

# NOVATO SANITARY DISTRICT BOARD AGENDA ITEM SUMMARY

<b>TITLE:</b> Wastewater Treatment Facility Upgrade Project 72609: Health Effects Study	<b>MEETING DATE:</b> January 9, 2012  <b>AGENDA ITEM NO.:</b> 76
<b>RECOMMENDED ACTION:</b> Accept a proposal from Exponent to evaluate potential health risks from treatment plant emissions.	
<b>SUMMARY AND DISCUSSION:</b> <p>A number of neighbors in the Lea Drive area have expressed concern about potential health effects from treatment plant emissions. District staff has located recognized experts in performing health risk assessments led by Dr. Robert Scofield of Exponent. Dr. Scofield has performed or peer-reviewed over 500 human health risk assessments for chemicals in soil, air, and water. In addition, he has taught and lectured extensively risk assessment.</p> <p>He proposes to:</p> <ul style="list-style-type: none"> <li>• Estimate worst-case H2S emissions from the treatment facility based on prior measurements,</li> <li>• Estimate worst-case offsite concentrations of emissions using dispersion models,</li> <li>• Characterize the dose-response relationship for H2S,</li> <li>• Characterize the health risk of offsite H2S levels,</li> <li>• Prepare a written report,</li> <li>• Participate in meetings and conference calls.</li> </ul> <p>Since Novato Sanitary District receives almost exclusively domestic sewage it does not contain industrial volatile compounds. The District regularly samples and analyzes for over 150 organic compounds most of which are non-detectable at very low levels of detection limits. A review of the levels of these compounds in the water shows that there is no chance that these compounds are being volatilized into the air. Accordingly, the emissions study will focus on H2S, which is the most likely compound to produce health effects from Novato sewage air emissions.</p> <p>They propose to do this work on a time and materials basis for an amount not to exceed \$28,300. A copy of their proposal and qualifications is attached.</p>	
<b>ALTERNATIVES:</b>	
<b>BUDGET INFORMATION:</b> This work will be funded from Capital Projects Account 72609, which has a budget of \$400,000 and a current balance of \$172,935.	
<b>DEPT.MGR.:</b>	<b>MANAGER:</b> <i>Sevelle, James</i>



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January 6, 2012

Ms. Beverly B. James  
Manager-Engineer  
Novato Sanitary District  
500 Davidson Street  
Novato, CA 94945

Subject: Proposal to Evaluate Potential Health Risks from Hydrogen Sulfide Emissions:  
Novato Sanitary District

Dear Ms. James:

Exponent is pleased to submit this proposal to provide human health risk assessment services to the Novato Sanitary District (NSD). We understand that people living near the Novato Sanitary District's treatment plant have expressed concern about hydrogen sulfide (H<sub>2</sub>S) emissions from the plant and that NSD has taken measures to identify and mitigate the sources of emissions. To address concerns about potential health effects, Exponent will use information from the October 4, 2011 report, *NTP Odor Control Evaluation- Summary Report*, and other information, to develop upper-bound estimates of the H<sub>2</sub>S levels in the neighborhood adjacent to the plant last summer when odor complaints were being received and when exposure concentrations were likely the highest. Using those conservative estimates of exposure, we will evaluate the likelihood that the exposures were at levels associated with either short-term or chronic health effects. The approach we take to the evaluation will be based on guidance and practices recommended by the Bay Area Air Quality Management District (BAAQMD) and the California Environmental Protection Agency (Cal-EPA) Office of Environmental Health Hazard Assessment (OEHHA).

## Technical Approach

The technical approach we propose is divided into the six tasks discussed below, including an estimate of H<sub>2</sub>S emissions from the plant, dispersion modeling to estimate concentrations in the adjacent neighborhood, identification of regulatory and toxicity limits, comparison of estimated concentrations to relevant exposure limits, and preparation of a written report. If requested, we will also participate in additional conference calls or meetings to discuss the project progress and/or results. Each of these tasks is discussed in more detail in the text below.

## **Task 1. Estimate Emissions of H<sub>2</sub>S**

The purpose of this task will be to develop a quantitative estimate of H<sub>2</sub>S emissions from the new Novato Wastewater Treatment Plant (NTP) during the start-up phase of the facility. More specifically, our goal will be to characterize the pattern of H<sub>2</sub>S emissions from the various sources identified in the October 4, 2011 report, *NTP Odor Control Evaluation- Summary Report*, prepared by V&A Consulting Engineers. As noted above, we will perform an initial estimate of emissions using worst-case assumptions. H<sub>2</sub>S vapor concentrations for the Headworks and Primary Clarifiers will be taken from Tables 1 and 2 of this report and will be assumed to have been prevalent at the plant for the summer months of plant startup. Total air flow rates for the biofilters at the Headworks and Primary Clarifiers will be taken from Tables 3 and 4 of this report, assuming that the fan of each process was operating at maximum airflow capacity. In this manner both average and maximum hourly emission rates will be determined from the plant during the time period in question.

In addition to the V&A report, we will participate in a conference call with NSD to discuss our proposed approach and to discuss any additional information the NSD may be able to provide. We will be trying to recreate conditions (flow, concentration, etc.) representative of the conditions when the H<sub>2</sub>S odors were reported by the neighbors.

Because the reports of odor came from residences very close to the facility, it will be important to understand the number, location and strength of the several potential sources of H<sub>2</sub>S emissions within the plant. For at least the initial evaluation, we will assume that the various sources near the biofilters at the Headworks and Primary Clarifiers can be treated as a single area source and that we will not need to address any emissions from the open aerobic tanks or from sludge digestion operations.

The products of this task will be an estimate of the maximum hourly emission of H<sub>2</sub>S, and the maximum daily estimate of H<sub>2</sub>S emissions to be used in evaluation of maximum hourly and maximum daily H<sub>2</sub>S exposures.

If the exposure levels resulting from the use of these worst-case assumptions are levels at which adverse health effects might be expected, we will develop recommendations for a more refined approach. We will discuss the technical approach and cost of any refinements with NSD before undertaking such refinements. Such refinements might address either the 1-hour or 24-hour average concentration estimates.

The cost of this task will not exceed \$4,700, without prior authorization. The cost estimate is based on the assumption that we will focus on sources associated with the primary clarifier operations, including the biofilters. It is also based on the assumption that emissions from other potential sources, including the aerobic treatment tanks and the sludge digesters, do not require evaluation.

## **Task 2. Estimate Offsite Concentrations of H<sub>2</sub>S**

The purpose of this task is to estimate H<sub>2</sub>S levels at residences closest to the NTP based on emission scenarios developed in Task 1. Dispersion modeling will be performed using a standard agency dispersion model such as AERMOD or CALPUFF. Obtaining local meteorology data and adapting it for use in the selected dispersion model for the exposure period of interest will be part of the effort under this task. We understand that electronic meteorological data is available from the plant and from nearby Gness Field. Model selection will depend on consideration of such factors as the availability of specific meteorology data, configuration of emissions sources, and structures in the immediate vicinity of the sources.

The products of this task will be estimates of 1-hour and 24-hour maximum concentrations at the residences in the immediate vicinity of the treatment plant. If information adequate to support an estimate of annual average emissions and dispersion is available, we will also develop an annual average exposure concentration to support an evaluation of the potential for chronic health effects.

The cost of this task will not exceed \$5,700, without prior authorization.

## **Task 3. Characterize Dose-Response Relationship for H<sub>2</sub>S**

The purpose of this task will be to characterize the acute and chronic toxicity of H<sub>2</sub>S, as well as the concentration-response relationships for odor reactions to H<sub>2</sub>S.

We will initiate the task by summarizing dose-response factors, exposure limit recommendations, and air quality standards published by relevant regulatory agencies and other authoritative organizations. While acute and chronic exposure limits have been developed by the State of California (and other agencies), the fact that odors could be detected intermittently over a period of a many weeks suggests the need to develop subchronic exposure limits as well. Subchronic limits will be developed using acute toxicity data such as that serving as the basis of California's acute exposure limit and the U.S. Environmental Protection Agency's (U.S. EPA) Acute Exposure Guideline Levels (AEGs), and using a principle of acute toxicity known as Haber's Law (a mathematical equation that describes the relationship between a chemical's toxic effect and concentration while taking into account the duration of exposure).

The product of this task will be a table of relevant exposure standards and guidelines, as well as published odor benchmark concentrations. We will also provide a brief text identifying the sources of the values, and describing the rationale for their selection. We anticipate that virtually all of the values we collect will be from summary documents previously prepared by credible organizations such as Cal-EPA, U.S. EPA, the Agency for Toxic Substances and Disease Registry (ATSDR), and similar organizations.

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The cost of this task will not exceed \$4,400 without prior authorization.

#### **Task 4. Characterize Health Risks of Offsite H<sub>2</sub>S Levels**

The purpose of this task is to characterize the likelihood of any acute, subchronic, or chronic health effects, or expected odor reactions associated with the 1-hour, 24-hour, and annual average exposure concentrations developed in Task 2. As an initial evaluation of subchronic and chronic exposure levels, we will compare the 24-hour average concentration estimates using the data available to exposure limits developed for longer (e.g. subchronic and chronic) exposure periods. Using the exposure concentrations developed in Task 2, along with the exposure limits and dose-response data developed in Task 3, we will evaluate the likelihood that published exposure standards were exceeded, or that people in the vicinity of the treatment plant experienced exposure levels associated with adverse health effects or nuisance.

The product of this task would be a verbal report of initial findings, a discussion of any key uncertainties and, possibly, discussion of refinements that may be undertaken to address the uncertainties.

The cost of this task will not exceed \$2,500 without prior authorization.

#### **Task 5. Prepare Written Report**

The purpose of this task will be to prepare a written report describing the purpose, methods, assumptions, and results of our evaluation. We will also include in the report any conclusions or recommendations we develop over the course of our evaluation.

The cost of a written report will depend on the degree to which any of the topics we address require a refined evaluation, and detailed presentation in the written report. Air dispersion modeling and any evaluation of alternative sources are examples of topics that could expand the level of effort required for a written report. If a written report is requested, we would provide a more precise scope/outline and more precise cost estimate prior to initiating the task.

Based on current expectations, and the scope of the evaluation described above, the cost of a written report will not exceed \$8,000, without prior authorization. This cost is based on the assumption that the scope of the report will not include discussion of any of the possible refinements mentioned in previous tasks, particularly in the evaluation of emission estimates.

The products of this task will be a draft and final written report. The report will include graphics (e.g., plume maps and charts comparing exposure concentrations to exposure limits) suitable for presentation in a public meeting. We assume NSD will review and provide comments on a draft report and that Exponent will respond to the comments and produce a final report.

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## Task 6. Participate in Meetings and Conference Calls

The purpose of this task is to prepare for and participate in any meetings or conference calls not identified above. This will include meetings with community members or the NSD Board of Directors, if participation in such meetings is requested. We estimate that the cost for this task will not exceed \$3,000. No costs will be incurred under this task if no meetings or calls other than those discussed as part of the Tasks 1 through 5 are requested.

### Cost Summary

The total cost of the scope of work described above will not exceed \$28,300, without prior authorization. The total cost of the evaluation may vary from the cost estimate provided above, depending on the need for more refined evaluations. Similarly, the decision to expand the evaluation to include additional sources beyond those discussed as part of Task 1 associated with the primary clarifiers would expand the scope of the evaluation we are proposing. We will not undertake any of these refinements or expansions without first receiving authorization for such expansions from NSD.

We can begin work as soon as we receive your written authorization to proceed, and we anticipate it will take one month to complete the evaluation and prepare a draft report.

We greatly appreciate being considered for this project and would welcome the opportunity to work with you.

Please call me at (510) 268-5066 if you have any questions.

Sincerely,



Robert Scofield, D.Env.  
Director of the Center for Exposure  
Assessment and Dose Reconstruction

Enclosures (2)

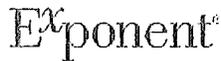
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## CONSULTING SERVICES SCHEDULE OF RATES & CHARGES

### PROFESSIONAL FEES

The staff of Exponent comprises highly qualified professionals - both employees and consultants. Exponent charges its clients for services provided according to the skill level of the individual assigned to the client's project. For billing purposes, Exponent provides the following staff classifications that designate relative experience, training, and accomplishment within a technical field together with the range of standard hourly fees charged for their services.

Principal/Officer	Senior-level technical or management person, responsible for technical direction or general management or administration of the Firm.	\$275.00-\$600.00
Senior Manager	Senior technical professional providing high-level or individual consulting assignments, or overall technical direction of projects, may have management responsibility for a technical field within the Firm.	\$225.00-\$450.00
Manager	Senior technical professional providing high-level or individual consulting assignments or overall technical direction of projects.	\$175.00-\$375.00
Senior Engineer/ Scientist/Associate	Experienced technical professional skilled in planning, organizing, controlling, and executing complex, higher-order projects or assignments.	\$150.00-\$275.00
Engineer/Scientist/ Associate	Trained/degreed professional responsible for executing technical assignments in support of client projects.	\$125.00-\$250.00
Technical/Research Specialist	Personnel experienced in instrumentation, programmer testing, library science, or the development or execution of research methodologies in support of technical/engineering projects.	\$ 100.00-\$195.00
Technical/Research Assistant	Laboratory, data processing, engineering-graphics, engineering technician or other personnel responsible for the execution of specialized tasks in support of technical / engineering projects.	\$ 60.00-\$140.00
Administrative/ Non-technical Assistant	Personnel who assist technical staff in various administrative non-technical areas, including scheduling, report productions, communications, logistics, and project support.	\$ 60.00-\$130.00

The above hourly rates represent the professional fees charged by Exponent for work performed within the continental United States. A rate is established for each employee within his/her classification, based on that person's individual qualifications and experience. These rates are modified annually on or about January 1, or otherwise at the discretion of Exponent. For projects conducted outside the continental United States, premium rates may be applied to adjust for cost-of-living differentials. Premium rates may also be applied when, at the client's request, work is to be accomplished in such a way as to increase costs to Exponent. This may occur due to schedule constraints or planned inefficiencies. Premium rates for this work shall be no less than 15% greater than the hourly rates quoted above. Payment is required in U.S. dollars within thirty (30) days after receipt of invoice, or interest charges may be applied.

### FIXED-PRICE SERVICES

When the services required or the character of the final work product are sufficiently defined, Exponent may provide such services or deliverables on a fixed-price basis.

### SPECIAL PROJECTS

Specialized software, methodologies, services, or technical products developed by Exponent will be charged at rates that reflect development costs and equivalent technical value. Specific prices and terms of agreement will be provided upon request.

### EQUIPMENT CHARGES

Technical equipment may be used both in-house and in the field to assist Exponent personnel in their work. An hourly access fee is charged for selected equipment, for which examples are the scanning electron microscope and the Materials Test System.

### OTHER PROJECT EXPENSES

Air travel is charged at the most effective fare basis for the project involved and is invoiced to the client at Exponent's cost. Exponent personnel below the principal classification charge coach fares per Exponent's policy. Local mileage is charged in accordance with I.R.S. guidelines. Some project expenses requiring administrative processing are charged at cost plus fifteen percent (15%). These may include (but are not necessarily limited to) meals, materials, equipment, outside laboratory tests, outside computer charges, special printing and reproduction, shipping charges, special fees, or supplemental insurance. Consumable materials may be charged in some instances on an applied rate rather than an incurred cost basis. Professional expenses related to legal discovery requirements brought about by Exponent's services will be charged at the above rates.

## TERMS AND CONDITIONS OF AGREEMENT



### CHARGES

Work performed under a fixed-price arrangement will be billed at the agreed fixed amount. Work performed on a time-and-expenses basis will be charged in accordance with the most current Consulting Services Schedule of Rates & Charges of Exponent. Any unusual work not specifically covered by that schedule will be charged at a rate mutually determined to be reasonable in relation to the type of work to be performed.

At the discretion of Exponent, a suitable retainer may be required from the client in advance. Such an amount will be held by Exponent until the final invoice is prepared, at which time the client's account will be reconciled.

Evidence storage and disposal after closure of Exponent's case file will be the responsibility of the client. Upon the client's request, Exponent may agree to provide temporary storage space for a reasonable fee, which the client agrees to pay monthly upon presentation of an invoice from Exponent.

Taxes will be charged where applicable.

### PAYMENT

Invoices are typically rendered monthly or in accordance with the agreed upon payment schedule, and are due upon receipt. Outstanding balances past due over 30 days are subject to a delinquency charge until paid. Exponent, without liability, may withhold delivery of reports and other data, and may suspend performance of its obligations to the client, pending full payment of all charges. Exponent reserves the right to decline further work with any client delinquent in payment of charges due to Exponent for previous work, until such balances are paid in full.

### EXECUTION OF SCOPE OF SERVICES

Exponent will work in accordance with generally accepted professional engineering practice. No other warranty, express or implied, is made concerning work performed under the agreement, including Exponent's findings, recommendations, specifications, or professional advice.

Exponent will diligently proceed with the contracted work and report to the client in a timely manner, except for delays occasioned by factors beyond Exponent's control, by factors that were not reasonably foreseeable, or by factors initiated by the client.

Work under the agreement will be terminated upon receipt by Exponent of written notice from the client, except that Exponent may complete such analyses, records, and reports as are reasonably necessary to adequately document the work performed through termination. Charges for such work will be kept to a reasonable minimum, not exceeding 10% of total charges incurred through the date of termination. Work under a fixed-price agreement that is terminated before completion will be billed on a percentage of completion basis for effort expended up to the receipt of client's written notice of termination. Work under the agreement may be terminated by Exponent only for just cause. This includes, but is not limited to: development of a material conflict of interest, judicially required participation in onerous discovery or other legal process outside the intended scope of the work, or the presence of circumstances beyond Exponent's control, such as natural disasters or government intervention.

Exponent, unless other specific arrangements are made, will maintain its technical files for 30 days after the final payment is received and the case file is closed. Financial records will be retained according to I.R.S. requirements, but not less than one year after the case file is closed.

### MISCELLANEOUS

The client assumes full and complete responsibility for all uses and applications of Exponent's recommendations, or work under this agreement, or failure to use recommendations or work, and agrees to indemnify and hold harmless Exponent, its affiliates, officers, directors, employees, agents, and stockholders against any and all liability, damages, losses, claims, demands, actions, causes of action, and costs including attorney's fees and expenses resulting from the death or injury to any person or damage to any property or any other alleged or actual damages resulting from the aforementioned use, application, or nonuse of Exponent's recommendations or work under this agreement.

The client agrees that in no event shall Exponent, its affiliates, officers, directors, employees, agents, or stockholders be liable for any incidental or consequential damages, direct or indirect, arising from Exponent's services under this agreement.

Exponent will hold in strictest confidence all proprietary information and trade secrets of the client to which it may be given access. Unless otherwise expressly agreed in writing, all reports, recommendations, procedures, and other information provided to the client under this agreement shall be joint property of the client and Exponent, and may be used without restriction by either. However, unless otherwise expressly agreed in writing, Exponent shall retain exclusive rights to all proprietary information, technologies, trade secrets, inventions, or patentable ideas developed during the performance of this agreement.

In any litigation involving the client in which Exponent is compelled by subpoena or court order to testify at a deposition or judicial proceeding, or to produce documents regarding work performed by Exponent, the client agrees to compensate Exponent, at its prevailing hourly rate, for all time spent by Exponent in responding to such legal process, including all time spent in preparing for such testimony. The client also agrees to pay Exponent's reasonable attorney's fees and expenses included in connection with the foregoing. In the event of any such subpoena or court order, Exponent will promptly notify the client to enable the client to object to any such testimony or production of documents.

In the event of a lawsuit between the client and Exponent under this agreement, such lawsuit shall be filed and tried only in a court of competent jurisdiction within San Francisco County, California. California law shall apply to any such proceeding. The prevailing party in any action shall recover from the losing party its reasonable attorney's fees and costs of suit incurred in addition to any other relief granted.

# Robert Scofield, D.Env., M.P.H.

*Principal Scientist and Center Director*

Exposure Assessment & Dose Reconstruction

Oakland

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(510) 268-5066

## Professional Profile

Dr. Scofield has over 30 years of experience in performing human health risk assessments and exposure assessments for chemicals in the environment and consumer products. He has managed or performed health risk over 500 human health risk assessments for chemicals in soil, water, and air. These evaluations have included major Superfund sites, RCRA Sites, agricultural chemical sites, Brownfield redevelopment sites, petroleum spill sites, manufactured gas plant sites, and other waste disposal or spill sites. He has also performed and reviewed multipathway risk assessments for diesel exhaust emissions, municipal and hazardous waste incinerators, and air emissions from industrial process stacks and research laboratories under a variety of State, Federal, and International regulatory programs and in support of risk communication. In recent years, Dr. Scofield has performed several risk assessments designed to meet the requirements of CEQA.

He has performed or peer reviewed risk assessments conducted in many countries in Europe, Asia, and South America. In Australia, he has performed or reviewed more than 20 risk assessments for contaminated land and air toxics sites in New South Wales, Victoria, South Australia, and Western Australia. Dr. Scofield is an approved risk assessor by the New South Wales government for risk assessments performed under their Site Auditor program. He has extensive experience performing critical evaluations of toxicology and epidemiology literature for setting exposure limits, characterizing dose-response relationships, and evaluating evidence for causal relationships between chemical exposures and adverse health effects. He has served on peer review committees for the U.S. Department of Defense and State of California.

In the area of product safety, Dr. Scofield has completed over 300 risk assessments involving the estimation of chemical exposure to consumer products or food. Many of these evaluations have been performed in support of assessments of compliance with California's Proposition 65. He has also performed risk assessments for clients in response to inquiries from the FDA and product recalls ordered by the CPSC. In addition, he has provided risk assessment in support of registration or regulation under FIFRA, CPSIA, and other State-specific product safety laws, as well as EU directives. Dr. Scofield has also provided product safety evaluations on behalf of companies considering the purchase of the rights to manufacture specific products or product lines or considering voluntary product recalls.

Dr. Scofield has taught and lectured extensively on risk assessment at universities, for private industries, and for the California Bar Association. He was an active member of the committee that developed the ASTM Standard, Risk Based Corrective Action (RBCA) for Petroleum Release Sites. In support of the American Petroleum Institute and the USEPA program to implement RBCA programs within State agencies, he taught basic toxicology, risk assessment, and risk-based corrective action to several State agencies. He was part of a team that developed and taught a class in toxicology and risk assessment for project managers within the Department of Defense. Dr. Scofield was a member of the National Research Committee on Natural Attenuation. He has been an invited speaker at the Brownfields Asia Conference on two occasions and was invited to present a guest lecture on risk assessment to the Chinese Research Academy of Environmental Sciences in 2008. He was invited to participate in a special meeting of the Toxicology Section of the Royal Society of Chemists in the United Kingdom to participate in discussions on the topic of determining significant health risk. Dr. Scofield is frequently invited to speak on Proposition 65.

## Credentials & Professional Honors

- » D.Env., Environmental Science and Engineering, University of California, Los Angeles (UCLA), 1984
- » M.P.H., Environmental Health Management, University of California, Los Angeles (UCLA), 1977
- » B.A., Biology, University of California, Los Angeles (UCLA), 1975