design/Construction Monitoring*
- *Groundwater Studies and Modeling*
- *Groundwater Development*
- *Conjunctive Use Planning*
- *Aquifer Storage and Recovery*
- *Water Quality Assessment*
- *Geophysical Investigation*
- *Geographic Information Systems*
- *Expert Witness and Legal Support*



PERCOLATION POND AND INFILTRATION STUDIES

Percolation pond assessment requires the consideration of a significant number of factors for the successful implementation and sustainability of a program.

Fugro has extensive experience on the Central Coast supporting percolation pond assessment projects for wastewater infiltration and storage and recovery studies. Fugro prides itself in providing a rounded approach to this field of investigation and assessment, thereby ensuring your success upon implementation. Following are a couple case study examples of our involvement in local projects:

1. Wastewater Percolation Pond Water Quality Modeling, Templeton Community Services District.

Fugro provided assessment for the expansion of a wastewater percolation pond facility located upstream of a rural community. Discharge was to be increased from 90,000 to 600,000 gpd. The project included surface and groundwater quality assessment, flow and solute transport modeling to assess current and future impacts on groundwater quality, expansion of monitoring network and interaction with regional governing bodies. The project resulted in the development of new Waste Discharge Requirements (WDR) for the facility that met both the governing bodies and Districts goals.

2. Nacimiento Recharge and Recovery, Atascadero Mutual Water Co.

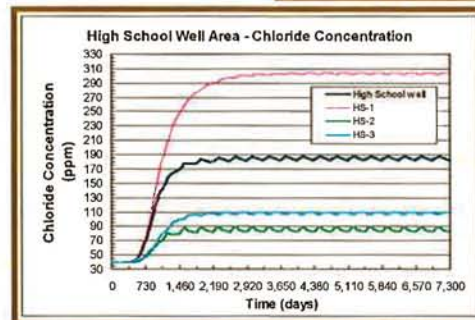
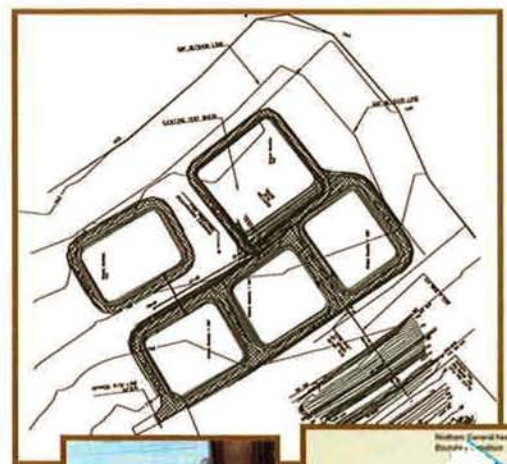
The hydrogeological aspects of a recharge and recovery project were assessed and evaluated by Fugro. The assessment included investigation of percolation potential, surface-groundwater aquifer interaction, well installation, aquifer parameter assessment, storage assessment and groundwater flow modeling. The project helped to assess the feasibility of the project in terms of aquifer capacity, site potential recharge and recovery wells and determine the potential recovery efficiency given different well configurations.

3. Additional Investigations Include

- Hydrogeological assessments for percolation pond feasibility and placement, City of Paso Robles.
- Groundwater banking assessment for the Paso Robles basin.
- Basin analysis and modeling studies for Tehachapi, Cummings and Paso Robles groundwater basins.

PERCOLATION POND ASSESSMENT

- Site Suitability
- Geological Investigation
- CPT Investigation
- Recharge and Recovery
- Wastewater Percolation Assessment
- Water Quality Assessment
- Groundwater Modeling
- Groundwater Impact Assessment
- Design and Planning



RESUME



Paul A. Sorensen, P.G, C.Hg.

Principal Hydrogeologist

EDUCATION:

M.A., Geology, University of California, Santa Barbara, 1980
B.S., Geological Sciences, University of Washington, Seattle, 1975

QUALIFICATIONS:

Professional Geologist, California
Certified Engineering Geologist, California
Certified Hydrogeologist, California

EXPERIENCE:

Mr. Sorensen has more than 24 years experience managing and directing projects related to hydrogeology, geology and engineering geology, with specific expertise in groundwater supply, basin analysis, and water resource management. His technical expertise includes regional groundwater basin analyses; perennial yield and basin water balance calculations; groundwater quality studies; aquifer test analyses; and water well, injection well, and monitoring well design and construction. Recent work has included serving as the responsible hydrogeologist for a variety of basin-wide water resource projects including basin analyses and basin-wide water balance and hydrologic budget conceptualization and calculations, and basin-wide numerical modeling.

SELECTED PROJECT EXPERIENCE:

Templeton Community Services District, Various Investigations

As District Hydrogeologist, Mr. Sorensen is involved in all water supply evaluation and development projects for the CSD. Investigations include evaluation of presence and distribution of Salinas River underflow to identify the District's legal rights to groundwater; groundwater flow modeling and calculation of basin yield; feasibility investigations of riparian water supplies; and design and construction management of new groundwater production wells.

Cambria Community Services District, Cambria Desalination Facility.

Performed hydrogeological feasibility studies of potential sites for the proposed desalination facility, and developed a detailed exploratory program for investigation of the beach environment at San Simeon Creek beach to evaluate depth, lithology, and hydrogeologic characteristics of the aquifer for the purpose of assessing the feasibility of utilizing beach wells, collector well systems, or slant well sea water intake facilities.

County Of San Luis Obispo, Paso Robles Groundwater Basin Study.

Conducted a basin analysis, safe yield study, numerical modeling, and simulation of potential basin-wide buildout scenarios of the Paso Robles Groundwater Basin. A hydrologic budget (water balance) for the basin was calculated using both the change in storage method and the inventory method, and the perennial yield was calculated. Development of the numerical model refined the calculated perennial yield figure, and simulated the impacts to the basin from several potential buildout scenarios.

District Geologist, Bear Valley Community Services District.

Long-term contract District geologist responsible for analysis of production and water quality history of 25-well production well field to provide options for increasing supplies. Prepared Water Supply Master Plan; technical analysis for feasibility investigation of proposed inter-basin water transfer arrangement between CSD and neighboring District, involving purchase and supply of imported water to local irrigators in lieu of groundwater pumping in exchange for groundwater production rights; feasibility analysis of artificial recharge surface infiltration ponds designed to recharge basin with up to 2,000 acre feet of imported surface water per year; and design and construction management of new groundwater production wells.

RESUME



David A. Gardner, C.Hg.

Senior Vice President, Water Resources Manager

EDUCATION: M.S. Geology, University of California, Los Angeles, 1973
B.S. Geology, University of California, Los Angeles, 1971

QUALIFICATIONS: Registered Geologist, California No. 3384, 1977
Certified Hydrogeologist, California No. HG 122, 1995
Professional Hydrogeologist, American Institute of Hydrology

EXPERIENCE: Mr. Gardner is the Senior Vice President of Fugro West, Inc., the western United States operating company of the Fugro group of companies. Prior to joining the firm, Mr. Gardner was a founding principal of the firm Staal, Gardner & Dunne, Inc. Mr. Gardner has more than 30 years of experience managing and directing projects involving groundwater resources and environmental engineering in California. He has served as the responsible hydrogeologist for a variety of water resource projects in California including basin groundwater management, safe yield studies, municipal well design, seawater intrusion abatement, desalination facilities, artificial recharge, and surface and groundwater quality monitoring. Mr. Gardner has provided attorney assistance and expert witness testimony involving groundwater litigation and conducted studies involving water rights, environmental impacts, and groundwater management.

SELECTED PROJECT EXPERIENCE:

Water Well Siting and Development. Project Principal for project planning, siting and construction of large diameter production wells in Los Angeles County, Gilroy and Soledad. Each of the studies evaluated the hydrogeology, water quality, water system constraints and included well testing.

Santa Clara Valley Water District San Tomas Injection Well Project. Technical and management oversight San Tomas Injection Well Project, examining the hydrogeologic feasibility of injection recharge of 1,000 acre-feet per year.

Kaweah Delta Conservation District Groundwater Management. Technical Consultant to Kaweah Delta Conservation District since 1996 evaluating issues that affect groundwater management, both regionally and locally.

Monterey County Water Resources Studies. Since 1986, Mr. Gardner has led 24 investigations of groundwater safe yield, water quality, conjunctive use, aquifer storage and recovery, and saline intake for desalination purposes. He was the principal investigator for and primary author of the "*Feasibility Study for Seaside Basin Injection/Recovery Project*" and the subsequent "*Summary of Operations Report for the Seaside Pilot Well Injection Well Project*," both important studies upon which alternative water supplies to replace Carmel River water are based.

Groundwater Management and Safe Yield Studies. Completed groundwater management and safe yield investigations of the Santa Barbara, Montecito, Carpinteria, and Ojai basins.

PUBLICATIONS: Hydrogeologic Investigation of the Montecito Ground Water Basin; Impact of Urbanization of the Long-term Recharge of the Goleta Ground Water Basin; Hydrogeologic Assessment, Oilfield Waste Disposal Site; Effect of Nitrogen Loading and Irrigation Rate on Amount of Nitrogen Leached to Groundwater.

RESUME



Shawn C. Roberts, Hydrogeologist

Project Hydrogeologist

EDUCATION: Ph.D., Hydrogeology, University College London, UK, 1999
M.Sc., Hydrogeology, University of East Anglia, UK, 1995
B.Sc., Geology, University of Southampton, UK, 1993

QUALIFICATIONS: Registered Geologist, Kansas, No. 357, 2005
Registered Geologist, Missouri, No. 2005039105, 2005

ADDITIONAL TRAINING: OSHA Hazardous Waste Operators and Emergency Response, 40-Hour Training.
Also OSHA trained in Confined Space and Manager and Supervisor Classes

EXPERIENCE: Dr. Roberts has over 8 years experience in the fields of groundwater resources, hydrogeology, contaminant hydrogeology and contaminated site remediation. His technical expertise includes surface/groundwater hydrological assessment (Ph.D.); groundwater and soil characterization and investigation; production water well, groundwater and vapor monitoring well design and construction (>100 wells); and aquifer testing and assessment. He has managed projects ranging from small private contracts up to Federal Superfund investigation. Dr Roberts has international experience having worked in Canada, UK and Zimbabwe.

SELECTED PROJECT EXPERIENCE: **Analysis of Tehachapi Alluvial Basin, California.** Conducted a basin analysis and safe yield study of the Tehachapi Groundwater Basin.

Water Well Installation, King City and City of Gilroy, California. Installed groundwater wells for potable water supply in the expansion of supply network.

Wastewater Percolation Pond Evaluation, City of Paso Robles, California. Conducted assessment of hydrogeological and infiltration characteristics of sites, for the percolation of wastewater.

Hydrogeological Study of a Proposed Residence and Vineyard, Templeton, California. Conducted a hydrological assessment to quantify the effect of a proposed abstraction.

Depressurization of the Basal Aquifer and Potable Groundwater Supply Programs, Alberta, Canada. Installation of water production wells for potable water supply and to depressurize the Basal aquifer for exploration.

Assessment of Chlorinated Solvents in a Limestone Aquifer, Cape Girardeau, Missouri. Project manager for investigation of a former transformer recycling facility, and NPL Superfund Site, where soil and groundwater were impacted in a karstic limestone topography.

Oil Field Restoration, TPH and VOC Impacted Soils, Los Angeles, California. Remediation of a 320-acre oil field. The program involved the characterization, excavation of TPH impacted material, land treatment, ex-situ soil vapor extraction of VOC impacted material.

PUBLICATIONS AND PRESENTATIONS: Well Hydrograph Analysis to Assess PCB Migration in Fractured Aquifers; Geophysical Fracture Delineation in Karstified Limestone; Methane Challenges in Soil Vapor Extraction Oil Field Remediation; Surface/Groundwater Interactions in a Limestone Aquifer; and Dissolved Organic Matter in the Lincolnshire Limestone.



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**SOUTHERN CALIFORNIA 2007 FEE SCHEDULE
 FOR CONSULTING SERVICES**

PROFESSIONAL STAFF	HOURLY RATE
Staff I Professional	\$ 95
Staff II Professional	105
Project Professional I	120
Project Professional II	125
Senior Professional	140
Associate	155
Principal	180
Principal Consultant	190

TECHNICAL AND OFFICE STAFF

Field Technician/Inspector - Non-Prevailing Wage, Straight Time	78
Field Technician/Inspector - Prevailing Wage, Straight Time	87
Construction Inspector	95
Construction Services Manager	105

Office Assistant	50
Word Processor/Clerical	60
Laboratory Technician	65
Technical Assistant/Illustrator	80
Illustrator II	85
CADD Operator	85
GIS Technician	90
HSE Manager	145

Overtime Rates for Technical and Office Staff:

- a. Saturday or over 8 hours/day during weekdays 1.3 x straight time
- b. Sundays/holidays 1.5 x straight time
- c. Swing or graveyard shift premium 1.3 x straight time

Fees for expert witness preparation, testimony, court appearances,
 or depositions will be billed at the rate of \$325 per hour.

OTHER DIRECT CHARGES

Subcontracted Services	Cost Plus 15%
Outside Reproduction	Cost Plus 15%
Outside Laboratory	Cost Plus 15%
Out-of-Pocket Expenses	Cost Plus 15%
Travel and Subsistence	Cost Plus 15%
Field Vehicle and Basic Sampling Equipment	\$100/day
Vehicle Mileage	\$0.50/mile
Specialized Software Applications	\$25/hr

Report reproduction and data reporting costs per staff hourly rates
 Fee Schedule is subject to revision periodically

LABORATORY TESTING See Separate Schedules

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January 2007 SC

TO: BOARD OF DIRECTORS
FROM: BRUCE BUEL *BBB*
DATE: JUNE 8, 2007

**AGENDA ITEM
E-10
JUNE 13, 2007**

CONSTRUCTION MANAGEMENT SERVICES POLICY

ITEM

Consider Director Trotter's request to review process for retention of construction management services [RECOMMEND ADOPTION].

BACKGROUND

The Board's informal policy on retention of construction management firms is to use a different firm than the design engineer (understanding that the design firm will always provide engineering services during construction). Director Trotter has requested that the Board discuss this policy and determine if it would be prudent to use the design firm to perform both construction management and engineering services during construction instead of retaining a separate construction management firm.

Agencies use both approaches and there are advantages and disadvantages to each. The principal reason that agencies separate the functions is to ensure that the agency has an independent expert to resolve problems resulting from design errors. The principal reason that agencies combine the functions is that it is often more cost effective and it minimizes staff time in seeking quotes from CM firms.

RECOMMENDATION

Staff believes that it is prudent to separate the functions on projects over \$1 million in construction cost. Under \$500,000 the value of an independent CM is unlikely to outway the extra cost of hiring that firm. Staff recommends that the Board discuss the issue and provide policy direction to staff, so that staff can draft a policy and bring that policy back to the Board for adoption.

ATTACHMENT

- None

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