APPENDIX 1.2
Regulatory Agency Correspondence

California Regional Water Quality Control Board
San Diego Region

Terry Tamminen
Secretary for Environmental Protection

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Arnold Schwarzenegger
Governor

May 13, 2004

Mr. Ray Purtee
City of San Diego
Environmental Services Department
9601 Ridgehaven Court, Suite 310
San Diego, CA 92123

In reply refer to:
LD:06-0378.02:mcdab

Dear Mr. Purtee:

SUBJECT: Draft Work Plan - Mission Bay Landfill Site Assessment

The Regional Water Quality Control Board (RWQCB) has completed our review of the Draft Mission Bay Landfill Site Assessment Work Plan, received by this office on March 8, 2004. Pursuant to Regional Board Order 97-11, E. Reporting Requirements, 1. b., the discharger shall submit a workplan at least 30 days prior to any maintenance activities that could alter existing surface drainage patterns or change existing slope configurations. These activities may include, but not be limited to, significant grading activities, the importation of fill material, the design and installation of soil borings, ground water monitoring wells and other devices for site investigation purposes. For the purposes of the site assessment, the Regional Board accepts the work plan as notification pursuant to the Reporting Requirements of Order 97-11 with the following comments.

GENERAL COMMENTS

1. The work plan must be signed by a licensed professional pursuant to the California Business and Professions Code (Sections 6735, 7835 and 7835.1).

2. The work plan indicates samples collected for EPA method 1669 will be analyzed by Battelle Marine Science Laboratory, Sequim, Washington. The work plan should provide documentation that the lab is certified by the State of California to perform the proposed analyses.

3. The work plan anticipates the placement of 4 groundwater monitoring wells to depths of up to 30 feet. The work plan should address methods to investigate the presence of waste constituents which could have migrated beneath the waste and to areas away from the landfill. Regional Board staff recommend the placement of additional wells at greater depths in order to assess the vertical extent of waste constituents.

4. Proposed groundwater monitoring well construction should include sumps to allow for potential DNAPL sampling and removal should these constituents be present.

5. The site assessment should include a hydrogeologic evaluation to investigate the potential for VOCs to migrate vertically and horizontally through the water bearing zones.

6. The work plan provides numerous goals and tasks. The use of charts, tables and MS Project type time lines could help to clarify the tasks and timeframes to be carried out during the investigation.

SPECIFIC COMMENTS

1. Page 1, Section 1.1, Overview, First Bulleted Paragraph

The text states: "The landfill boundaries, operational history, and landfill contents are uncertain". This statement appears to disagree with the statement on Page 4, Summary of Refuse Operations which indicates that the know volumes and composition of waste in the landfill have been summarized.

2. Page 2, Section 1.1, Paragraph 1

The final report should provide an evaluation of sewer lines and/or storm drains in the vicinity of the site as contributing factors for elevated contaminants in Mission Bay.

3. Page 3, Section 1.3

The description of the Scope of Services in the work plan is confusing as currently written. The final report should provide the Scope of Services in table or chart form addressing the related goals and tasks.

4. Page 14, Section 1.5.2.2 Location Specific ARARs

Add a reference to Title 23. "Compliance with relevant portions of Title 22, *23* and 27 of the CCR…"

5. Page 15, Section 1.5.2.3, Action Specific ARARs, Paragraph 5

The text states that " Any landfill related action fall within the guidelines and regulations promulgated by the CIWMB and SWRCB under 27 CCR and guidance issued by the CIWMB to the LEAs." The Regional Board currently regulates the Mission Bay Landfill pursuant to waste discharge requirements (WDRs) issued to the City of San Diego as Order 97-11 (and addenda thereto). The Order currently uses requirements of CCR Title 23, Chapter 15 to regulate the Mission Bay Landfill. A reference to 23 CCR should be added.

6. Page 34, Section 2.4.4, Groundwater and Surface Water Analytical Summary,

The text states "The median metal concentrations denoted in Figure 2.8 were produced with a very high proportion of concentrations reported below laboratory detection limits..." Summary Table 2.10 should be revised to include corresponding laboratory detection limits.

8. Page 54, Section 3.4.2 Chemical Analyses

The text indicates that a revised methodology to specifically address chemical analyses is proposed in this workplan. The text should reference the specific section that includes the revised methodology.

9. Page 65, Section 4.3.5 Soil Boring and Monitoring Well Permit Requirements

The text indicates the installation of 5 wells. Previous discussions in the text indicate 4 wells. Please revise the text as necessary.

FIGURES

1. Figure 3.1

Figure 3.1 uses unconventional contours 1'-15', 8'-19', 16'-23' to describe landfill thickness. Landfill thickness should be indicated using a standard contouring interval. Typically isopach maps are drawn using consecutive contours (i.e. 0'-5', 5'-10', 10'-15', etc).

Figure 3.1 exhibits inconsistencies between the line indicating the "landfill delineation" and shaded area indicating estimated refuse thickness. We acknowledge that additional investigations are needed and are indicated by a dashed line. However, the areas in the vicinity of borings 19 and 20 are estimated to have refuse thickness between 1 – '9', yet are shown outside of the landfill limits.

As you know, the Regional Board regulates water quality aspects of the Mission Bay Landfill under Regional Board Order No. 97-11 (and addenda thereto). The Regional Board may also use additional requirements from California Code of Regulations, Title 27 (27 CCR) to the extent that those State requirements apply (pre-1984) to the site. Although our "Basin Plan" does not designate any beneficial uses of groundwater at the site, there are designated beneficial uses for the surface waters of Mission Bay and the San Diego River. After the proposed study is complete and the final report is issued, the Regional Board will assess the results in light of applicable water quality objectives for the protection of surface waters located in proximity to the Mission Bay Landfill.

The Regional Board's role in the evaluation risks to human health is limited. For solid waste management units (landfills) that area of expertise generally falls within the jurisdiction of the California Integrated Waste Management Board (CIWMB), the Local Enforcement Agency (LEA), or the Department of Toxic Substances Control (DTSC). Therefore, the Regional Board defers to representative(s) of the LEA and/or DTSC for comments and recommendations on information that may be necessary for the completion or evaluation of a site-specific human health risk assessment.

The heading portion of this letter includes a Regional Water Quality Control Board (Regional Board) code number noted after "In reply refer to:" In order to assist us in the processing of your correspondence please include this code number in the heading or subject line portion of all correspondence and reports to the Regional Board pertaining to this matter.

If you have any questions regarding this letter, please contact Brian McDaniel of the Regional Board's Land Discharge Unit at (858) 627-3927.

Sincerely,

JOHN R. ODERMATT, Senior Engineering Geologist
Land Discharge Unit

JRO:bkm
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cc: Ms. Rebecca Lafreniere, City of San Diego, Solid Waste Local Enforcement Agency, 1010 Second Avenue, Suite 600, San Diego, CA 92101-4998

THE CITY OF SAN DIEGO

October 11, 2004

Mr. John R. Odermatt
Senior Engineering Geologist
Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Dear Mr. Odermatt:

Subject: Mission Bay Landfill Site Assessment Work Plan Response to Comments

The City of San Diego is pleased to respond to your letter of May 13, 2004, regarding your review of the Draft Mission Bay Landfill Site Assessment Work Plan. The City's consultant for this project, SCS Engineers, has prepared the work plan, is presently conducting the field work, and will prepare the final report. The following response was prepared by the City's consultant, SCS Engineers.

GENERAL COMMENTS:

1. Enclosed is a cover letter for the Review Draft Work plan which is signed by the Registered Geologist and acknowledges their responsibility for the content.

2. The Battelle Marine Science Laboratory in Sequim, Washington is certified nationally through the National Environmental Laboratory Accreditation Program. The laboratory is not specifically certified by the State of California. However, this is the only laboratory in the USA which performs the ultra low level metals analysis, and it was instrumental in developing the ultra clean procedures for sampling groundwater to facilitate the very low detection limits in the analysis. Therefore, we feel that using this laboratory will provide analytical data of a quality that cannot be obtained by using any laboratory which is certified in California.

3. The proposed wells will be installed to approximate depths of 30 feet below grade. The maximum depth to the base of the waste is 23 feet below grade. Therefore, we believe that sampling groundwater up to 30 feet below grade is sufficient to address the presence of waste constituents which could have migrated beneath the waste. In our opinion, it would be premature to install deeper wells until the tidal study has been completed. In addition, at least two wells will be drilled through the waste near the ends of the former river channel that lies below the midsection of the landfill, so samples will be collected from below the waste at these locations.

4. Sumps will be included at the base of the wells. Instead of the standard 4 inch deep well cap alone, a five foot long section of Schedule 40 PVC with threaded ends will be attached to the base of the screen above the standard well cap. This will facilitate potential DNAPL sampling and removal should these constituents be present.

5. It is our opinion that the site assessment as proposed in the Work plan includes a preliminary hydrogeological evaluation to investigate the potential for vertical and horizontal migration of volatile organic constituents. The final report will address this issue and recommend further assessment, if the studies show it to be warranted.

6. The timeline of the work plan implementation is dynamic, and is changing in response to requests from the Technical Advisory Committee, as well as the sub-committee reviewing the field work. Therefore, we did not feel it would be valuable to include charts of the implementation schedule in the work plan.

SPECIFIC COMMENTS:

1. The apparent contradiction between the statements on pages 1 and 4 results from the fact that some, but not all, of the information is available. Therefore the landfill boundaries and operational history are uncertain, but some information is known and was summarized.

2. The locations of storm drains and sewer lines at the site are being evaluated as part of the assessment.

3. The comment is noted and a table of the site assessment scope will be included in the final report.

4. The comment is noted, the reference to Title 23 should have been included in the text.

5. The comment is noted, and we are aware that the landfill is regulated by the RWQCB pursuant to Order 97-11 (and addenda thereto). The reference to Title 23 should have been included in the text.

6. Although the detection limits were not provided in Table 2.10, they were presented on Figure 2.8. Table 2.10 will be revised to show the detection limits in the final report.

7. The specific section that includes the revised methodology to specifically address chemical analyses is section 4.13.4

8. The reference to five wells was an error. The number of proposed wells to be installed is four.

FIGURES:

1. Unconventional contour intervals were used on Figure 3.1 because the available data were insufficient to allow the use of a standard contour interval. The inconsistency noted in the vicinity of borings 19 and 20 will be amended in the final report.

If you have any questions regarding the status of the project, or if I can be of any further assistance, please call me at (858) 573-1208.

Respectfully,

Ray Purtee

Ray A. Purtee
Project Manager

RAP/gbm

Enclosure

c: Chris Gonaver, Assistant Environmental Services Director
Steven F. Fontana, Deputy Environmental Services Director
Sylvia Castillo, Senior Civil Engineer/Environmental Services/Protection Division
Mission Bay Technical Advisory Committee

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SCS ENGINEERS

September 29, 2004

Project Number: 01203520.00

Mr. Ray Purtee, P.E.
Project Manager
City of San Diego Environmental Services Division
9601 Ridgehaven Court, Suite 310
San Diego, California 92123-1636

RE: Review Draft Workplan for Mission Bay Landfill Project

Dear Mr. Purtee:

This letter is an attachment to the above-referenced document in order to address the request of the Regional Water Quality Control Board (RWQCB) that the workplan be signed according to the California Business and Professions Code. The above-referenced document, dated March 4, 2004, was prepared under my responsible charge as acknowledged by my signature below.

SCS Engineers incorporated the comments made by various individuals and organizations into a document entitled *Workplan Response Comments for Mission Bay Landfill Site Assessment* dated April 27, 2004. Please note that comments from the RWQCB and the Office of Environmental Health Hazard Assessment were received after the workplan comment period and thus were too late for incorporation in this document. The comments were subsequently addressed in individual letters from the City of San Diego.

If you have any questions regarding the workplan, or if I can be of any further assistance, please call me at (858) 571-5500.

Respectfully,
SCS Engineers

Jay Jones, Ph.D., R.G. (4106)
Senior Technical Manager

Enclosure

Office of Environmental Health Hazard Assessment

Joan E. Denton, Ph.D., Director
Headquarters • 1001 I Street • Sacramento, California 95814
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Terry Tamminen
Agency Secretary

Arnold Schwarzenegger
Governor

TO: Mr. Brad Penick
California Integrated Waste Management Board
Remediation, Closure and Technical Services
P.O. Box 4025
Sacramento, California 95812

VIA: Jim C. Carlisle, DVM, Senior Toxicologist
Integrated Risk Assessment Section

FROM: Charles B. Salocks, PhD, DABT, Staff Toxicologist
Integrated Risk Assessment Section

DATE: May 14, 2004

SUBJECT: Review of the Draft Work Plan for Mission Bay Site Assessment, San Diego
Work Order # IWM-C0167-05

Background

The document, "Review Draft Workplan for Mission Bay Landfill Site Assessment, City of San Diego" was prepared by SCS Engineers and dated March 4, 2004. This document was reviewed by Office of Environmental Health Hazard Assessment (OEHHA) under an agreement with the Integrated Waste Management Board, dated March 31, 2004.

General Comments

Many of the comments discussed below address concerns with the proposed methods of sample collection and analysis. These methods must be scientifically defensible and consistent with current state and federal guidelines for environmental investigations, because the data derived from this investigation will provide the foundation for assessing potential risks to human health and the environment. These considerations are an essential element in the process of identifying the most appropriate methods for characterizing the nature and extent of contamination at this site. In this regard, adoption of investigative methods that are appropriate for current and former landfills has the potential to underestimate potential health risks by (1) not identifying all contaminants present at the site, (2) under representing the true environmental concentrations of contaminants, and (3) not providing information sufficient to delineate contaminant source areas and hot spots.

The work plan lacks details on the methods and assumptions that will be used to evaluate potential human health risks. In particular, the descriptions of potentially exposed populations

and exposure scenarios are minimal. This information would be useful because it could affect the scope of the investigation, the environmental media that are evaluated, and the types of analyses that are performed.

Purpose and Scope of the Investigation

The purpose of this investigation must be clearly stated. The work plan suggests that this investigation is being conducted primarily to determine whether contaminants originating from the landfill pose a significant hazard to human health and the environment. Therefore, the apparent goal of the investigation is to characterize the landfill and the environmental media (soil, sediment, air, groundwater and surface water) that may have been impacted by contaminants originating from the landfill.

Investigation of the imported soil that was used to construct the landfill cover should be regarded as a separate and unrelated investigation. Such an investigation may indeed be worthwhile, based on site history, but it is unrelated to the landfill investigation. Surface soil apparently originated from several different locations and, if contaminated at all, probably had a different range of contaminants. Therefore, cover soil should be regarded as a potential second source of contaminants that is unrelated to the landfill.

At present, there is no basis for concluding that soil that was used to cover the landfill was different from the soil that was used to build up the islands and shoreline elsewhere in Mission Bay. Therefore, if contaminants were identified in the cover soil, it would be reasonable to conclude that the same contaminants may be present elsewhere in Mission Bay Park. Such a finding would have the potential to expand the scope of this investigation considerably.

Background Samples

Review of the history of waste disposal activities (including trenching), subsequent dredging of shallow sediments and importation of soil from unidentified locations for development of Mission Bay Park clearly indicates that the former landfill site is highly disturbed and composed of uncharacterized soils from a variety of locations. For this reason, determination of site-specific background concentrations of metals in soil and groundwater is problematic. Nevertheless, to assess the *relative* hazard of soil and groundwater at the landfill, background concentrations of metals should be determined in soil and groundwater samples collected from nearby locations that have not been extensively disturbed by construction and excavation activities.

Sample Collection Procedures

1. Volatile Organic Compounds (VOCs) in Subsurface Soil

It is well documented that the concentration of volatile organic compounds (VOCs) in soil samples declines significantly during sample collection, storage and transit prior to analysis. This problem is particularly acute for extremely volatile VOCs such as vinyl chloride, a known human carcinogen that is frequently detected in landfills.

Sections 4.7.1 and 4.7.2 of the work plan describe procedures for collection of subsurface soil samples. Boring samples are to be driven into clear acetate sleeves, and the ends of the

sleeves covered with Teflon sheeting and tightly closed with end caps. This procedure is no longer regarded as state-of-the-art because it does not prevent loss of VOCs.

To prevent loss of VOCs from soil samples, the preferred method is collect sub-samples of drilling cores using EnCore™ samplers. Use of the EnCore™ sampler is described in USEPA Method 5035A [Closed System Purge-and-Trap and Extraction for Volatile Organics in Soil and Waste Samples" (July, 2002)] and in the Hazardous Materials Laboratory's Standard Operating Procedure 732-S (July, 1998). The holding time for samples retained in EnCore samplers is 48 hours.

2. Landfill Gases

Section 4.5.1 of the work plan proposes collection of "raw" landfill gas samples in accordance with Tier 2 sampling and analysis techniques prescribed by U.S. EPA as part of the new source performance standards for municipal solid waste landfills. The validity of applying these guidelines to a landfill that has been closed for over 45 years is debatable. In particular, the proposal to composite five landfill gas samples into one canister will not provide data that can be used to define the boundaries of the former landfill or identify contamination "hot spots." Nevertheless, if SCS proceeds to composite landfill gas samples in accordance with the work plan, human health risks should be calculated by assuming that the source concentration of each VOC identified is five times the highest concentration detected in each composite sample. This recommendation is based on the possibility that all contaminants detected in the composite sample were collected from a single location, and were diluted with samples from four other locations that had no detectable contaminants.

Section 4.5.1.1 suggests that sample canisters may be composed of stainless steel or aluminum. U.S. EPA method TO-14A ("Determination of Volatile Organic Compounds (VOCs) in Ambient Air Using Specially Prepared Canisters with Subsequent Analysis by Gas Chromatography") specifies stainless steel canisters only. Therefore, all landfill gas samples should be collected in SUMMA® passivated stainless steel canisters.

3. Near-Surface Soil Vapor

Section 4.5.2 indicates that near-surface soil vapor samples will also be composited, with five samples collected in a single 6-liter SUMMA canister. As discussed above, important information regarding the landfill boundary and potential presence of contamination hot spots is lost when samples are composited. If these data are used for estimation of potential human health risk, the highest concentration of each detected contaminant should be multiplied by five to estimate exposure point concentrations.

4. Surface Soil

Section 4.7.3 describes procedures to be used for collection of surface soil samples. As noted above, surface soil was not obtained from the landfill, and the detection of significant concentrations of contaminants in surfaces soil would have the potential to expand the scope of this investigation considerably. For this reason, OEHHA does not recommend collection of surface soil samples.

However, if surface soil samples are collected, they should not be composited. "Homogenizing" samples in the field in a plastic baggie (page 78) is not effective and is inappropriate.

5. Groundwater

Section 4.13.4 indicates that groundwater samples will be filtered using a 0.45-micron filter prior to analysis. Exclusive analysis of filtered samples inconsistent with U.S. EPA guidelines [*Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A* (1989); p. 4-12] because certain classes of persistent contaminants (e.g., PCBs) have a strong tendency to become adsorbed onto very fine particles. For this reason, groundwater samples should be analyzed *before and after* filtration.

6. Surface Flux of VOCs

Collection of surface flux samples using the procedures described in this work plan does not appear to be warranted for the following reasons:

- Section 5.4.5 indicates that surface flux of volatile gas emission will be determined "to assess the integrity of the landfill cover as an effective gas migration barrier." A review of the history of this site provides no indication that an engineered cover was ever installed over the landfill (Section 3.2.1). Therefore, the soil covering the landfill assuredly does *not* provide an effective barrier to upward gas migration.

- The ultimate use of surface flux data is not clear. No structures have been constructed over the landfill, and VOCs emitted from the surface will be rapidly diluted with ambient air. There are no potentially exposed populations residing on or near the landfill, so exposure point concentrations and consequent heath risks are likely to be exceedingly low.

- Surface flux samples collected in accordance with SCAQMD Rule 1150.1 are subject to dilution with ambient air because the collection funnel is under negative pressure. (This difficulty does not arise with surface isolation flux chambers because samples are collected under slight positive pressure.)

<u>Analytical Methods</u>

1. Total and Hexavalent Chromium

Soil and sediment samples should be analyzed for hexavalent chromium as well as total chromium. Samples should be processed in accordance with U.S. EPA method 3060A ("Alkaline Digestion for Hexavalent Chromium"), and alkaline digests should be analyzed using U.S. EPA method 7199 ("Determination of Hexavalent Chromium in Drinking Water, Groundwater and Industrial Wastewater Effluents by Ion Chromatography").

2. Analysis of VOCs

Section 4.5.1.3 indicates that U.S. EPA method TO-14 will be used for analysis of all hazardous air pollutants (HAPs). This statement is incorrect because there are 189 HAPs but the documentation for method TO-14 identifies just 40 target analytes.

For analysis of VOCs, U.S. EPA method TO-15 has several advantages over TO-14; the primary advantage is that TO-15 is capable of detecting 97 VOCs. Additionally, method TO-15 specifies gas chromatography/mass spectrometry (GC/MS) as the exclusive detection method. GC/MS is more scientifically defensible than older, more conventional detection methods. Furthermore, method TO-15 incorporates a multisorbent/dry purge technique for water management, a procedure that may be particularly important for accurately quantifying water-soluble VOCs. For these reasons, Method TO-15 is the preferred analytical methods for analysis of VOCs.

3. Analysis of Breakdown Products of Chlorinated Solvents

Under anaerobic conditions that typically exist at landfills, chlorinated solvents undergo reductive dehalogenation. Intermediate compounds that may be produced include 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethylene (1,1-DCE), *cis*- and *trans*-1,2-dichloroethylene (*cis*- and *trans*-1,2-DCE), and vinyl chloride (VC). All of these compounds possess high volatility and, in our experience, may not be quantified during standard GC/MS analysis *unless the analyst is specifically informed that these compounds are of interest.* Therefore, it is imperative that the laboratory that will be analyzing soil samples is provided with this information.

Human Health Risk Assessment

1. Potentially Exposed Populations

The human health risk assessment work plan (Section 6.3) does not discuss potentially exposed populations. Figure 3.3 ("Site Conceptual Model Diagram; Potentially Complete Contaminant Exposure Pathways and Receptors") indicates that a "recreational" exposure scenario and a "short-term construction and maintenance worker" scenario will be evaluated, but justifications for these choices are not provided. Where are the nearest residential human populations, and how far are they from the landfill? Will employees of nearby businesses (Sea World, for example) be evaluated in this analysis? A thorough evaluation of potentially exposed populations should be included in the work plan, along with justification for selecting one or more of these populations for evaluation in the health risk assessment.

2. Exposure parameters

Exposure parameter values are directly related to the magnitude of health risk estimates and must be justified. Parameter values should be based on U.S. EPA and California EPA guidelines for exposure assessment, e.g., *Exposure Factors Handbook* (U.S. EPA, 1997) and *Air Toxics Hot Spots Program Risk Assessment Guidelines, Part IV, Technical Support Document for Exposure Assessment and Stochastic Analysis* (California EPA, 2000).

Thank you for the opportunity to comment on this document. If you have any questions or comments, please call me at (916) 323-2605.

October 12, 2004

Mr. Brad Penick
California Integrated Waste Management Board
Remediation, Closure, and Technical Services
P.O. Box 4025
Sacramento, California 95812

Subject: Response to Comments on the Site Assessment Work Plan for Mission Bay Landfill

Dear Mr. Penick:

The City of San Diego is pleased to respond to the memo from OEHHA dated May 14, 2004, and addressed to your office regarding your review of the Draft Mission Bay Landfill Site Assessment Work Plan. The City's consultant for this project, SCS Engineers, has prepared the work plan, is presently conducting the field work, and will prepare the final report. The following response was prepared by the City's consultant, SCS Engineers.

General Comments

We appreciate your comments regarding the proposed methods of sampling and analysis, and agree that they are of great importance. We have attempted to address your specific concerns in the following paragraphs.

Regarding the potentially exposed populations and exposure scenarios that will be covered in the human health risk assessment, we will endeavor to address these by analyzing exposure pathways as discussed in Section 6.3.3.

Purpose and Scope of the Investigation

It is our understanding from historical research that the soil used to cover the landfill was dredged from Mission Bay during the construction of Mission Bay Park. Although this soil was not part of the landfill contents, it does potentially represent a human health risk as contaminants have been detected in the bay sediments and these soils may now be exposed at the surface and, therefore, may have a complete exposure pathway. We respectfully disagree with your assertion that the cover soils should be assessed in a separate investigation because we feel that the cover soils are an integral part of the landfill. This assessment was designed to assess the site as a whole, rather than separate sources within it, and the scope is limited to the Mission Bay Landfill site.

DIVERSITY
ADS US ALL TOGETHER

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collect samples to analyze background concentrations of metals. It is our intention to compare the metals concentrations in soils and groundwater to the applicable or relevant and appropriate requirements (ARARs).

Sample Collection Procedures

1. EnCore samplers were used for the collection of soil and sediment samples to be analyzed for volatile organic compounds (VOCs).

2. The sampling method proposed for the landfill gases is a field tested and commonly used method. The individual samples were field screened for methane and hydrogen sulfide. Samples will be appropriately weighted in the risk assessment. All landfill gas samples were collected in SUMMA passivated stainless steel canisters.

3. See #2.

4. As discussed in the Purpose and Scope section above, we consider that collection of surface soil samples is the conservative approach to conducting the human health risk assessment for the landfill. Surface soil samples were not composite for analysis.

5. The existing scope and budget for this assessment does not allow for analysis of groundwater before and after filtration. The monitoring wells are part of a permanent network and, if the assessment indicates that there is a need for analysis of samples prior to filtration, this could be performed at a future date in the monitoring program.

6. Surface flux samples have been collected to be conservative in our approach. Even though the cover soils are not an engineered cap, they are the cover that is present. Therefore, it is our intention to assess the risk that exists in the current situation.

Analytical Methods

1. A subset of soil samples from borings, all surface soil and sediment samples, and all groundwater samples have been or will be analyzed for hexavalent chromium.

2. Method TO-15 was used for the VOC analysis in the landfill gas samples.

3. The analytical laboratory was notified by electronic mail and by telephone to be aware of the possible presence of chlorinated solvents and their breakdown products in soil samples.

2. Exposure parameter values will be based on U.S.EPA and California EPA guidelines for exposure assessment.

If you have any questions regarding the status of the project, or if I can be of any further assistance, please call me at (858) 573-1208.

Respectfully,

Ray Purtee

Ray A. Purtee
Project Manager

RAP/gbm

cc: Chris Gonaver, Assistant Environmental Services Director
Steven F. Fontana, Deputy Environmental Services Director
Sylvia Castillo, Senior Civil Engineer, Protection Division
Mission Bay Technical Advisory Committee

Office of Environmental Health Hazard Assessment

Joan E. Denton, Ph.D., Director
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Mailing Address: P.O. Box 4010 • Sacramento, California 95812-4010
Oakland Office • Mailing Address: 1515 Clay Street, 16th Floor • Oakland, California 94612

Terry Tamminen
Agency Secretary

Arnold Schwarzenegger
Governor

MEMORANDUM

TO: Mr. Brad Penick
California Integrated Waste Management Board
Remediation, Closure and Technical Services
P.O. Box 4025
Sacramento, California 95812

VIA: Jim C. Carlisle, DVM, Senior Toxicologist
Integrated Risk Assessment Section

FROM: Charles B. Salocks, PhD, DABT, Staff Toxicologist
Integrated Risk Assessment Section

DATE: November 17, 2004

SUBJECT: RESPONSE TO COMMENTS RECEIVED FROM THE CITY OF SAN DIEGO AND SCS ENGINEERS REGARDING A REVIEW CONDUCTED BY THE OFFICE OF ENVIRONMENTAL HEALTH HAZARD ASSESSMENT ON THE DRAFT WORK PLAN FOR MISSION BAY LANDFILL SITE ASSESSMENT
Work Order # IWM-C0167-05

Background

The document, "Review Draft Workplan for Mission Bay Landfill Site Assessment, City of San Diego" was prepared by SCS Engineers and dated March 4, 2004. Under an agreement with the California Integrated Waste Management Board (CIWMB), the Office of Environmental Health Hazard Assessment (OEHHA) conducted a technical review of this document. Comments from OEHHA were summarized in a May 14 memo to Mr. Brad Penick of CIWMB.

On October 14, 2004, OEHHA received a facsimile of a letter from the City of San Diego to the California Integrated Waste Management Board detailing the City's responses to our comments on the landfill site assessment workplan. These comments were prepared by the City's consultant, SCS Engineers. This memo summarizes the responses of OEHHA to these comments.

Evaluation of Contaminants in Surface Soil

OEHHA recognizes that the *present* scope of the investigation is limited to the Mission Bay Landfill site. However, as noted in our previous memo, the detection of contaminants in surface soil, which was imported and apparently did not originate from the landfill, would have the potential to expand the scope of the investigation.

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Since the same source of soil was used to construct islands and build up shoreline elsewhere in Mission Bay Park, it would be reasonable to expect that soil containing the same contaminants is also present elsewhere in the park.

Data Quality Objectives

During development of a site investigation work plan, it is essential that the parties involved identify their research objectives, identify the data needs to address these objectives, plan how the data will be interpreted, and attempt to anticipate whether the data will be adequate to support future decisions. Recognizing this, the U.S. EPA has developed procedures for identifying data quality objectives (DQOs) early in the planning process (see *Guidance for the Data Quality Objectives Process*, U.S. EPA Office of Research and Development, September 1994). DQOs are qualitative and quantitative statements developed to ensure that the data obtained during a site investigation are adequate to support future decisions. OEHHA recommends that these guidelines be taken into consideration in the future when plans for the acquisition of additional data are made.

Collection of Background Soil Samples for Analysis of Metals

Background samples are collected to distinguish between naturally occurring concentrations of metals and concentrations arising as a result of human activities (in this case, waste disposal). Since the background soil concentrations of some metals (particularly arsenic) often exceed their respective Preliminary Remediation Goals, the determination of site-specific background concentrations of metals is essential to appropriately evaluate the significance of metals concentrations detected in soil samples collected from the landfill.

Aerial photographs of Mission Bay Park taken from 1958-1961 indicate that the elevation of land directly north of the landfill (i.e., the present location of the southeastern portion of Fiesta Island) was similar to that of the landfill. Therefore, soil samples collected from the southeastern portion of Fiesta Island, at the same elevation as the landfill, are likely to contain background concentrations of metals. That is, samples collected from this area probably represent the composition of soils present in the South Shores area of Mission Bay prior to development of the landfill. OEHHA recommends that at least seven such samples be collected from this area to identify background concentrations of metals. A qualified geologist should be consulted to confirm that the samples from Fiesta Island have been collected from strata similar to the landfill samples with which they will be compared.

Evaluation of Metals Data by Comparison with ARARs

The proposal to compare concentrations of contaminants detected in soil and ground water with applicable or relevant and appropriate requirements ("ARARs") is inconsistent with the objective of establishing remedial objectives on the basis of a health risk assessment. ARARs and to-be considered standards ("TBCs") do not take into consideration the cumulative impacts of simultaneous exposure to multiple contaminants. In addition, ARARs such as MCLs are

based in part on economic and technical considerations, and applicability of these considerations in evaluating the need for remediation at a former landfill is dubious.

Applicability of Sampling Strategies Developed for Municipal Solid Waste Landfills

The proposed sampling methods may be field tested and commonly used, but they were developed to determine the need for controls on emissions of methane and non-methane organic gases from recently constructed or recently operated municipal solid waste (MSW) landfills. As far as OEHHA can determine, the Mission Bay Landfill site does not meet the criteria specified for implementation of New Source Performance Standards (NSPS) or Emission Guidelines (EG) for MSW landfills (see *Municipal Solid Waste Landfills, Volume I: Summary of the Requirements for the New Source Performance Standards and Emission Guidelines for Municipal Solid Waste Landfills*, U.S. EPA Office of Air Quality Planning and Standards, February 1999). The sampling guidelines for MSW landfills were not developed to address the questions raised in this investigation, namely, what chemicals are present, how much is present, where are they located, and where are they going? OEHHA reiterates its concern that the data generated from composite samples may not be sufficient to delineate the boundaries of the landfill, contaminant source areas and contaminant hot spots.

Filtration of Groundwater Samples

As noted previously, exclusive analysis of filtered groundwater samples is inconsistent with U.S. EPA risk assessment guidelines [*Risk Assessment Guidance for Superfund, Volume I, Human Health Evaluation Manual, Part A* (1989); p. 4-12]. Since persistent pollutants such as DDT and PCBs can migrate in groundwater while adsorbed to fine particles, analytical data from unfiltered samples would be useful in evaluating the fate and transport of contaminants originating from the landfill. In this regard, OEHHA notes that one of the stated goals of the workplan was "Determine the fate and transport of COPC that may have been disposed of during the active life of the Mission Bay Landfill." While analysis of unfiltered samples may not have been included in the original budget for this project, the additional information provided may well be worth the additional cost.

Analysis of Hexavalent Chromium

To clarify our earlier recommendation, soil samples should be analyzed for hexavalent chromium using U.S. EPA method 7199 ("Determination of Hexavalent Chromium in Drinking Water, Groundwater and Industrial Wastewater Effluents by Ion Chromatography"). In our experience, method 7196A, a colorimetric method, does not generate reliable data and should not be used.

Thank you for the opportunity to comment once again on the workplan for investigation of the Mission Bay Landfill site. If you have any questions or comments, please call me at (916) 323-2605.

THE CITY OF SAN DIEGO

February 17, 2005

Mr. Brad Penick
California Integrated Waste Management Board
Remediation, Closure, and Technical Services
P.O. Box 4025
Sacramento, CA 95812

Dear Mr. Penick:

Subject: Response to memorandum dated November 17, 2004, regarding City of San Diego's response to comments on the Site Assessment Workplan for Mission Bay Landfill

The City of San Diego is pleased to respond to the memo from OEHHA dated November 17, 2004, and addressed to your office regarding your review of the Draft Mission Bay Landfill Site Assessment Workplan. The following response was prepared by the City's consultant for this project, SCS Engineers.

Evaluation of Contaminants in Surface Soil

Your comment is acknowledged.

Data Quality Objectives (DQOs)

The project objectives, data requirements, and adequacy of the data for the human health and ecological risk assessment were evaluated during the preparation of the workplan. This evaluation resulted in the development of a sampling program that would provide data to support the human health and ecological risk assessment. Although a formal DQO process was not followed a functionally equivalent process was conducted.

Collection of Background Samples for Analysis of Metals

Review of geological and historical data from the area indicates that the southeastern portion of Fiesta Island would not be comparable to many of the soils in the landfill area even though they were placed as fill at approximately the same elevation at one time. The islands were created with sandy levees infilled with muds and then capped with cleaner sands. Although most of the sediments came from the Mission Bay area, there is considerable variability within the bay both

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in lithology and geochemistry. In addition the landfill was later capped with additional dredged sediments, which likely originated from periodic dredging efforts to maintain the Mission Bay entrance channel and from minor grading operations within the Park associated with development.

Therefore, we cannot agree with your statement that Fiesta Island represents a comparable geochemical environment. For these reasons, we have concluded that it is impossible to ascertain, with any degree of certainty, an appropriate location for true background soil samples. In lieu of local background soil samples we therefore propose to use the California background soils data reported in Background Concentrations of Trace and Major Elements in California Soils (Bradford et al., 1996). Background soils data collected from a location closest to Mission Bay will be used. To the extent that details regarding sample names, locations and distance from Mission Bay are available in the document, they will be provided in the report.

Evaluation of Metals Data by Comparison with ARARs

Metals data will be screened by comparison to background soils data reported in Bradford et al. (1996) as described above.

Applicability of Landfill Gas Sampling Strategies

Composite gas samples will be adjusted for purposes of human health risk assessment by assuming the source concentration of each detected VOC identified is five (or the actual number of samples in the appropriate composite sample) times the highest concentration detected in each composite sample. This protocol has been agreed with OEHHA at other sites and is an example of using our best professional judgment to come up with a reasonable method to utilize composite soil gas data.

Filtration of Groundwater Samples

Your comment is acknowledged. One of the groundwater samples was analyzed for total metals due to challenges with filtering of that sample, so there will be an opportunity to compare the unfiltered to nearby filtered samples. If analysis of unfiltered samples is considered desirable, it can be conducted in future sampling events.

Analysis of Hexavalent Chromium

Your comment is acknowledged. EPA Method 7199 was used for analysis of hexavalent chromium in the subset of soil samples from borings, all surface soil and sediment samples, and all groundwater samples.

If you have any questions regarding the status of the project, or if I can be of any further assistance, please call me at (858) 573-1208.

Respectfully,

Ray Purtee

Ray Purtee
Project Manager

cc: Chris Gonaver, Assistant Environmental Services Director
Steven F. Fontana, Deputy Environmental Services Director
Sylvia Castillo, Senior Civil Engineer, Protection Division
Mission Bay Technical Advisory Committee

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Alan C. Lloyd, Ph.D.
Agency Secretary

Arnold Schwarzenegger
Governor

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MEMORANDUM

TO: Mr. Brad Penick
California Integrated Waste Management Board
Remediation, Closure and Technical Services
P.O. Box 4025
Sacramento, California 95812

VIA: Jim C. Carlisle, DVM, Chief
Applied Risk Assessment Unit
Integrated Risk Assessment Section

FROM: Charles B. Salocks, Ph.D., DABT, Staff Toxicologist
Integrated Risk Assessment Section

DATE: March 28, 2005

SUBJECT: REVIEW OF RECENT CORRESPONDENCE REGARDING THE FORMER MISSION BAY LANDFILL, SAN DIEGO
Work Order # IWM-C0167-05

Background

For the past year, the Office of Environmental Health Hazard Assessment (OEHHA) has provided technical assistance to the California Integrated Waste Management Board (CIWMB) in the review of documentation pertaining to the investigation of the former Mission Bay landfill in San Diego. OEHHA provided comments on the document "Review Draft Workplan for Mission Bay Landfill Site Assessment, City of San Diego" in a letter dated May 14, 2004. This review elicited a response letter from the City of San Diego, and OEHHA prepared a second letter summarizing our comments to the City's response on November 17, 2004.

On February 14, 2005 OEHHA was asked by Rebecca Lafreniere of the San Diego Solid Waste Local Enforcement Agency to review the following documents:

1. A January 10, 2005 memorandum from Paul Damian, Risk Assessment Practice Leader, SCS Engineers, to Tessa McRae, Project Director, SCS Engineers, detailing key assumptions proposed for the human health risk assessment for the former Mission Bay landfill.

2. A February 17, 2005 letter from Ray Purtee, San Diego Environmental Services Department, to Brad Penick, California Integrated Waste Management Board, summarizing the City's responses to the November 17, 2004 letter from OEHHA regarding the work plan for the former Mission Bay landfill site investigation.

OEHHA's comments on these two documents are summarized below.

Response to Comments from Ray Purtee dated February 17, 2005

1. Background Samples

As OEHHA has noted previously, the identification of appropriate locations for collection of background samples for this site is problematic. However, the solution proposed by the City and SCS Engineers – to adopt as background the concentrations of metals reported by Branford et al. (1996) – is not reasonable. In the Branford study, samples were collected from three locations in the San Diego area. The *nearest* location is 9½ miles north of Mission Bay, near the intersection of Interstates 5 and 805. (The other two locations are 20-30 miles east of Mission Bay, near Jamul and Alpine.) It is extremely unlikely that metal concentrations detected in soil samples collected 9½ miles away represent ambient conditions at Mission Bay.

U.S. EPA risk assessment guidelines clearly stipulate, "Background samples are collected *at or near the hazardous waste site* in areas not influenced by site contamination" (U.S. EPA, 1989; italics added). The contamination of concern in this investigation is landfill waste. The local background concentrations of metals may indeed be variable as a result of historical dredging operations. This may make the determination of background concentration ranges more challenging. More samples than usual may need to be collected in order to obtain a statistically meaningful data set. Nevertheless, collection of samples outside the landfill boundary represents the most appropriate and scientifically defensible strategy for determining background concentrations of metals for this site.

Response to Memorandum from Paul Damian to Tessa McRae dated January 10, 2005

1. Receptor Populations and Exposure Pathways

The proposed populations of concern are adult and child recreational users of Mission Bay Park, and landfill or park maintenance personnel. The latter would presumably include utility workers who may be engaged in excavation, soil trenching, underground utility repair, and similar activities that may require direct contact with subsurface soil and/or shallow groundwater.

OEHHA does not agree with the narrow definition of a recreational user as a walker or bicyclist. Children are also allowed to use the park, and the activities of child recreational users potentially could lead to much more significant exposure to contaminated soil. Children also may come into contact with subsurface soil, although it would be reasonable to assume that the depth of a child's "excavation" would be no more than about 2 feet. Therefore, contact with, and ingestion of, subsurface soil should be included as exposure pathways in both scenarios. (The risk assessment work plan is somewhat contradictory in this regard. The discussion of exposure pathways on page 2 indicates that exposure to surface soil will be included in the analysis, but the approach proposed on the following page is to use soil from a depth range of 0-5 feet to calculate exposure point concentrations. OEHHA assumes latter process will be used for the health risk assessment.)

An evaluation of two hypothetically exposed populations will be useful in terms of making remedial decisions about this site. However, given the high profile of this investigation, it would also be useful to estimate the potential exposure of populations actually living or working in the vicinity of the site, even if their exposures are below those of the two hypothetical populations. For example, it would be reasonable to evaluate the exposure – via inhalation of VOCs and wind-blown dust in outdoor air – of Sea World employees. Sea World is immediately adjacent to the former landfill, and employees could potentially be exposed for 40 hours per week for many years. For similar reasons, the exposure estimates for the nearest downwind residential population should also be calculated.

2. Selection of Chemicals of Potential Concern - Organics

Using a 5% detection frequency as a criterion for excluding an organic chemical as a COPC (chemical of potential concern) is only appropriate when a relatively large number of samples have been analyzed and a spatial analysis shows that the "hits" are not clustered. For example, if the 5% criterion were applied blindly in a case where just 20 samples had been analyzed, the detection of a particular contaminant in one sample would justify eliminating the contaminant as a COPC. However, an alternative conclusion would be that the single detection indicates the presence of a contaminant hot spot, and additional sampling would be needed to determine whether or not this is the case. Therefore, OEHHA recommends that a low detection frequency not be used the sole basis for eliminating a chemical as a COPC. Other considerations – such as a history of use of a chemical at the site and geographic clustering of detection "hits" as discussed above – should also be considered in making this decision.

Regarding the proposal to eliminate a chemical because it was also detected in blank samples, an important qualifier is that the comparison must be to the specific blank samples that were prepared for the set of site samples being analyzed. Comparison to a generic list of common laboratory contaminants is not appropriate.

3. Selection of Chemicals of Potential Concern – Inorganics

The "comparison method" for identifying a metal as a COPC is appropriate and consistent with regulatory guidelines. As an adjunct to the comparison test, OEHHA recommends the Wilcoxon rank sum test in place of Cochran's t-test. Use of the Wilcoxon rank sum test is consistent with 1997 guidelines published by the Department of Toxic Substances Control (DTSC). As discussed above, site-specific background samples should be collected and analyzed to determine the distributions of ambient concentrations of metals.

4. Exposure Parameters Values

The risk assessment work plan correctly notes that standardized exposure parameters for a recreational scenario are not available. However, the parameter values proposed for use in the risk assessment are not consistent with those recently approved by DTSC for the Lava Cap Mine Superfund site. Lava Cap Mine has several characteristics in common with Mission Bay Park, and the exposure scenarios developed for it are similar to those that Mr. Damian has proposed for Mission Bay Park. For Lava Cap Mine, exposure estimates were developed for Recreation 1 (toddlers), Recreation 2 (school age children) and Short-term Construction Worker scenarios. Parameter values for these scenarios are summarized in the table attached to this memo. OEHHA added an estimate of the duration of each visit to the park, based on data presented in Table 15-110 of the Exposure Factors Handbook (U.S. EPA, 1999). Three hours is approximately equivalent to the 50th percentile value for the amount of time children 11 years of age and younger spend outdoors at a pool, river or lake. OEHHA recommends that the values presented in Table 1 be used for the health risk assessment for the Mission Bay landfill.

Soil ingestion is episodic, not continuous, and exposure via this route is situation-dependent. For example, no soil ingestion occurs when one is bathing, but a great deal may occur during activities such as gardening. For the recreational scenario, it is reasonable to assume that all the soil ingestion that occurs in a day occurs during the time spent at the park. Therefore, incidental soil ingestion rates should not be reduced by a factor that accounts for the relative amount of time spent at the park. For the same reason, it should also be assumed that all dermal contact with soil occurs during the time spent at the park.

The proposal to apportion inhalation rates to account for the relative amount of time spent at the park is reasonable. However, while a one-hour duration may be appropriate for a visit by a jogger or bicyclist, it is not appropriate for a toddler or a school-age child. As noted above, OEHHA recommends that each visit to the park should be assumed to last three hours. Therefore, the estimate of the amount of air inhaled during each visit to the park should be based on an assumed duration of three hours.

The recommended value for soil adherence to the skin of children (3 mg/cm^2) is based on research by Holmes et al. (1999) and Kissel et al. (1996). As discussed above, this recommendation is consistent with the parameter value approved by DTSC for use at Lava Cap Mine.

Thank you for the opportunity to comment on this document. If you have any questions or comments, please call me at (916) 323-2605.

cc: Rebecca Lafreniere, REHS
City of San Diego
Solid Waste Local Enforcement Agency
1010 Second Avenue, Suite 600, MS 606L
San Diego, California 92101-4998

References

California Environmental Protection Agency (1997). *Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities, Final Policy.* Department of Toxic Substances Control, Human and Ecological Risk Division, Sacramento, CA.

Holmes, K.K., Shirai, J.H., Richter, K.Y., and Kissel, J.C. (1999). Field measurement of dermal soil loadings in occupational and recreational activities. *Environmental Res. Sect. A* **80**: 148-157.

Kissel, J.C., Richter, K.Y., and Fenske, R.A. (1996). Field measurements of dermal soil loading attributable to various activities: Implication for exposure assessment. *Risk Analysis* **16**: 115-125.

United States Environmental Protection Agency (1989). *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual, (Part A), Interim Final.* Office of Emergency and Remedial Response, Washington, DC.

United States Environmental Protection Agency (1999). *Exposure Factors Handbook (EFH).* Office of Research and Development, Washington, DC.

Table 1. Recommended Exposure Parameter Values for Mission Bay Park Exposure Scenarios

	Recreation 1 (Toddlers)	Recreation 2 (School Age)	Short-Term Construction Worker
Exposure Frequency (days/year)	104	104	250
Duration of Each Visit (hours)	3	3	8
Exposure Duration (years)	6	6	1
Body Weight (kg)	15	33	70
Soil Ingestion (mg/day)	200	100	480
Exposed Skin Surface Area (cm^2)	2800	4300	5700
Soil Adherence to Skin (mg/cm^2)	3	3	0.8
Inhalation Rate (m^3/day)	10	10	20