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UNITED STATES
ENVIRONMENTAL PROTECTION AGENCY
REGION IX

IN THE MATTER OF:

CASMALIA RESOURCES HAZARDOUS WASTE MANAGEMENT FACILITY
Santa Barbara County, California

Respondents

American Environmental Management Corporation;
Calwest Galvanizing Co.;
Continental Airlines;
Crosby and Overton, Inc.;
Davis Walker Corporation;
Gillette Company;
Haz-Control/South Bay Chemical;
K.M.S., Inc.;
Operating Industries, Inc.;
Plessey Precision Metals;
Safety Specialists, Inc.;
U.S. Pipe and Foundry, Co.

UNILATERAL ADMINISTRATIVE ORDER FOR REMOVAL RESPONSE ACTIVITIES

U.S. EPA Region IX
CERCLA
Docket No. 96-04

Proceeding Under Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act, as amended, 42 U.S.C. §9606(a)

02-0015941

I. JURISDICTION AND GENERAL PROVISIONS

1. This Unilateral Administrative Order is issued to AMERICAN ENVIRONMENTAL MANAGEMENT CORPORATION; CALWEST GALVANIZING CO.; CONTINENTAL AIRLINES; CROSBY AND OVERTON, INC.; DAVIS WALKER CORPORATION; GILLETTE COMPANY; HAZ-CONTROL/SOUTH BAY CHEMICAL; K.M.S., INC.; OPERATING INDUSTRIES, INC.; PLESSEY PRECISION METALS; SAFETY SPECIALISTS, INC.; U.S. PIPE AND FOUNDRY, CO. (collectively referred to herein as "Respondents") pursuant to the authority vested in the President of the United States by Section 106(a) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. § 9606(a), as amended ("CERCLA"), and delegated to the Administrator of the United States Environmental Protection Agency ("EPA") by Executive Order No. 12580, January 23, 1987, 52 Federal Register 2923. This authority was further delegated to the Regional Administrators by EPA Delegation No. 14-14-C, and was further delegated to the Director of the Hazardous Waste Management Division, Region IX, by Region IX Delegations 1290.41 and 1290.42.

2. As set forth herein, this Order requires Respondents to transport, treat, and dispose of, or arrange for the transport, treatment, and disposal of contaminated liquids collected from Sump 9B and the Gallery Well at the Casmalia Resources Hazardous Waste Management Facility ("Casmalia," "Casmalia Site," or "Site").

3. On November 15, 1995, prior to the issuance of this Order, EPA notified the Office of the Attorney General for the State of California and the State of California Department of Toxic Substances Control that EPA would be issuing this Order pursuant to Section 106(a) of CERCLA, 42 U.S.C. § 9606(a).

II. PARTIES BOUND

4. This Order applies to and is binding upon Respondents and Respondents' directors, officers, employees, agents, receivers, successors, and assigns. Any change in ownership or corporate transfer of assets or real or personal property shall in no way alter Respondents' responsibilities under this Order. Respondents are jointly and severally liable for carrying out all activities required by this Order. Compliance or noncompliance by one or more Respondents with any provision of this Order shall not excuse or justify noncompliance by any other Respondent.

5. Respondents shall ensure that their contractor(s), subcontractor(s), and representative(s) receive a copy of this Order and comply with this Order. Respondents shall be responsible for any noncompliance with this Order.

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III. FINDINGS OF FACT

6. The Casmalia Site is located on approximately 252 acres in northern Santa Barbara County, near the small, unincorporated community of Casmalia. From approximately 1973 to 1989, the Site operated as a hazardous waste treatment, storage, and disposal facility. Billions of pounds of industrial and commercial solid and liquid hazardous wastes were disposed of at the Site during its operation.

7. Hazardous waste management units at the Site include or have included: landfills, surface impoundments, shallow injection wells, waste spreading areas, trenches, and a liquid waste neutralization system. The facility owner/operator(s), Casmalia Resources, Hunter Resources, and Kenneth Hunter Jr., attempted unsuccessfully to obtain a final operating permit under the Resource Conservation and Recovery Act, as amended. The facility ceased operation in 1989, and has not been closed in accordance with state and federal requirements pertaining to the closure of hazardous waste facilities.

8. There have been and continue to be actual and threatened releases of hazardous substances from the Site posing threats to human health and the environment. Releases and threatened releases of hazardous substances from the Site include a wide variety of organic and inorganic compounds, and metals, including, but not limited to those listed in Attachment 1. These hazardous substances have been, are being, and/or threaten to be released from the Site into the soil, groundwater, and/or air.

9. Sump 9B and the Gallery Well are two extraction wells located downgradient of the Pesticides/Solvents Landfill. See diagram in Attachment 1. Contaminated liquids collected from these wells contain high concentrations of organic and inorganic compounds, and metals. Contaminants found in contaminated liquids extracted from Sump 9B and the Gallery Well at the Site include, but are not limited to those listed in Attachment 1.

10. On July 21, 1992, EPA signed an Action Memorandum, under CERCLA Section 104, to undertake removal actions in response to actual and threatened releases of hazardous substances from the Site. The Action Memorandum has been amended by documents dated February 24, 1993 and March 21, 1995.

11. As part of the ongoing EPA removal action, contaminated liquids are currently pumped from Sump 9B and the Gallery Well to reduce the potential for further subsurface migration of contaminants into and through the groundwater and to prevent the contaminants from these wells from reaching the surface and potentially contaminating surface soils, surface waters, and the air. Last winter's heavy rains substantially increased the

volume of contaminated liquids extracted from Sump 9B and the Gallery Well, and another winter of heavy rains may cause hazardous substances to migrate or be released unless extraction, treatment, and disposal rates can be maintained and/or increased. Contaminated liquids, once extracted, are temporarily stored in tanks at the Site and later transported off-site for permanent treatment and disposal.

12. Continued hauling and proper treatment and disposal of the contaminated liquids extracted from Sump 9B and the Gallery Well are necessary to control and/or prevent the occurrence of contaminated seeps and surface flows, to diminish the possibility of public exposure to hazardous substances from the Site, and to reduce the opportunity for hazardous substances to migrate into and through the groundwater.

13. The conditions at the Site pose a potential risk to the nearby residents of Casmalia and the surrounding population and environment. The substances included in Attachment 1 are toxic and/or carcinogenic to animals and/or humans.

14. Each of the Respondents arranged for the disposal and treatment of, or arranged with a transporter for disposal or treatment of, hazardous substances owned or possessed by each Respondent.

IV. CONCLUSIONS OF LAW AND DETERMINATIONS

15. The Casmalia Site is a "facility" as defined in Section 101(9) of CERCLA, 42 U.S.C. § 9601(9).

16. Each Respondent is a "person" as defined in Section 101(21) of CERCLA, 42 U.S.C. 9601(21).

17. Each Respondent is a "liable party" as defined in Section 107(a) of CERCLA, 42 U.S.C. § 9606(a).

18. The substances listed in Attachment 1 are found at the Site and are "hazardous substances" as defined in Section 101(14) of CERCLA, 42 U.S.C. § 9601(14).

19. The past disposal at and migration of hazardous substances from the facility into the environment are a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

20. The potential for future migration of hazardous substances from the facility into the environment poses a threat of a "release" as defined in Section 101(22) of CERCLA, 42 U.S.C. § 9601(22).

21. Conditions present at and associated with the facility constitute an imminent and substantial endangerment to public

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health, welfare, and the environment, and the release and/or threat of release of one or more hazardous substances from the facility, if not controlled, may present an imminent and substantial endangerment to the public health or welfare or the environment.

22. The contamination and endangerment at this facility constitute an indivisible injury. The actions required by this Order are necessary to protect the public health, welfare, and the environment, and are not inconsistent with the NCP and CERCLA.

V. ORDER

23. Based on the foregoing, Respondents are hereby ordered, jointly and severally, to comply with the following provisions, including but not limited to all attachments to this Order, all documents incorporated by reference into this Order, and all schedules and deadlines in this Order, attached to this Order, or incorporated by reference into this Order.

VI. DEFINITIONS

24. Unless otherwise expressly provided herein, terms used in this Order which are defined in the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, U.S.C. §§ 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986, Pub. L. No. 99-499, 100 stat. 1613 (1986) ("CERCLA") or in the Solid Waste Disposal Act, as amended 42 U.S.C. §§6901 et seq., (also known as the Resource Conservation and Recovery Act, "RCRA") or in regulations promulgated under CERCLA or RCRA shall have the meaning assigned to them in CERCLA, RCRA, or in such regulations.

VII. WORK TO BE PERFORMED

25. Between the Effective Date of this Order and termination date of the Work as specified by EPA under this Order, Respondents shall perform, at their expense, and without limitation as to its cost, the Work specified, below.

26. Respondents shall arrange and provide for the transport, treatment, and disposal of contaminated liquids collected from Sump 9B and the Gallery Well. The facility selected by Respondents for off-site treatment and disposal shall be permitted or otherwise legally authorized to accept, treat, and dispose of such contaminated liquids.

27. Respondents shall arrange and provide for the transport and disposal of effluent associated with any on-site treatment of contaminated liquids from the Sump 9B and the Gallery Well. If, in order to lawfully dispose of such effluent, additional

treatment is required, Respondents shall arrange and provide for the additional treatment. The facility selected by Respondents for off-site treatment, if necessary, and disposal shall be permitted or otherwise legally authorized to accept and treat such effluent.

28. Respondents shall use the Uniform Hazardous Waste Manifest for transporting the contaminated liquids and the effluent, and shall identify themselves as the arranger for disposal and/or treatment.

29. Respondents shall, prior to any transport of contaminated liquids or of effluent to an out-of-state facility, provide written notification to the appropriate state environmental official in the receiving facility's state and to EPA.

30. In the event that the performance of Work under this Order results in the alteration, destruction or abandonment of any needed facility at the Casmalia Site, Respondents shall either repair or replace, as determined by EPA, such facility with one that provides the same level of control or function.

31. Respondents shall obtain and hold any permits or other authorizations, where required, for performing the Work under this Order.

32. In accordance with § 300.415 of the National Contingency Plan, removal actions taken pursuant to CERCLA Section 106 under this Order shall, to the extent practicable considering the exigencies of the situation, attain federal and state applicable or relevant and appropriate requirements ("ARARs"). Respondents may propose to EPA that meeting an ARAR is not practicable and propose an alternate approach. Implementation of such proposal is subject to EPA's written determination.

33. The termination date of the Work required under this Order will be specified by EPA and communicated to the Respondents.

VIII. PROJECT COORDINATION AND COORDINATOR

34. Respondents shall communicate and coordinate with EPA and with one another in carrying out the requirements of this Order.

35. To the extent not inconsistent with this Order, Respondents shall implement the Work under this Order so as to cooperate and coordinate with other activities being performed by EPA's On-scene Coordinator, EPA's contractors, and other parties working under EPA's direction at the Casmalia Site pursuant to the ongoing CERCLA response action.

36. Upon request by EPA, Respondents shall cooperate with EPA in providing information regarding the Work to the public and

participate, if requested by EPA, in community relations activities associated with the Work under this Order. As requested by EPA, Respondents shall prepare information packets for distribution to the public or shall participate in EPA-sponsored community meetings.

37. All aspects of the Work to be performed shall be under the direction and supervision of a single qualified Supervising Contractor, the selection of which is subject to disapproval by EPA.

38. Respondents shall also jointly select a Project Coordinator who represents collectively the Respondents and shall be the Respondents' point of contact for EPA regarding the Respondents' compliance with the terms of this Order. The selection of the Project Coordinator is subject to disapproval by EPA.

IX. SUBMISSION OF PLANS AND REPORTS

39. Respondents shall prepare the following plans and reports.

40. Respondents shall prepare a draft and a final Work Plan. The Work Plan shall include, but is not limited to, a description of, and expeditious schedule for performing, the Work under this Order.

41. Respondents shall prepare a draft and a final Health and Safety Plan. The Health and Safety Plan shall be consistent with Occupational Health and Safety Administration ("OSHA") regulations for Hazardous Waste Site Activities. It shall address, but is not limited to addressing, the safety of workers, the community, and others during performance of the Work and in the event of a spill or other emergency situation, and the communication and notification procedures with EPA, other government officials, and with community members, as appropriate.

42. If any sampling and analysis is performed in carrying out the Work under this Order, Respondents shall prepare both a draft and a final Quality Assurance Project Plan and Sampling Plan.

43. As requested by EPA, Respondents shall prepare written reports on the status of Work performed under this Order. These reports shall include, but not be limited to: activities/tasks undertaken during the reporting period, and expected to be undertaken during the next reporting period; deliverables/milestones completed during the reporting period, and expected to be completed during the next reporting period; identification of issues and actions that have been or are being taken to resolve the issues; schedules and schedule changes.

44. The final plans under this Section shall address and/or incorporate, as appropriate, EPA's comments and are subject to

EPA approval.

45. After EPA specifies the termination date of the Work required under this Order, and in accordance with the schedule in Section X, Respondents shall prepare a Completion of Work Report that shall include, but not be limited to, a general description of the Work that was performed and demonstration that all obligations under this Order have been satisfactorily completed or achieved by the Respondents in accordance with this Order.

46. The Completion of Work Report shall include, but not be limited to, a good faith estimate of total costs or statement of actual costs incurred in complying with the Order, a listing of quantities and types of materials removed, a discussion of removal and disposal options considered for those materials, a listing of the ultimate destinations of those materials, a presentation of the analytical results of all sampling and analyses performed, and accompanying appendices containing all relevant documentation generated during the removal action (e.g., manifests, invoices, bills, contracts, and permits). The Report shall also include the following certification signed by a person who supervised or directed the preparation of that report:

> Under penalty of law, I certify that to the best of my knowledge, after appropriate inquiries of all relevant persons involved in the preparation of the report, the information submitted is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

The Completion of Work Report is subject to EPA's written approval.

47. Respondents shall provide to EPA copies of results of all sampling and tests and all other data generated by Respondents or their contractor(s), or on the Respondents' behalf during implementation of this Order. Results and other data shall be provided in both hard copy and electronic forms, as specified by EPA.

48. Unless otherwise directed by EPA, Respondents shall provide, to the EPA Project Coordinator, three (3) copies of all draft documents and four (4) copies of all final documents under this Section.

X. SCHEDULE

49. Unless otherwise specified by EPA, Respondents shall be ready to provide for the transport, treatment, and disposal of the contaminated liquids and effluent under Section VII, no later than January 31, 1996. The specific date in January 1996 will be

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determined by EPA and communicated to the Respondents.

50. Respondents shall select a Supervising Contractor within fourteen (14) days of the Effective Date of this Order.

51. Respondents shall select a Project Coordinator within fourteen (14) days of the Effective Date of this Order.

52. Respondents shall submit the draft Work Plan and Health and Safety Plan within twenty-five (25) days of the Effective Date of this Order.

53. Respondents shall submit the draft Quality Assurance Project Plan and Sampling Plan within seven (7) days of a determination that Respondents will need to perform sampling and analysis in implementing the Work under this Order.

54. Respondents shall submit a written report(s) on the status of Work within five (5) days of EPA's oral request.

55. Respondents shall submit all final plans under Section IX within five (5) days of receipt of EPA's written comments.

56. Respondents shall submit the Completion of Work Report within ten (10) days of completion of the Work required by this Order.

57. Respondents shall submit results of all sampling and tests and all other data upon receipt of such results and data.

XI. EPA PROJECT COORDINATOR, ON-SCENE COORDINATOR, AND REGIONAL COUNSEL

58. All communications, whether written or oral, from Respondents' Project Coordinator and all submissions under Section IX of this Order, shall be directed to EPA's Project Coordinator for the Work under this Order. A copy of all written communications and all final submissions shall be sent to the EPA Assistant Regional Counsel for the Casmalia Site.

EPA's Project Coordinator for this Order is:

Karen Ueno, H-3
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105
(415) 744-2023

EPA's Assistant Regional Counsel for this Order is:

Joanne Marchetta, RC-3-4
U.S. Environmental Protection Agency

75 Hawthorne Street
San Francisco, CA 94105
(415) 744-1315

EPA's On-scene Coordinator for purposes of Paragraphs 35 and 61, and Section XV is:

Robert Mandel, H-8-3
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105
(415) 744-2290
Region IX 24-Hour Emergency Number (415) 744-2000

59. If EPA changes its Project Coordinator or On-scene Coordinator, EPA will notify the Respondents' Project Coordinator within three days (3) days of such change.

60. EPA's Project Coordinator shall have the authority lawfully vested in a Remedial Project Manager ("RPM"), by the National Contingency Plan ("NCP"), 40 C.F.R. Part 300.

61. EPA's On-scene Coordinator shall have the authority lawfully vested in an On-Scene Coordinator by the NCP, 40 C.F.R. Part 300. EPA's On-scene Coordinator shall have authority, consistent with the NCP, to halt any Work required by this Order, and to take any necessary response action. Absence of the OSC from the Site shall not be cause for Respondents' stoppage of work unless specifically directed by the OSC.

XII. ACCESS TO PROPERTY AND INFORMATION

62. Respondents shall provide and/or obtain access, if necessary, to the Site and off-site areas to which access is needed to implement this Order, and provide access to all records and documentation related to the conditions at the Site and the action conducted pursuant to this Order. Such access shall be provided to EPA employees, contractors, agents, consultants, designees, and representatives. These individuals shall be permitted to move freely at the Site and appropriate off-site areas in order to conduct actions which EPA determines to be necessary.

63. Where action under this Order is to be performed in areas owned by or in possession of someone other than Respondents, Respondents shall use their best efforts to obtain all necessary access agreements within twenty-five (25) days after the Effective Date of this Order, or as otherwise specified in writing by the EPA Project Coordinator. Respondents shall immediately notify EPA if after using their best efforts they are unable to obtain such agreements. Respondents shall describe in writing their effort(s) to obtain access. EPA may then assist

Respondents in gaining access, to the extent necessary to implement the removal actions described herein, using such means as EPA deems appropriate. EPA reserves the right to seek reimbursement from Respondents for all costs and attorney's fees incurred by the United States in obtaining access for Respondents.

XIII. RECORD RETENTION, DOCUMENTATION, AVAILABILITY OF INFORMATION

64. Respondents shall preserve all documents and information relating to Work performed under this Order, or relating to the hazardous substances found on or released from the Site, for ten (10) years following completion of the Work required by this Order. At the end of this period and thirty (30) days before any document or information is destroyed, Respondents shall notify EPA that such documents and information are available to EPA for inspection, and upon request, shall provide the originals or copies of such documents and information to EPA. In addition, Respondents shall provide documents and information retained under this Section at any time before expiration of the 10-year period at the written request of EPA.

65. Respondents may assert a business confidentiality claim pursuant to 40 C.F.R. § 2.203(b) with respect to part or all of any information submitted to EPA pursuant to this Order, provided such claim is allowed by Section 104(e)(7) of CERCLA, 42 U.S.C. § 9604(e)(7). However, analytical and other data specified in Section 104(e)(7)(F) of CERCLA shall not be claimed as confidential by the Respondents. EPA shall only disclose information covered by a business confidentiality claim to the extent permitted by, and by means of the procedures set forth at, 40 C.F.R. Part 2, Subpart B. If no such claim accompanies the information when it is received by EPA, EPA may make it available to the public without further notice to Respondents.

XIV. OFF-SITE SHIPMENTS

66. All hazardous substances, pollutants or contaminants removed off-site pursuant to this Order for treatment, storage, or disposal shall be treated, stored, or disposed of at a facility in compliance, as determined by EPA, with 42 U.S.C. § 9621(d)(3) and 58 Federal Register 49200, September 22, 1993.

XV. EMERGENCY RESPONSE AND NOTIFICATION OF RELEASES

67. If any incident, or change in Site conditions, during the actions conducted pursuant to this Order causes or threatens to cause an additional release of hazardous substances from the Site or an endangerment to the public health, welfare, or the environment, the Respondents shall immediately take all appropriate action to prevent, abate, or minimize the threat.

The Respondents shall take these actions in accordance with all applicable provisions of this Order, including, but not limited to the Health and Safety Plan. Respondents shall also immediately notify the Project Coordinator, the EPA On-scene Coordinator, and the Region IX 24-hour Emergency Number at (415) 744-2000. If Respondents fail to take appropriate action as required by this Section, and EPA takes the action instead, Respondents shall reimburse EPA for all costs of the response action not inconsistent with the NCP. Respondents shall pay the response costs within thirty (30) days of Respondents' receipt of demand for payment and a summary of costs incurred.

68. In the event of any release of a hazardous substance, in addition to notifying the persons identified in Paragraph 67 of this Section, Respondents shall also immediately notify the National Response Center at (800) 424-8802. Respondents shall submit a written report to the EPA Project Coordinator within three (3) days after each release, setting forth the events that occurred and the measures taken or to be taken to mitigate any release or endangerment caused or threatened by the release and to prevent the reoccurrence of such a release. This reporting requirement is in addition to, not in lieu of, reporting under CERCLA Section 103(c) and Section 304 of the Emergency Planning and Community Right-To-Know Act of 1986, 42 U.S.C. Sections 11001 et seq.

69. Nothing in this Section shall be deemed to limit any authority of the United States to take, direct, or order all appropriate action to protect human health and the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances on, at, or from the Site.

XVI. ENFORCEMENT: PENALTIES FOR NONCOMPLIANCE

70. Violation of any provision of this Order may subject Respondents to civil penalties of up to twenty-five thousand dollars ($25,000) per violation per day, as provided in Section 106(b)(1) of CERCLA, 42 U.S.C. § 9606(b)(1). Respondents may also be subject to punitive damages in an amount up to three times the amount of any cost incurred by the United States as a result of such violation, as provided in Section 107(c)(3) of CERCLA, 42 U.S.C. § 9607(c)(3). Should Respondents violate this Order or any portion hereof, EPA may carry out the required actions unilaterally, pursuant to Section 104 of CERCLA, 42 U.S.C. § 9604, and/or may seek judicial enforcement of this Order pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606.

XVII. UNITED STATES NOT LIABLE

71. The United States, by issuance of this Order, assumes no liability for any injuries or damages to persons or property resulting from acts or omissions by Respondents, or their

directors, officers, employees, agents, representatives, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order. Neither EPA nor the United States may be deemed to be a party to any contract entered into by any Respondent or its directors, officers, employees, agents, successors, assigns, contractors, or consultants in carrying out any action or activity pursuant to this Order.

XVIII. RESERVATION OF RIGHTS

72. Except as specifically provided in this Order, nothing herein shall limit the power and authority of EPA or the United States to take, direct, or order all actions necessary to protect public health, welfare, or the environment or to prevent, abate, or minimize an actual or threatened release of hazardous substances, pollutants or contaminants, or hazardous or solid waste on, at, or from the Site. Further, nothing herein shall prevent EPA from seeking legal or equitable relief to enforce the terms of this Order, from taking other legal or equitable action as it deems appropriate and necessary, or from requiring the Respondents in the future to perform additional activities pursuant to CERCLA, 42 U.S.C. § 9607(a), et seq., or any other applicable law.

73. EPA reserves the right to bring an action against Respondents under Section 107 of CERCLA, 42 U.S.C. § 9607, for recovery of any response costs incurred by the United States and not reimbursed by Respondents. This reservation shall include, but is not limited to, past costs, direct costs, indirect costs, the costs of oversight, the costs of compiling the cost documentation to support a cost demand, and accrued interest as provided in § 107 of CERCLA.

74. Notwithstanding any other provision of this Order, at any time during the response action, EPA may perform its own studies, complete the response action (or any portion of the response action) as provided in CERCLA and the NCP, and seek reimbursement from Respondents for its costs, or seek any other appropriate relief.

75. Notwithstanding any provision of this Order, the United States hereby retains all of its information gathering, inspection, and enforcement authorities and rights under CERCLA, RCRA, and any other applicable statutes and regulations.

76. Nothing in this Order shall constitute a satisfaction of a release from any claim, cause of action against the Respondents or any person not a party to this Order, for any liability such person may have under CERCLA, other statutes, or the common law, including but not limited to any claims of the United States for costs, damages and interest under Sections 106(a) and 107(a) of

CERCLA, 42 U.S.C. § 9606(a) and 9607(a).

77. This Order does not constitute a pre-authorization of funds under Section 111(a)(2) of CERCLA, 42 U.S.C. § 9611(a)(2).

XIX. MODIFICATIONS

78. Modifications to any plan or schedule may be made in writing by the EPA Project Coordinator or at the EPA Project Coordinator's oral direction. If the EPA Project Coordinator makes an modification, orally, it will be memorialized in writing, however, the effective date of the modification shall be the date of the EPA Project Coordinator's oral direction. The rest of the Order, or any other portion of the Order may only be modified in writing by signature of the Director of the Hazardous Waste Management Division, Superfund Programs, Region IX.

79. If Respondents seek permission to deviate from any approved plan or schedule, Respondents' Project Coordinator shall submit a written request to EPA for approval outlining the proposed modification and its basis.

80. No informal advice, guidance, suggestion, or comment by EPA regarding reports, plans, specifications, schedules, or any other writing submitted by the Respondents shall relieve the Respondents of their obligation to obtain such formal approval as may be required by this Order, and to comply with all requirements of this Order unless it is formally modified.

XX. NOTICE OF COMPLETION

81. When EPA determines, after EPA's review of the Completion of Work Report, that all actions have been fully performed in accordance with this Order, with the exception of any continuing obligations required by this Order, EPA will provide notice to the Respondents. If EPA determines that any action has not been completed in accordance with this Order, EPA will notify the Respondents, provide a list of the deficiencies, and require that Respondents modify the Work Plan to correct such deficiencies. The Respondents shall implement the modified and approved Work Plan and shall submit a modified Completion of Work Report in accordance with the EPA notice. Failure by Respondents to implement the approved modified Work Plan shall be a violation of this Order.

XXI. ADMINISTRATIVE RECORD

82. Upon request by EPA, Respondents shall submit to the EPA Project Coordinator all documents related to the implementation or selection of the response action for possible inclusion in the Administrative Record file.

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XXII. INSURANCE

83. Prior to commencing any on-site Work under this Order, the Respondents shall secure, and shall maintain for the duration of this Order, comprehensive general liability insurance and automobile insurance with limits of one million dollars, combined single limit. If the Respondents demonstrate by evidence satisfactory to EPA that any contractor or subcontractor maintains insurance covering the same risks but in lesser amount, then the Respondents need provide only that portion of the insurance described above which is not maintained by such contractor or subcontractor.

XXIII. EFFECTIVE DATE AND COMPUTATION OF TIME

84. This Order shall be effective twelve (12) days after the Order is signed by the Director of the Hazardous Waste Management Division, Superfund Programs, Region IX.

85. Except as otherwise specified herein, all schedules for performance of ordered activities shall be calculated from this Effective Date.

86. Unless otherwise specified herein, "day" shall mean a calendar day. In computing any period of time under this Order, where the last day would fall on a Saturday, Sunday, or Federal holiday, the period shall run until the close of business of the next business day.

XXIV. OPPORTUNITY TO CONFER

87. Respondents may request, within seven (7) days after the date this Order is signed, a conference with EPA to discuss this Order. Any such conference shall be held within four (4) days after the Effective Date of this Order, unless otherwise agreed to in writing by EPA.

88. The purpose and scope of the conference shall be limited to issues involving the implementation of the response actions required by this Order and the extent to which Respondents intend to comply with this Order. This conference is not an evidentiary hearing, and does not constitute a proceeding to challenge this Order. It does not give Respondents a right to seek review of this Order, or to seek resolution of potential liability, and no official stenographic record of the conference will be made. At any conference held pursuant to Respondents' request, Respondents may appear in person or by an attorney or other representative.

89. Requests for a conference made by telephone must be confirmed in writing mailed the day of the telephone request, to the EPA Assistant Regional Counsel, or to the EPA Project Coordinator, if the telephone request was made to the EPA Project

Coordinator.

XXV. NOTICE OF INTENT TO COMPLY

90. Each Respondent shall provide, not later than seven (7) days after the Effective Date of this Order, written notice to the EPA Assistant Regional Counsel stating whether that Respondent will comply with the terms of this Order. If any Respondent does not unequivocally commit to perform the Work as provided by this Order, its shall be deemed to have violated this Order and to have failed or refused to comply with this Order. Each Respondent's written notice shall include the name, title, address, telephone number and facsimile number for a person representing Respondent, with whom EPA may communicate regarding implementation of this Order, until the Respondents designate the primary contacts in accordance with Section VIII of this Order. Each Respondent's written notice shall describe, using facts that exist on or prior to the Effective Date of this Order, any "sufficient cause" defenses asserted by Respondent under Sections 106(b) and 107(c)(3) of CERCLA. The absence of a response by EPA to the notice required by this Paragraph shall not be deemed to be acceptance of Respondent's assertion.

XXVI. SEVERABILITY

91. If a court issues an order that invalidates any provision of this Order or finds that one or more Respondents have sufficient cause not to comply with one or more provisions of this Order, Respondents shall remain bound to comply with all provisions of this Order not invalidated or determined to be subject to a sufficient cause defense by the court's order.

So Ordered, this twenty-second day of November, 1995.

BY: Keith Takata

Keith Takata
Acting Director
Hazardous Waste Management Division, Superfund Programs
U.S. Environmental Protection Agency, Region IX

EFFECTIVE DATE: December 4, 1995

02-0015956

ATTACHMENT 1

Unilateral Administrative Order for Removal Response Activities Docket No. 96-04

Casmalia Resources Hazardous Waste Management Facility

ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF ENFORCEMENT
NATIONAL ENFORCEMENT INVESTIGATIONS CENTER
BUILDING 53, BOX 25227, DENVER FEDERAL CENTER
DENVER, COLORADO 80225

DATE: April 28, 1994

SUBJECT: Analysis Results from December 1993 Casmalia Site Samples, Santa Maria, CA NEIC Project M63

FROM: Jon Beihoffer, Senior Chemist Jon Beihoffer

TO: Thomas Dahl
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1. EXECUTIVE SUMMARY

During the week of December 6th, 1993 sampling was conducted at fourteen locations (Figure 1) at or near the Casmalia Site near Santa Maria, CA. Groundwater samples were received at EPA-NEIC in five shipments from December 7th to 13th, 1993. The groundwater samples were analyzed by EPA-NEIC to determine if migration beyond the facility boundary had occurred at the locations selected for sampling and to provide additional information regarding the chemical contamination of the groundwater. The analytical results for the groundwater samples are included in Tables 1-6.

The results of this phase of analyses indicate low levels of contaminants have been transported at least as far as three on-site RAP trenches. Contaminants appear to be moving in the groundwater in a southerly direction, following the topographical relief of the land. The migration was supported by concentration gradients seen in volatile and semivolatile organics results, and by the chloride/bromide ratio results. There is indication of contaminants migrating beyond the facility boundary in well A2B and possible well RP-61B.

Based on data obtained by NEIC to date, volatile organics and chloride/bromide ratio are the best indicators for migration of groundwater contaminants from this site. At current concentrations, dissolved and/or total recoverable elements are not definitive indicators because of analytical problems associated with analyzing high dissolved salt samples and because groundwater quality varies significantly around this site, which makes determining true background levels very difficult.

Many of the groundwater samples contained percent levels of dissolved salts. The major anionic constituents

were chloride and sulfate. Sodium, calcium, magnesium and potassium were the major cationic constituents with boron, barium, iron, lithium, manganese, silicon and strontium being present in lesser amounts. Nickel was found on-site in the Gallery and S9B wells, PSCT-1 trench, and RAP trenches 3A & C5. Nickel was also found outside facility boundary at low levels (<0.07 mg/L), which indicates nickel may occur naturally in the groundwater around this site. No rare earth elements were detected in any of the groundwater samples.

High concentrations (10,000s to 100,000s ug/L) of common organic solvents were present in the Gallery and S9B wells. The major organic solvents found were methylene chloride, methyl ethyl ketone (MEK), tetrahydrofuran (THF), chloroform, trichloroethylene (TCE), and tetrachloroethylene or perchloroethylene (PCE). Some of these solvents were found as far down gradient as the RAP trenches.

Semivolatile organics were present in the Gallery and S9B wells at levels from the 1,000s to 100,000s of ug/L. The major semivolatile organics were phenol, 2-methylphenol, 4-methylphenol, benzoic acid, isophorone, cyclohexanone, 2-butoxyethanol, 2-(2-butoxyethoxy)ethanol, and dichloropyridines. Semivolatile organic contaminants were found down gradient as far as the PSCT trench, and were not detected in the RAP trenches or wells outside the facility boundary. With the exception of 2,4-D, which was detected in the Gallery well and PSCT-1 trench, no chlorinated pesticides were detected in any of the groundwater samples. No PCBs or para chlorobenzenesulfonic acid (p-CBSA) were detected in any of the groundwater samples.

The percentage of dissolved organic carbon attributed to volatile and semivolatile organics was a small portion of dissolved organic carbon present in the samples, usually less than 20%. The dissolved organic carbon fractionation results for the on-site groundwater samples showed most of the organic carbon was hydrophillic. The major emphasis of the second phase of analyses will be identifying more hydrophillic organic constituents in these groundwater samples.

2. EXPERIMENTAL SECTION FOR GROUNDWATER SAMPLES

2.1 Sample Background

During the week of December 6th to 10th, 1993, sampling was conducted with Ecology & Environment personnel at fourteen locations at or near the Casmalia Site near Santa Maria, CA. The locations were two on-site wells, four on-site trenches and eight wells outside the facility boundary. Well MW-7BU was a RCRA interim status "background well". Two EPA-NEIC personnel were present during the sampling to

witness the sampling events and provide technical assistance. In addition, two equipment blanks were collected. Three field blanks, five trip blanks and one DDI water blank were also prepared at this time.

Groundwater samples from the Casmalia Site were received in forty four coolers at EPA-NEIC in five shipments from December 7th to 13th, 1993. Upon receiving and opening, it was found that: 1) two coolers were taped, but had missing custody seals, 2) two sample bottles were mislabeled, 3) four sample bottles were missing custody seals, and 4) one sample bottle was broken. The samples were cool and the presence of ice in each cooler was noted. A chain-of-custody record was included in each cooler.

2.2 Overview of Sampling

Each of the locations outside the facility boundary was purged by a mechanical pumping device. The purge volume was three casing volumes except for well RP-61B where it was one casing volume because of slow well recovery. Six of the wells outside the facility boundary were purged using three portable electrical pumps. These wells were B3M, RP-59B, RP-61B, RP-65B, RP-76A and MW-7BU. Wells A2B and C4M contained dedicated jet pumps. These wells were purged by their pumps. Two on-site wells and four trenches contained dedicated electrical pumps; they were purged for approximately 10 minutes using their pumps.

Wells outside the facility boundary were sampled using disposable Teflon bailers. The two on-site wells and four trenches were sampled from a spigot at each well head.

2.3 Overview of Sample Analyses

Samples were analyzed by EPA-NEIC for the purpose of: 1) obtaining legally defensible data, 2) determining if contaminants from on-site wastes were migrating to locations outside the facility boundary, 3) providing additional information regarding chemical makeup of the samples, and 4) evaluating analytical and sampling procedures and techniques.

2.4 General Constituent Methods

Alkalinity was determined by standard potentiometric titrations of the samples. Ion selective potentiometry was used for measuring the pH of the samples. pH measurements were done in the field and in the laboratory. The laboratory pH measurements were reported. Conductivity was determined

by measuring the resistance of the samples using a self contained conductivity meter. Total suspended solids (TSS) and total dissolved solids (TDS) were determined gravimetrically.

Total inorganic carbon (TIC) was determined directly by acidification and purging the sample with coulormetric detection. Dissolved organic carbon (DOC) was determined by filtering, acidification and purging of the sample and analyzing the sample preparation by oxidation with coulormetric detection.

Ion chromatography (IC) was used in the analysis of the samples for the strong acid anions of bromide, chloride, fluoride, nitrite, nitrate, phosphate and sulfate. Chlorine was determined by wavelength dispersive X-ray fluorescence spectroscopy (XRF) to confirm chloride in the samples outside the facility boundary. Inductively coupled argon plasma optical emission spectroscopy (ICAP-OES) analysis for sulfur was used as a confirmation method for sulfate. The inductively coupled argon plasma mass spectrometry (ICAP-MS) analysis for bromine was used as a confirmation method for bromide.

2.5 Inorganic Methods

Samples were acidified in the field and digested with hydrochloric and nitric acid for total recoverable elemental analysis. Samples were filtered and acidified in the field for dissolved elemental analysis. The prepared samples were analyzed using inductively coupled argon plasma optical emission spectroscopy (ICAP-OES). Cold vapor atomic absorption spectroscopy (AA) was used in the mercury analyses after samples were digested in accordance with standard EPA method. The samples were analyzed for a total of 37 elements. The elements of interest were aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, mercury, molybdenum, nickel, phosphorus, potassium, rhenium, selenium, silicon, silver, sodium, strontium, sulfur, thallium, tin, titanium, tungsten, vanadium, uranium, yttrium, zinc, and zirconium.

Inductively coupled plasma mass spectrometry (ICAP-MS) was used to see if rare earths and radioactive elements were present in the samples. ICAP-MS was used as a confirmation method for the following elements: antimony, bromide, barium, cadmium, lead, molybdenum, nickel, thallium, tin, and zinc. ICAP-MS was also used to achieve the drinking water maximum contaminant limit (MCL) for lead and thallium.

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2.6 Organic Methods

Purge and trap gas chromatography/mass spectrometry (GC/MS) was utilized to analyze for volatile organics in the samples. Semivolatile organics were determined in the samples by liquid-liquid extraction with methylene chloride and analyzing the extracts by GC/MS. Chlorinated pesticides and PBCs were determined in the samples by liquid-solid extraction and analyses by gas chromatography/electron capture detection (GC/ECD). Liquid-solid extraction and GC/ECD were used to analyze for chlorinated acids in the samples.

An ion-paired reverse phase high-pressure liquid chromatography (HPLC) method was used for the analysis of para chlorobenzenesulfonic acid (p-CBSA) in the samples. Phenol was determined by reverse phase HPLC as a confirmation method for phenol by liquid-liquid extraction and GC/MS analysis.

In an effort to aid in defining the appropriate analytical approaches that may be useful in identifying additional organic constituents, the six on-site samples were analyzed by dissolved organic carbon fractionation. This work was performed by Huffman Laboratories, Inc., of Wheat Ridge, Colorado, and is based on a method developed cooperatively with the U.S. Geological Survey (J.A. Leenheer and E.D. Huffman, "Analytical Method for Dissolved Organic Carbon Fractionation", Water Resources Investigations 79-4, 1979, U.S. Geological Survey). This analysis classifies organic constituents into either hydrophobic or hydrophillic, and as either acids, bases, or neutrals.

3. RESULTS FOR GROUNDWATER SAMPLES

3.1 General Constituent Analysis Results

Table 1 contains the results for total suspended solids (TSS), total dissolved solids (TDS), conductivity, pH, alkalinity, total inorganic carbon (TIC), and dissolved organic carbon (DOC). The strong acid anions results and chloride/bromide ratio are given in Table 2. The precision and bias data obtained for the different analyses are given in Table 7. All the groundwater samples were analyzed within their holding times.

The chloride results were within 20% of the XRF method. Most of the bromide results were within 34% of the ICAP-MS method. The sulfate results were within 8% of the ICAP-OES method. The ratios of TDS to conductivity ranged from 0.68

to 0.96, with a mean ratio of 0.82. The percent difference (%D) for the anion-cation balances were within 10%.

Dissolved organic carbon could be used as an indicator for migration beyond the facility boundary, but this parameter lacks sensitivity and selectivity. Groundwater sample results from wells outside the facility boundary for chloride and sulfate are high and vary significantly suggesting that they are not definitive indicators of migration beyond the facility boundary for this site.

Chloride/bromide ratio is a good indicator for groundwater contaminant migration at this former (geologic time) marine environment site. The chloride/bromide ratio in sea water is 292:1 (CRC Handbook of Chemistry and Physics, 58th Ed., 1977-1978, F-203). Samples which have chloride/bromide ratios significantly lower than 292:1 indicate contaminated groundwater. Samples which have chloride/bromide ratios significantly larger than 292:1 indicate groundwater which has been infiltrated with fresh water source. All the on-site locations have chloride/bromide ratios significantly less than 292:1. Also, two wells outside the facility boundary (A2B & B3M) have chloride/bromide ratios significantly less than 292:1. Chloroform at 12 ug/L was also found in well A2B which agrees with the chloride/bromide ratio for evidence of migration at this location. The limitations of chloride/bromide ratio is that it does not indicate the degree of contamination or toxicity at the location.

3.2 Inorganic Analysis Results

Tables 3 & 4 contain the total recoverable elemental and dissolved elemental results for the groundwater samples, respectively. The precision and bias data obtained for the elemental analyses are given in Tables 8 & 9. The results for a select group of elements were within 40% of the ICAP-MS method. All the groundwater samples were analyzed and/or digested within their holding times.

The major cationic constituents of the groundwater samples were sodium, calcium, magnesium and potassium, with boron, barium, iron, lithium, manganese, silicon and strontium being present in lesser amounts. Nickel was found on-site in the Gallery and S9B wells, PSCT-1 trench, and RAP trenches 3A & C5. Nickel was also found outside facility boundary at low levels (<0.07 mg/L), which indicates nickel may occur naturally in the groundwater around this site. No rare earth elements were detected in any of the groundwater samples.

All the groundwater samples had high levels of dissolved solids. This caused matrix effects and interferences for the ICAP-OES analytical procedure. The high dissolved solids affects the nebulization rate and cools the argon plasma which changes the observation height in the instrument, affecting calibration, interference corrections and ultimately the accuracy of the sample results. Several of the element's channels, normally monitored by ICAP-OES procedures, had elevated baselines caused by the samples matrices. This reduced the sensitivity and possibly a bias for the ICAP-OES analytical procedure.

Because of the large amount of sulfate in the samples, any lead disposed at the site would form insoluble sulfate salts and hence their presence would not be expected in the groundwater.

Antimony, arsenic, selenium, and tin should be determined by ICAP-OES hydride technique. All the groundwater samples had significant baseline raises, due to sample interferences, around the channels normally monitored by ICAP-OES analytical procedure for these elements. The hydride technique releases these elements out of the sample matrix in their hydride form, which eliminates interferences.

Lead and thallium should be determined by ICAP-MS or AA procedures to meet the drinking water maximum contaminant limits (MCLs) for these elements, because ICAP-OES procedures do not have the sensitivity for these elements to meet the MCLs requirements.

Dissolved elemental analysis had poor agreement between dilutions for several of the elements. Standard addition techniques were tried to correct for the matrix effects associated with these samples. However, this did not correct the matrix effect. Poor agreement between dilutions was still seen in the samples for several of the elements. Therefore, elemental results were reported from the highest sample dilutions, which were at least five times the instrument detection limit, to minimize the sample matrix effects.

Dissolved and/or total recoverable elements are not definitive indicators of migration outside the facility boundary under current conditions for the following reasons: 1) Groundwater samples contain high dissolved solids which caused severe matrix effects for the analytical procedure. 2) No significant levels of rare earth metals were found on-site, which could be used as a tracer. 3) Some elementals normally associated with contaminated groundwater could occur naturally in this groundwater formation due to high levels of sulfates, such as, antimony, arsenic, selenium and probably

nickel. 4) It is difficult to determine background elemental levels for determining migration beyond the facility boundary, because groundwater quality varies significantly around this site.

3.3 Organic Analysis Results

Tables 5 & 6 contain the results for volatile organics and semivolatile organics, respectively. The precision and bias data obtained for these analyses are given in tables 10 & 11. All the groundwater samples were analyzed and/or extracted within their holding times. With the exception of 2,4-D, which was detected in the Gallery well and PSCT-1 trench, no chlorinated pesticides were detected in any of the groundwater samples. No PCBs or para chlorobenzenesulfonic acid were detected in the samples. No volatile organics were detected in groundwater samples from the following locations: RAP-1B, RAP-C5, B3M, RP-59B, RP-65B, RP-76A, and MW-7BU.

Well A2B, which is located close to the facility in the A drainage, showed migration beyond the facility boundary. The well was contaminated with 12 ug/L of chloroform. The chloride/bromide ratio also confirmed contamination. The California "Action Limit" is 6 ug/L for chloroform.

Well RP-61B, which is located close to the facility in the north drainage, was found to have 1.7 ug/L of 1,2-dichloropropane and 1.8 ug/L of 1,2-dibromoethane. The drinking water maximum contaminant limits (MCL) is 5 ug/L for 1,2-dichloropropane. There is no MCL for 1,2-dibromoethane. The equipment rinse water blank for the portable pump, which was used to purge this well, was found to have 1 ug/L of 1,2-dibromoethane. The chloride/bromide ratio did not indicate contamination. These compounds were not detected in any other of the groundwater samples. Therefore, there was only slight indication of migration beyond the facility boundary at this location.

Trench RAP-3A, which is located near the facility boundary in the A drainage, was found to have 2.3 ug/L of trichloroethylene and 1.0 ug/L of tetrachloroethylene. Concentration gradients were seen on-site for these compounds and several other volatile organic compounds.

The volatile organic analysis had good precision and bias. The results for a few volatile organics , which overlap with semivolatile organic analysis, were within 21% of the semivolatile organic results. The groundwater samples exhibited no analytical problems. Volatile organics would be a good indicator of migration outside the facility boundary. Volatile organics are present at high levels on-site, most of

them are toxic, do not occur naturally, are easily analyzed by standard analytical procedures, and move readily in groundwater.

Semivolatile organics were present in the Gallery and S9B wells at levels from the 1,000s to 100,000s of ug/L. The major semivolatile organics were phenol, 2-methylphenol, 4-methylphenol, benzoic acid, isophorone, cyclohexanone, 2-butoxyethanol, 2-(2-butoxyethoxy)ethanol, and dichloropyridines. Semivolatile organic contaminants were found down gradient as far as the PSCT trench, and were not detected in the RAP trenches or wells outside the facility boundary. 2,4-D was detected in the Gallery well and PSCT-1 trench.

The semivolatile organics analysis identified and quantified eight new compounds. The compounds were benzoic acid, cyclohexanone, 2-butoxyethanol, 2-(2-butoxyethoxy) ethanol, 2-chloropyridine, 2,3-dichloropyridine, 2,5-dichloropyridine, 2,6-dichloropyridine, and pentachloropyridine. Cyclohexanone, 2-butoxyethanol, and 2-(2-butoxyethoxy)ethanol are common industrial solvents. The chlorinated pyridines are distinctive compounds and toxic.

Groundwater samples exhibited some analytical problems for the semivolatile organic analytical procedure. Groundwater samples caused the formation of an emulsion in the base/neutral fraction of the liquid-liquid extraction. The emulsion caused problems for this extraction. Two other extraction techniques could be used to eliminate the emulsion formation with these groundwater samples. These extractions are continuous liquid-liquid extraction or liquid-solid extraction techniques.

Another analytical problem was recovery of acid surrogates and the spiked phenolic constituents. Four groundwater samples had acid surrogate recoveries less than 10%. These samples were from wells RP-76A, C4M, RAP-3A, and RAP-C5. Two of these groundwater samples had recoveries less than 10% for phenolic constituents spiked. Also, the comparison between HPLC analysis and semivolatile organic analysis for phenol showed a significant bias. The semivolatile organic phenol results were approximately one third of the HPLC phenol results for the Gallery and S9B groundwater samples. NEIC suggests the analysis of phenol by standard HPLC/DAD analytical procedures as a better approach for the Gallery & S9B wells.

Semivolatile organics could be a good indicator of migrations beyond the facility boundary for the same reasons as the volatile organics. However, no semivolatile organics were detected in the wells beyond the facility boundary or

the three RAP trenches in this study. This analytical procedure has a few problems associated with it. It is complex, has a long turn around time, analytical problems arose with the extraction of these groundwater samples, and significant bias was detected for the phenolic constituents.

A small portion, usually less than 20%, of the dissolved organic carbon present in the samples is associated with the volatile organic and semivolatile organic constituents identified. The dissolved organic carbon fractionation results for the on-site groundwater sample showed that the majority of the dissolved organic carbon was hydrophillic. The Gallery and S9B wells were greater than 80% hydrophillic. The PSCT-1 trench was greater than 70% hydrophillic. The RAP-3A, RAP-1B, and RAP-C5 trenches ranged from 40% to 60% hydrophillic.

3.4 Evaluation of Sampling

A few problems occurred during the sampling events. Custody seals were missing on a few sample bottles and coolers. Two sample bottles were mislabeled and one sample bottle broke during shipment. The field notes and monitoring well sampling data sheets were incomplete for some of the wells outside the facility boundary. The field notes and data sheets were missing the information about which portable pump was used to purge some of the wells. This information was important because the equipment rinse water blanks from the portable pumps were contaminated with low levels of volatile and semivolatile organics. This information was needed to associate equipment rinse water blanks with portable pumps and the wells they were used on. Also, an equipment rinse water blank was not prepared for one of the portable pumps.

Table 12 contains the results for trip blanks, DDI water blank, equipment rinse water blanks, and field blanks. The equipment rinse water blanks were probably contaminated from leaching of absorbed material in the polyethylene tubing on the portable pumps. Analysis also found that DDI water used in the decontamination of the portable pumps was contaminated with low levels of volatile organics.

NEIC recommends that methanol rinse not be left out of the decontamination procedure, and organic free water be used in the final rinse when sampling for volatile and semivolatile organics or any other organic parameter. NEIC also recommends equipment rinse water blanks be prepared from the Teflon bailers which were used to sample the wells outside the facility boundary.

Figure 1. Sampling Locations

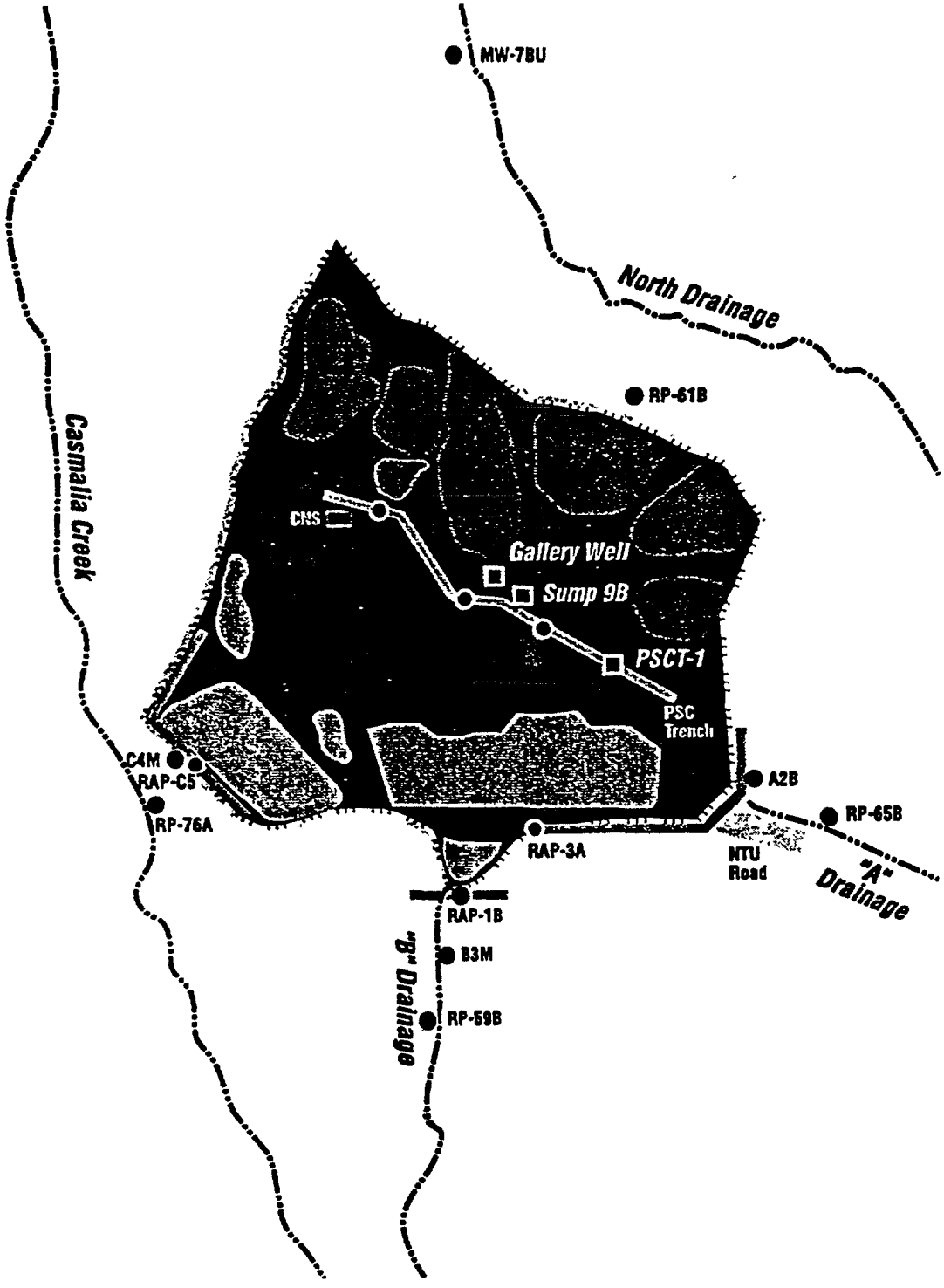

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Table 1. General Constituents Results

Station	TSS (mg/L)	TDS (mg/L)	Conductivity (umhos/cm)	pH	Alkalinity (mg/L)	TIC (mg C/L)	DOC (mg C/L)
Gallery	112	16000	17100	4.9	521	102	9350
S9B	126	11700	13300	6.3	1350	333	3980
PSCT-1	8	11000	13200	7.3	529	158	21
RAP-3A	<10*	10400	12500	7.1	428	125	11
RAP-1B	<10	8520	10900	7.4	403	122	18
RAP-C5	<10	7510	9660	6.9	213	67	24
A2B	7	9530	10600	7.5	507	141	10
B3M	<10	9450	12200	7.3	211	63	11
C4M	<10	3390	4970	7.4	238	57	<8
RP-59B	6	6710	8640	7.3	433	119	<8
RP-61B	5	8680	11300	7.6	1040	280	<8
RP-65B	5	9530	10300	7.6	211	61	8
RP-76A	70	2280	3310	7.2	169	43	<8
MW-7BU	7	4500	6140	7.3	273	79	<8

* = Constituent not detected, 99% confident the sample value is less than amount reported.

Table 2. Strong Acid Anions Results

Station	Fluoride (mg/L)	Chloride (mg/L	Bromide (mg/L)	Nitrate (mg/L)	Phosphate (mg/L)	Sulfate (mg/L)	Chloride/ Bromide
Gallery	<40*	5790	250	<40	<40	2030	23:01
S9B	<40	4270	125	<40	<40	1420	34:1
PSCT-1	<40	2930	70	<40	<40	3720	42:1
RAP-3A	<40	3870	20	180	<40	3440	194:1
RAP-1B	<40	3210	40	170	<40	2120	80:1
RAP-C5	<40	2170	70	<40	<40	2320	31:1
A2B	<0.4	1890	18	58.6	<0.4	4930	105:1
B3M	<0.4	3600	29	101	<0.4	2770	124:1
C4M	<0.4	1320	2.0	2.6	<0.4	1010	660:1
RP-59B	<0.4	2360	5.9	21.6	<0.4	2340	400:1
RP-61B	<0.4	1660	3.6	<0.4	<0.4	3660	461:1
RP-65B	<0.4	1910	6.3	139	<0.4	4690	305:1
RP-76A	<0.4	614	2.2	14.4	<0.4	968	279:1
MW-7BU	<0.4	1770	4.0	21.7	<0.4	1420	443:1

* = Anion not detected, 99% confident the sample value is less than amount reported.

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Table 3. Total Recoverable Elements Results

Element	Gallery (mg/L)	S9B (mg/L)	PSCT-1 (mg/L)	RAP-3A (mg/L)	RAP-1B (mg/L)	RAP-C5 (mg/L)	A2B (mg/L)
Ag	<0.01*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Al	0.64	<0.02	<0.02	<0.1	<0.1	<0.1	<0.1
As**	0.006	0.03	0.004	<0.006	<0.006	<0.006	<0.006
B	5.37	4.58	5.21	5.19	3.56	3.20	5.48
Ba	0.08	0.12	0.04	0.02	0.03	0.03	0.01
Be	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ca	1540	1170	757	690	704	538	435
Cd	0.13	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Co	0.70	0.02	0.01	<0.01	<0.01	0.02	<0.01
Cr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cu	0.01	<0.02	<0.01	<0.02	<0.02	<0.02	<0.02
Fe	253	147	2.63	<0.2	<0.2	<0.2	0.61
Hg***	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
K	56.0	34.1	42.1	29.8	18.5	18.2	46.1
Li	5.70	2.72	1.90	1.95	1.38	0.78	2.33
Mg	1090	812	714	607	515	398	622
Mn	38.6	23.7	1.79	0.21	0.28	3.00	0.45
Mo	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Na	1470	1380	1740	1740	1410	1330	1460
Ni	2.97	0.35	0.41	0.08	0.06	0.39	<0.03
P	2.07	1.74	0.38	0.10	0.10	0.55	<0.1
Pb****	0.03	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Re****	0.006	0.004	0.007	0.002	0.001	0.008	0.001
S	794	541	1200	1120	789	811	1410
Sb**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Se**	0.01	<0.01	0.005	0.03	<0.01	<0.01	<0.01
Si	25.5	23.4	19.0	17.7	16.5	17.3	18.42
Sn**	0.009	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sr	11.1	7.28	5.70	5.21	4.79	3.41	3.75
Ti	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tl****	0.003	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
U****	0.003	0.006	0.028	0.006	0.002	0.005	0.0007
V	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
W	<0.06	<0.06	<0.06	<0.2	<0.2	<0.2	<0.2
Y	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zn	10.8	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Zr	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

* = Element not detected, 99% confident the sample value is less than amount reported.
** = Element concentration determined by hydride ICAP-OES.
*** = Hg concentration determined by cold vapor AA.
**** = Element concentration determined by ICAP-MS.

Table 3. Total Recoverable Elements Results (continued)

Element	B3M (mg/L)	C4M (mg/L)	RP-59B (mg/L)	RP-61B (mg/L)	RP-65B (mg/L)	RP-76A (mg/L)	MW-7BU (mg/L)
Ag	<0.01*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Al	<0.1	0.10	<0.1	<0.1	0.02	0.27	0.42
As**	<0.006	<0.006	<0.006	<0.006	<0.006	0.024	<0.006
B	3.15	1.98	5.66	8.67	4.28	0.87	3.25
Ba	0.04	0.05	0.02	0.01	0.02	0.13	0.02
Be	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Ca	763	289	423	216	554	229	389
Cd	<0.01	<0.01	<0.01	<0.01	0.005	<0.01	<0.01
Co	<0.01	<0.01	0.01	<0.01	<0.01	<0.01	<0.01
Cr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cu	<0.02	<0.02	<0.02	<0.02	<0.01	<0.02	<0.02
Fe	<0.2	0.25	<0.2	0.35	0.09	31.1	0.6
Hg***	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
K	12.3	7.74	20.0	67.2	20.7	12.6	44.4
Li	1.11	0.26	1.54	2.78	1.91	0.12	0.78
Mg	509	151	286	274	767	118	151
Mn	0.01	0.28	0.46	0.09	0.04	2.35	0.03
Mo	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	0.02
Na	1540	659	1390	2220	1250	342	833
Ni	0.06	<0.03	0.05	0.04	0.06	<0.03	0.04
P	0.80	1.83	0.48	0.32	0.17	4.90	0.26
Pb****	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Re****	0.002	0.001	0.001	0.001	0.003	0.001	0.001
S	958	313	749	1230	1520	290	410
Sb**	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Se**	0.01	<0.01	<0.01	<0.01	0.098	<0.01	0.04
Si	20.4	20.8	20.1	19.0	21.7	22.1	21.6
Sn**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Sr	5.08	1.10	3.16	3.01	5.14	0.90	1.40
Ti	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01
Tl****	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
U****	0.006	0.001	0.012	0.002	0.009	0.0002	0.026
V	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
W	<0.2	<0.2	<0.2	<0.2	<0.06	<0.2	<0.2
Y	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zn	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04
Zr	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02

* = Element not detected, 99% confident the sample value is less than amount reported.
** = Element concentration determined by hydride ICAP-OES.
*** = Hg concentration determined by cold vapor AA.
**** = Element concentration determined by ICAP-MS.

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Table 4. Dissolved Elements Results

Element	Gallery (mg/L)	S9B (mg/L)	PSCT-1 (mg/L)	RAP-3A (mg/L)	RAP-1B (mg/L)	RAP-C5 (mg/L)	A2B (mg/L)
Ag	<0.01*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Al	0.59	<0.03	<0.03	<0.03	<0.03	<0.03	<0.1
B	5.38	4.60	5.16	5.28	3.77	3.24	5.21
Ba	0.09	0.12	0.04	0.02	0.03	0.03	0.01
Be	<0.03	<0.03	<0.03	<0.03	<0.03	<0.03	<0.05
Ca	1570	1100	761	705	743	568	446
Cd	0.12	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Co	0.69	0.02	<0.01	<0.01	<0.01	0.01	<0.02
Cr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cu	0.03	<0.01	<0.01	0.04	<0.01	<0.01	0.05
Fe	239	157	1.91	<0.2	<0.2	<0.2	<0.1
K	58.9	33.6	43.1	32.9	19.0	19.5	44.2
Li	5.58	2.69	1.79	1.98	1.42	0.77	2.32
Mg	1070	775	722	618	540	415	630
Mn	39.7	24.7	1.83	0.24	0.31	3.16	0.49
Mo	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Na	1470	1330	1760	1780	1480	1400	1470
Ni	2.94	0.35	0.43	0.10	<0.03	0.42	<0.05
P	2.09	0.65	0.25	0.14	0.12	0.53	0.12
Pb	<0.06	<0.06	<0.06	<0.06	<0.06	<0.06	<0.07
S	798	568	1210	1150	837	853	1430
Si	41.6	30.0	17.9	17.4	16.4	16.6	16.9
Sn	<0.04	<0.04	<0.04	<0.04	<0.04	<0.04	<0.02
Sr	11.0	7.70	5.73	5.26	4.96	3.57	3.70
Ti	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tl	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.2
V	<0.01	<0.01	0.01	0.01	<0.01	0.01	0.01
W	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Y	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zn	11.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.01
Zr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

* = Element not detected, 99% confident the sample value is less than amount reported.

Table 4. Dissolved Elements Results (continued)

Element	B3M (mg/L)	C4M (mg/L)	RP-59B (mg/L)	RP-61B (mg/L)	RP-65B (mg/L)	RP-76A (mg/L)	MW-7BU (mg/L)
Ag	<0.01*	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Al	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
B	3.12	1.81	5.21	8.02	3.95	0.81	3.17
Ba	0.04	0.04	0.02	0.01	0.01	0.06	0.02
Be	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ca	770	281	406	213	530	224	391
Cd	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Co	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Cr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cu	<0.01	0.03	<0.01	<0.01	0.01	<0.01	0.01
Fe	<0.1	<0.1	<0.1	<0.1	<0.1	14.4	<0.1
K	13.5	8.1	15.6	61.8	23.5	11.8	43.6
Li	1.14	0.24	1.44	2.68	1.78	0.13	0.82
Mg	515	150	272	264	752	116	153
Mn	<0.01	<0.01	0.36	0.10	<0.01	2.26	<0.01
Mo	<0.02	<0.02	0.02	<0.02	<0.02	<0.02	<0.02
Na	1540	655	1310	2130	1210	336	852
Ni	<0.05	<0.05	0.06	<0.05	0.05	<0.05	0.05
P	0.93	1.64	0.46	0.25	0.20	1.37	0.25
Pb	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07	<0.07
S	958	312	712	1170	1470	285	407
Si	17.2	18.1	16.9	15.3	15.5	17.8	18.6
Sn	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Sr	5.0	1.06	2.94	2.82	4.85	0.85	1.40
Ti	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Tl	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
V	0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01
W	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Y	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zn	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Zr	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01

* = Element not detected, 99% confident the sample value is less than amount reported.

Table 5. Volatile Organics Results*

Compound	Gallery (ug/L)	S9B (ug/L)	PSCT-1 (ug/L)	RAP-3A (ug/L)	A2B (ug/L)	RP-61B (ug/L)
1,1-Dichloroethylene	<2000**	<2000	290	<0.4	<0.4	<0.4
Methylene Chloride	564000	376000	170	<0.4	<0.4	<0.4
1,1-Dichloroethane	13000	18000	2400	<0.4	<0.4	<0.4
1,2-Dichloroethane	12000	10000	<200	<0.4	<0.4	<0.4
cis-1,2-Dichloroethylene	<2000	<2000	450	<0.4	<0.4	<0.4
1,2-Dichloropropane	<2000	<2000	<200	<0.4	<0.4	1.7
Chloroform	44000	29000	150	<0.4	12.2	<0.4
1,1,1-Trichloroethane	75000	55000	2600	<0.4	<0.4	<0.4
Trichloroethylene	20000	24000	2000	2.3	<0.4	<0.4
Tetrachloroethylene	18000	15000	7900	1.0	<0.4	<0.4
1,3-Dichlorobenzene	<2000	<2000	100	<0.4	<0.4	<0.4
1,4-Dichlorobenzene	<2000	<2000	120	<0.4	<0.4	<0.4
1,2-Dichlorobenzene	<2000	<2000	680	<0.4	<0.4	<0.4
1,2,4-Trichlorobenzene	<2000	<2000	130	<0.4	<0.4	<0.4
1,2-Dibromoethane	<2000	<2000	<200	<0.4	<0.4	1.8
Benzene	<2000	6200	150	<0.4	<0.4	<0.4
Toluene	19000	25000	390	<0.4	<0.4	<0.4
Ethylbenzene	<2000	6700	220	<0.4	<0.4	<0.4
m/p-Xylene	14000	19000	2000	<0.4	<0.4	<0.4
o-Xylene	<2000	5200	1100	<0.4	<0.4	<0.4
Carbon Disufide	16000	6200	<200	<0.4	<0.4	<0.4
Tetrahydrofuran (THF)	117000	68000	<200	<0.4	<0.4	<0.4
Acetone	588000	<5000	<2000	<5	<5	<5
2-Butanone (MEK)	1220000	278000	<400	<0.4	<0.4	<0.4
4-Methyl-2-pentanone (MIBK)	86000	39000	<200	<0.4	<0.4	<0.4

* = No volatile organics were detected in groundwater samples from locations RAP-1B, RAP-C5, B3M, RP-59B, RP-65B, RP-76A, and MW-7BU.

** = Compound not detected, 99% confident the sample value is less than amount reported.

Table 6. Semivolatile Organics Results*

Compound	Gallery (ug/L)	S9B (ug/L)	PSCT-1 (ug/L)
Phenol	244000**	100000**	3
Benzyl alcohol	3960	1420	<1***
2-Methylphenol	13500	6550	<1
4-Methylphenol	2310	1400	4
2-Nitrophenol	390	36	<3
2,4-Dimethylphenol	90	51	<1
2,4-Dichlorophenol	690	991	1
4-Chloro-3-methylphenol	100	71	<1
Benzoic acid	29400	23600	<5
Isophorone	39700	6860	7
Naphthalene	80	93	25
2-Methylnaphthalene	<20	24	7
Cyclohexanone	229000	14300	<10
2-Butoxyethanol	273000	45900	<10
2-(2-Butoxyethoxy)ethanol	83400	11400	<10
2-Chloropyridine	5040	1900	<1
2,3-Dichloropyridine	3390	1470	<1
2,5-Dichloropyridine	940	441	<1
2,6-Dichloropyridine	8250	3600	70
Pentachloropyridine	320	62	73
2,4-D****	760	2160	4

* = No extable organics were detected in groundwater samples from locations RAP-3A, RAP-1B, RAP-C5, RP-59B, RP-61B, RP-65B, RP-76A and MW-7BU.

** = Compound concentration determined by HPLC/DAD.

*** = Compound not detected, 99% confident the sample value is less than amount reported.

**** = Compound concentration determined by GC/ECD.

Table 7. General Constituents Analysis Precision and Bias*

Parameter: Total Suspended Solids (TSS), concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Control Sample		
Location	Average	%RSD	Average	%RSD	Number	T. Value	% Dev
Gallery	106	1.7	112	7.6	WP023	90.7	-1.9
S9B	126	0.2	NA	NA			
PSCT-1	NA	NA	-10	18.9			
RP-65B	<10**	NA	<10	NA			

Parameter: Total Dissovled Solids (TDS), concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Control Sample		
Location	Average	%RSD	Average	%RSD	Number	T. Value	% Dev
Gallery	15900	0.8	16000	0.5	WP1185	158	-7.6
S9B	11700	0.2	NA	NA			
PSCT-1	NA	NA	11000	0.2			
RP-65B	9510	0.2	9530	0.3			

Parameter: Conductiviy, unit is umhos/cm							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Control Sample		
Location	Average	%RSD	Average	%RSD	Number	T. Value	% Dev
Gallery	17400	5.1	17100	2.5	WP384	92.7	2.7
PSCT-1	13400	4.4	13200	1.7			
RP-65B	10500	4.4	10300	3.4			

Paramter: pH							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Control Sample		
Location	Average	%RSD	Average	%RSD	Number	T. Value	% Dev
NA	NA	NA	NA	NA	WP1185	6.0	-3.5

Paramter: Alkalinity, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Control Sample		
Location	Average	%RSD	Average	%RSD	Number	T. Value	% Dev
Gallery	NA	NA	521	1.9	WP384	17.5	6.1
PSCT-1	NA	NA	529	0.0			
RP-65B	NA	NA	211	0.0			

Paramter: Total Inorganic Carbon (TIC), concentration is mg C/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Location	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Gallery	118	9.6	102	22.2	102	485	98.1
S9B	345	8.3	NA	NA	345	485	91.0
PSCT-1	170	1.8	159	9.7	159	485	95.2
RAP-1B	122	3.4	NA	NA	122	485	98.6
RP-65B	67	0.8	61	12.6	61	485	103.9

* NA = Not Applicable, NS = Not Spiked, %RSD = Percent Relative Devation, T. Value = True Value, %Dev = Percent Devation, S. Level = Spike Level, and %Rec = Percent Recovery.

** = Constituent not detected, 99% confident the sample value is less than amount reported.

Table 7. General Constituents Analysis Precision and Bias (continued)*

Paramter: Dissolved Organic Carbon (DOC), concentration is mg C/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Location	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Gallery	NA	NA	9350	0.7	9350	NS	NS
PSCT-1	NA	NA	21	0.0	21	NS	NS
RAP-3A	122	10.7	NA	NA	11	100	98.0
RP-65B	<9**	NA	<9	NA	<9	100	106.0
Location: Gallery Well, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Parameter	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Chloride	5790	3.7	5790	0.1	5790	5000	96.4
Bromide	255	1.7	250	5.7	250	250	121.2
Nitrate	<40	NA	<40	NA	<40	250	123.2
Sulfate	2070	0.9	2030	3.1	2030	2500	109.0
Location: S9B Well, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Parameter	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Chloride	4270	10.2	NA	NA	4270	5000	103.6
Bromide	125	3.7	NA	NA	125	250	117.9
Nitrate	<40	NA	NA	NA	<40	250	120.0
Sulfate	1420	3.4	NA	NA	1420	2000	101.6
Location: PSCT-1 Trench, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Parameter	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Chloride	NA	NA	2930	1.9	2930	NS	NS
Bromide	NA	NA	70	0	70	NS	NS
Nitrate	NA	NA	<40	NA	<40	NS	NS
Sulfate	NA	NA	3720	0.2	3270	NS	NS
Location: RP-65B Well, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Parameter	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Chloride	1950	2.1	1910	3.3	1910	2000	93.0
Bromide	5.9	17.0	6.3	7.9	6.3	5.0	128.0
Nitrate	136	7.6	139	2.6	139	200	112.0
Sulfate	4800	1.9	4690	3.5	4690	4000	108.2

* NA = Not Applicable, NS = Not Spiked, %RSD = Percent Relative Devation, S. Level = Spike Level, and %REC = Percent Recovery.

** = Constituent not detected, 99% confident the sample value is less than amount reported.

Table 8. Total Recoverable Elements Analysis Precision and Bias*

Location: Gallery Well, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Element	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Ag	<0.01**	NA	<0.01	NA	<0.01	1	92
Al	0.64	4	0.64	0.0	0.64	0.5	83
As	0.006	12	0.006	13.2	<0.01	NA	NA
B	5.39	1	5.37	0.7	5.37	10	98
Ba	0.08	1	0.08	0.0	0.08	1	74
Be	<0.01	1	<0.01	NA	<0.01	1	102
Ca	1590	1	1540	4.3	1540	3659	94
Cd	0.14	6	0.13	4.8	0.13	1	99
Co	0.70	0	0.70	1.1	0.70	1	92
Cr	<0.01	NA	<0.01	NA	<0.01	1	89
Cu	0.01	28	0.01	0.0	<0.01	2	98
Fe	257	1	253	2.5	253	200	90
Hg	<0.001	NA	<0.001	NA	<0.001	0.005	70
K	55.8	2	56.0	0.5	56.0	50	97
Li	5.76	1	5.70	1.5	5.70	5	107
Mg	1100	1	1090	0.5	1090	1119	89
Mn	39.5	1	38.6	3.3	38.6	50	91
Mo	<0.01	NA	<0.01	NA	<0.01	1	91
Na	1500	1	1470	2.2	1470	500	104
Ni	2.97	2	2.97	0.0	2.97	5	95
P	2.04	3	2.07	1.8	2.07	5	109
Pb	0.03	MSA	0.03	15.7	0.03	MSA	MSA
Re	0.006	MSA	0.006	12.9	0.006	MSA	MSA
S	810	1	794	2.9	794	500	102
Sb	<0.03	NA	<0.03	NA	<0.02	NA	NA
Se	0.005	14	0.006	12.9	0.006	NA	NA
Si	25.4	7	25.5	23.6	25.5	200	104
Sn	0.009	12	0.009	0.0	0.01	1	74
Sr	11.1	1	11.1	0.0	11.1	20	111
Ti	<0.01	NA	<0.01	NA	<0.01	1	85
Tl	0.003	MSA	0.003	0.0	0.003	MSA	MSA
U	0.002	MSA	0.003	28.3	0.003	MSA	MSA
V	<0.01	NA	<0.01	NA	<0.01	1	98
W	<0.06	NA	<0.06	NA	<0.06	1	104
Y	<0.01	NA	<0.01	0.0	0.01	1	97
Zn	11.3	1	10.8	5.8	10.8	10	94
Zr	<0.02	NA	<0.02	NA	<0.02	1	97

* NA = Not Applicable, %RSD = Percent Relative Devation, S. Level = Spike Level, %Rec = Percent Recovery and MSA = Method of Standard Additions.
** = Element not detected, 99% confident the sample value is less than amount reported.

Table 8. Total Recoverable Elements Analysis Precision and Bias (continued)*

Location: PSCT-1 Trench, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Element	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Ag	<0.01**	NA	<0.01	NA	<0.01	1	93
Al	<0.02	NA	<0.02	NA	<0.02	0.5	109
As	0.003	2	0.004	4.0	<0.01	NA	NA
B	5.31	2	5.21	2.8	5.21	10	95
Ba	0.04	4	0.04	0.0	0.04	1	68
Be	<0.01	NA	<0.01	NA	<0.01	1	102
Ca	769	1	757	2.4	757	731	93
Cd	<0.01	NA	<0.01	NA	<0.01	1	105
Co	0.01	14	0.01	0.0	<0.01	1	107
Cr	<0.01	NA	<0.01	NA	<0.01	1	103
Cu	<0.01	NA	<0.01	NA	<0.01	1	95
Fe	2.57	1	2.63	3.2	2.63	2	101
Hg	<0.001	NA	<0.001	NA	<0.001	0.005	121
K	41.3	2	42.1	2.5	42.1	50	98
Li	1.87	3	1.90	2.5	1.90	5	106
Mg	726	2	714	2.3	714	1110	86
Mn	1.83	1	1.79	3.2	1.79	2	104
Mo	<0.01	NA	<0.01	NA	<0.01	1	98
Na	1770	2	1740	1.9	1740	500	96
Ni	0.44	4	0.41	8.9	0.41	1	108
P	0.36	2	0.38	9.3	0.38	1	106
Pb	<0.02	NA	<0.02	NA	<0.02	MSA	MSA
Re	0.007	MSA	0.007	0.0	0.007	MSA	MSA
S	1210	1	1200	2.0	1200	500	97
Sb	<0.02	NA	<0.02	NA	<0.02	NA	NA
Se	0.005	0	0.005	0.0	<0.01	NA	NA
Si	19.8	7	19.0	5.9	19.0	20	86
Sn	<0.01	NA	<0.01	NA	<0.01	1	85
Sr	5.81	2	5.71	2.6	5.71	10	101
Ti	<0.01	MSA	<0.01	NA	<0.01	1	91
Tl	0.001	MSA	0.001	0.0	0.001	MSA	MSA
U	0.027	NA	0.028	2.6	0.028	MSA	MSA
V	<0.01	NA	<0.01	NA	<0.01	1	107
W	<0.06	NA	<0.06	NA	<0.06	1	87
Y	<0.01	NA	<0.01	NA	<0.01	1	97
Zn	<0.04	NA	<0.04	NA	<0.04	1	106
Zr	<0.02	NA	<0.02	NA	<0.02	1	97

* NA = Not Applicable, %RSD = Percent Relative Devation, S. Level = Spike Level, %Rec = Percent Recovery and MSA = Method of Standard Additions.

** = Element not detected, 99% confident the sample value is less than amount reported.

Table 8. Total Recoverable Elements Analysis Precision and Bias (continued)*

Location: RP-65B Well, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Element	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Ag	<0.01**	NA	<0.01	NA	<0.01	1	96
Al	0.02	NA	0.02	36.2	0.02	0.5	126
As	<0.006	NA	<0.006	NA	<0.01	NA	NA
B	4.24	2	4.28	1.3	4.28	10	97
Ba	0.02	28	0.02	13.7	0.002	1	74
Be	<0.01	NA	<0.01	NA	<0.01	1	103
Ca	555	2	554	0.1	554	732	102
Cd	0.005	11	0.006	12.9	<0.01	1	100
Co	<0.01	NA	<0.01	NA	<0.01	1	102
Cr	<0.01	NA	<0.01	NA	<0.01	1	97
Cu	<0.02	NA	<0.02	NA	<0.02	1	94
Fe	0.07	3	0.09	21.4	<0.2	1	112
Hg	<0.001	NA	<0.001	NA	<0.001	0.005	102
K	21.2	3	20.7	2.9	20.7	50	89
Li	1.89	3	1.91	1.3	1.91	5	105
Mg	767	2	767	0.0	767	1110	87
Mn	0.005	0	0.004	5.3	<0.01	1	98
Mo	<0.01	NA	<0.01	NA	<0.01	1	94
Na	1250	2	1250	0.0	1250	500	99
Ni	0.05	21	0.06	12.9	<0.03	1	108
P	0.16	0	0.17	4.3	0.17	1	125
Pb	<0.02	NA	<0.02	NA	<0.02	MSA	MSA
Re	0.003	MSA	0.003	28.3	0.003	MSA	MSA
S	1520	2	1520	0.2	1520	500	100
Sb	<0.02	NA	<0.02	NA	<0.02	NA	NA
Se	0.098	1	0.098	0.3	0.10	NA	NA
Si	20.7	12	21.7	6.4	21.7	20	114
Sn	<0.01	NA	<0.01	NA	<0.01	1	85
Sr	5.13	2	5.14	0.2	5.14	5	107
Ti	<0.01	NA	<0.01	NA	<0.01	1	94
Tl	<0.001	NA	<0.001	NA	<0.001	MSA	MSA
U	0.009	MSA	0.009	8.3	0.009	MSA	MSA
V	<0.01	NA	<0.01	NA	<0.01	1	102
W	<0.06	NA	<0.06	NA	<0.06	1	88
Y	<0.01	NA	<0.01	NA	<0.01	1	98
Zn	<0.04	NA	<0.04	NA	<0.04	1	95
Zr	<0.02	NA	<0.02	NA	<0.02	1	99

* NA = Not Applicable, %RSD = Percent Relative Devation, S. Level = Spike Level, %Rec = Percent Recovery and MSA = Method of Standard Additions.

** = Element not detected, 99% confident the sample value is less than amount reported.

Table 9. Dissolved Elements Analysis Precision and Bias*

Location: Gallery Well, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Element	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Ag	<0.01**	NA	<0.01	NA	<0.01	0.5	89.6
Al	0.59	7.7	0.59	1.4	0.59	0.5	102.1
B	5.39	2.3	5.38	0.3	5.38	2	92.4
Ba	0.08	1.8	0.09	4.9	0.09	0.5	97.0
Be	<0.03	NA	<0.03	NA	<0.03	0.5	99.7
Ca	1550	1.5	1570	2.5	1570	1000	90.9
Cd	0.11	3.9	0.12	1.8	0.12	0.5	91.3
Co	0.67	2.8	0.69	3.3	0.69	0.5	89.0
Cr	<0.01	NA	<0.01	NA	<0.01	0.5	88.9
Cu	0.04	28.0	0.03	58.7	0.003	0.5	103.7
Fe	234	1.6	239	3.2	239	100	98.8
K	58.5	2.2	58.9	1.1	58.9	20	71.0
Li	5.47	1.1	5.58	3.0	5.58	3	117.7
Mg	1050	1.4	1070	2.3	1070	300	69.3
Mn	38.9	1.5	39.7	2.7	39.7	20	98.7
Mo	<0.02	NA	<0.02	NA	<0.02	0.5	91.7
Na	1440	1.4	1470	2.7	1470	1000	86.0
Ni	2.89	1.6	2.94	2.4	2.94	0.5	90.6
P	2.07	3.8	2.09	1.4	2.09	1	106.3
Pb	<0.06	NA	<0.06	NA	<0.06	0.5	95.3
S	783	2.0	798	2.7	798	200	105.1
Si	39.0	3.3	41.6	9.1	41.6	50	99.1
Sn	<0.04	NA	<0.04	NA	<0.04	1	70.1
Sr	10.7	1.6	11.0	3.0	11.0	5	98.6
Ti	<0.01	NA	<0.01	NA	<0.01	0.5	84.2
Tl	<0.05	NA	<0.05	NA	<0.05	0.5	94.4
V	<0.01	NA	<0.01	NA	<0.01	0.5	96.8
W	<0.4	NA	<0.4	NA	<0.4	1	105.8
Y	<0.01	NA	<0.01	NA	<0.01	1	94.5
Zn	11.7	2.5	11.9	1.8	11.9	0.5	96.8
Zr	<0.01	NA	<0.01	NA	<0.01	1	67.8

* NA = Not Applicable, %RSD = Percent Relative Devation, S. Level = Spike Level, and %Rec = Percent Recovery.

** = Element not detected, 99% confident the sample value is less than amount reported.

Table 9. Dissolved Elements Analysis Precision and Bias (continued)*

Location: PSCT-1 Trench, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Element	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Ag	<0.01**	NA	<0.01	NA	<0.01	0.5	88.5
Al	<0.03	NA	<0.03	NA	<0.03	0.5	101.2
B	5.18	0.7	5.16	0.3	5.16	3	92.5
Ba	0.04	1.4	0.04	4.2	0.04	0.5	98.9
Be	<0.03	NA	<0.03	NA	<0.03	0.5	106.2
Ca	764	1.4	761	0.6	761	500	101.6
Cd	<0.01	NA	<0.01	NA	<0.01	0.5	100.0
Co	<0.01	NA	<0.01	NA	<0.01	0.5	97.5
Cr	<0.01	NA	<0.01	NA	<0.01	0.5	91.4
Cu	<0.01	NA	<0.01	NA	<0.01	0.5	105.0
Fe	2.03	2.5	1.91	9.0	1.91	0.5	108.3
K	43.7	3.7	43.1	2.1	43.1	50	87.6
Li	1.81	3.5	1.79	1.3	1.79	1	109.9
Mg	723	1.8	722	0.2	722	500	96.0
Mn	1.84	1.8	1.83	0.4	1.83	1	92.0
Mo	<0.02	NA	<0.02	NA	<0.02	0.5	97.8
Na	1770	1.9	1760	0.1	1760	1000	95.7
Ni	0.42	1.4	0.43	5.7	0.43	0.5	97.2
P	0.25	5.4	0.25	0.0	0.25	5	102.4
Pb	<0.06	NA	<0.06	NA	<0.06	0.5	98.2
S	1210	1.5	1210	0.3	1210	1000	102.1
Si	18.6	2.5	17.9	5.2	17.9	10	98.8
Sn	<0.04	NA	<0.04	NA	<0.04	1	87.3
Sr	5.74	2.0	5.73	0.3	5.73	3	94.5
Ti	<0.01	NA	<0.01	NA	<0.01	0.5	92.4
Tl	<0.05	NA	<0.05	NA	<0.05	0.5	90.7
V	0.01	30.7	0.01	0.0	0.01	0.5	100.8
W	<0.4	NA	<0.4	NA	<0.4	1	97.5
Y	<0.01	NA	<0.01	NA	<0.01	1	95.6
Zn	<0.05	NA	<0.05	NA	<0.05	0.5	96.2
Zr	<0.01	NA	<0.01	NA	<0.01	1	90.8

* NA = Not Applicable, %RSD = Percent Relative Devation, S. Level = Spike Level, and %Rec = Percent Recovery.

** = Element not detected, 99% confident the sample value is less than amount reported.

Table 9. Dissolved Elements Analysis Precision and Bias (continued)*

Location: RP-65B Well, concentration is mg/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Element	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Ag	<0.01**	NA	<0.01	NA	<0.01	0.5	90.0
Al	<0.1	NA	<0.1	NA	<0.1	0.5	97.8
B	3.81	2.9	3.95	5.0	3.95	0.5	132.4
Ba	0.01	4.4	0.01	0.0	0.01	0.5	93.3
Be	<0.05	NA	<0.05	NA	<0.05	0.5	98.7
Ca	506	3.9	530	6.3	530	300	134.9
Cd	<0.01	NA	<0.01	NA	<0.01	0.5	94.9
Co	<0.02	NA	<0.02	NA	<0.02	0.5	92.8
Cr	<0.01	NA	<0.01	NA	<0.01	0.5	91.2
Cu	<0.01	NA	<0.01	NA	<0.01	0.5	101.0
Fe	<0.1	NA	<0.1	NA	<0.1	0.5	100.8
K	21.2	11.4	23.5	13.5	23.5	20	92.9
Li	1.67	7.4	1.78	8.7	1.78	1	102.8
Mg	719	3.8	752	6.2	752	400	93.2
Mn	<0.01	NA	<0.01	NA	<0.01	0.5	93.1
Mo	<0.02	NA	<0.02	NA	<0.02	0.5	89.8
Na	1150	3.9	1210	6.5	1210	1000	91.9
Ni	0.05	NA	0.05	2.3	0.05	0.5	97.2
P	0.21	6.5	0.20	5.0	0.2	1	115.7
Pb	<0.07	NA	<0.07	NA	<0.07	0.5	92.8
S	1410	3.8	1470	5.3	1470	1000	104.1
Si	15.0	3.7	15.5	4.3	15.5	20	130.7
Sn	<0.02	NA	<0.02	NA	<0.02	1	89.3
Sr	4.63	4.4	4.85	6.6	4.85	5	101.2
Ti	<0.01	NA	<0.01	NA	<0.01	0.5	90.1
Tl	<0.2	NA	<0.2	NA	<0.2	0.5	96.9
V	0.01	NA	0.01	0.0	0.01	0.5	95.6
W	<0.4	NA	<0.4	NA	<0.4	1	100.6
Y	<0.01	NA	<0.01	NA	<0.01	1	94.1
Zn	<0.01	NA	<0.01	NA	<0.01	0.5	96.6
Zr	<0.01	NA	<0.01	NA	<0.01	1	90.2

* NA = Not Applicable, %RSD = Percent Relative Devation, S. Level = Spike Level, and %Rec = Percent Recovery.

** = Element not detected, 99% confident the sample value is less than amount reported.

Table 10. Volatile Organics Analysis Precision and Bias*

Location: Gallery Well, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Methylene Chloride	559000	7.3	564000	1.3	564000	500000	114
1,1-Dichloroethane	13000	10.7	13000	0.0	13000	50000	109
1,2-Dichloroethane	11000	11.5	12000	6.1	12000	50000	83
Chlorofrom	44000	9.5	44000	0.0	44000	50000	100
1,1,1-Trichloroethane	75000	13.3	75000	0.0	75000	50000	92
Trichloroethylene	19000	11.1	20000	3.6	20000	50000	103
Tetrachloroethylene	18000	17.5	18000	0.0	18000	50000	94
Toluene	20000	16.2	19000	7.4	19000	50000	105
m\p-Xylene	14000	23.6	14000	5.2	14000	50000	95
Carbon Disufide	15000	10.7	16000	4.6	16000	50000	111
Tetrahydrofuran (THF)	116000	15.8	117000	0.6	117000	69000	126
Acetone	673000	10.0	588000	20.6	588000	NS	NS
2-Butanone (MEK)	1210000	15.6	1220000	0.6	1220000	1000000	97
4-Methyl-2-pentanone (MIBK)	86000	15.9	86000	0.0	86000	100000	78
Location: S9B Well, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Methylene Chloride	376000	3.4	NA	NA	376000	250000	95
1,1-Dichloroethane	18000	2.8	NA	NA	18000	50000	108
1,2-Dichloroethane	10000	4.1	NA	NA	10000	50000	81
Chlorofrom	29000	3.0	NA	NA	29000	50000	94
1,1,1-Trichloroethane	55000	2.4	NA	NA	55000	50000	78
Trichloroethylene	24000	2.3	NA	NA	24000	50000	100
Tetrachloroethylene	15000	5.0	NA	NA	15000	50000	94
Benzene	6200	5.2	NA	NA	6200	50000	119
Toluene	25000	5.0	NA	NA	25000	50000	110
Ethylbenzene	6700	6.2	NA	NA	6700	50000	103
m\p-Xylene	19000	5.9	NA	NA	19000	50000	97
o-Xylene	5200	5.9	NA	NA	5200	50000	99
Carbon Disufide	6200	6.9	NA	NA	6200	50000	109
Tetrahydrofuran (THF)	68000	8.8	NA	NA	68000	69000	107
2-Butanone (MEK)	278000	10.5	NA	NA	278000	250000	110
4-Methyl-2-pentanone (MIBK)	39000	10.4	NA	NA	39000	50000	128

* NA = Not Applicable, NS = Not Spiked, %RSD = Percent Relative Devation, S. Level = Spike Level, and %Rec = Percent Recovery.

*Table 10. Volatile Organics Analysis Precision and Bias (continued)**

Location: PSCT-1 Trench, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
1,1-Dichloroethylene	290	4.5	290	2.5	290	1000	94
Methylene Chloride	160	4.8	170	4.3	170	1000	119
1,1-Dichloroethane	2400	2.1	2400	0.0	2400	1000	105
cis-1,2-Dichloroethylene	450	1.6	450	0.0	450	1000	114
Chlorofrom	150	1.0	150	4.9	150	1000	98
1,1,1-Trichloroethane	2600	1.4	2600	0.0	2600	1000	86
Trichloroethylene	2000	1.3	2000	0.0	2000	1000	101
Tetrachloroethylene	7900	0.3	7900	0.0	7900	4000	96
1,3-Dichlorobenzene	100	0.6	100	0.0	100	1000	95
1,4-Dichlorobenzene	120	1.4	120	0.0	120	1000	96
1,2-Dichlorobenzene	670	0.7	680	1.0	680	1000	95
1,2,4-Trichlorobenzene	130	2.7	130	0.0	130	1000	91
Benzene	150	3.0	150	0.0	150	1000	122
Toluene	390	4.9	390	1.8	390	1000	111
Ethylbenzene	220	9.3	220	0.0	220	1000	107
m\p-Xylene	2000	3.1	2000	0.0	2000	1000	84
o-Xylene	1100	0.6	1100	0.0	1100	1000	102
Location: RAP 3A Trench, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Trichloroethylene	2.3	2.7	NA	NA	2.3	NS	NS
Tetrachloroethylene	1.0	5.1	NA	NA	1.0	NS	NS
Location: A2B Well, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Chlorofrom	12.2	2.7	NA	NA	12.2	NS	NS
Location: RP-61B Well, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
1,2-Dichloropropane	1.7	3.2	NA	NA	1.7	5.0	110
1,2-Dibromoethane	1.8	1.9	NA	NA	1.8	5.0	103

* NA = Not Applicable, NS = Not Spiked, %RSD = Percent Relative Devation, S. Level = Spike Level, and %Rec = Percent Recovery.

Table 11. Extractable Organics Analysis Precision and Bias*

Location: Gallery Well, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Phenol	76300	6.2	81500	9.0	8150	80000	57
Benzyl alcohol	3870	8.6	3960	3.2	3960	3000	59
2-Methylphenol	12700	12.4	13500	8.4	13500	12000	93
4-Methylphenol	2010	7.3	2310	18.4	2310	2000	52
2-Nitrophenol	490	13.1	390	35.9	390	300	52
2,4-Dimethylphenol	90	10.3	NA	NA	90	NS	NS
2,4-Dichlorophenol	710	6.8	690	4.5	690	500	126
4-Chloro-3-methylphenol	100	2.5	100	0.0	100	100	113
Benzioc acid	25400	10.3	29400	19.0	29400	30000	78
Isophorone	38600	5.2	39700	3.9	39700	40000	92
Naphthalene	80	1.9	NA	NA	80	NS	NS
Cylcohexanone	213000	1.5	229000	9.9	229000	200000	22
2-Butoxyethanol	264000	4.0	273000	4.4	273000	250000	86
2-(2-Butoxyethoxy)ethanol	85000	10.8	82400	4.6	82400	90000	76
2-Chloropyridine	4180	7.5	5040	24.1	5040	4000	63
2,5-Dichloropyridine	740	8.4	940	29.5	940	1000	67
2,3-Dichloropyridine	2800	16.3	3390	24.4	3390	3000	73
2,6-Dichloropyridine	8090	2.8	8250	2.7	8250	8000	66
Pentachloropyridine	470	11.9	320	65.6	320	1000	68
2,4-D	760	15.9	NA	NA	760	20000	104

* NA = Not Applicable, NS = Not Spiked, %RSD = Percent Relative Devation, S. Level = Spike Level, and %Rec = Percent Recovery.

Table 11. Extractable Organics Analysis Precision and Bias (continued)*

Location: S9B Well, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Phenol	39300	7.1	NA	NA	39300	40000	57
Benzyl alcohol	1420	9.8	NA	NA	1420	1200	105
2-Methylphenol	6550	8.1	NA	NA	6550	6000	95
4-Methylphenol	1400	8.7	NA	NA	1400	1400	71
2-Nitrophenol	36	13.6	NA	NA	36	40	110
2,4-Dimethylphenol	51	37.9	NA	NA	51	100	253
2,4-Dichlorophenol	991	9.5	NA	NA	991	1000	121
4-Chloro-3-methylphenol	71	7.8	NA	NA	71	80	94
Benzioc acid	23600	23.3	NA	NA	23600	24000	142
Isophorone	6860	18.2	NA	NA	6860	8000	123
Naphthalene	93	14.7	NA	NA	93	NS	NS
2-Methylnaphthalene	24	9.8	NA	NA	24	40	64
Cylcohexanone	14300	15.4	NA	NA	14300	14000	105
2-Butoxyethanol	45900	4.6	NA	NA	45900	44000	73
2-(2-Butoxyethoxy)ethanol	11400	7.3	NA	NA	11400	12000	137
2-Chloropyridine	1900	6.8	NA	NA	1900	2000	95
2,5-Dichloropyridine	441	10.3	NA	NA	441	400	108
2,3-Dichloropyridine	1470	8.3	NA	NA	1470	1600	89
2,6-Dichloropyridine	3600	18.3	NA	NA	3600	4000	96
Pentachloropyridine	62	17.1	NA	NA	62	NS	NS
2,4-D	2160	8.4	NA	NA	2160	NS	NS

Location: PSCT-1 Trench, concentration is ug/L							
	Precision Evaluation				Bias Evaluation		
	Analycial Triplicate		Field Duplicate		Spike Recovery		
Compound	Average	%RSD	Average	%RSD	Sample	S. Level	%Rec.
Phenol	1.1	19.5	3.1	90.4	3.1	50	50
4-Methylphenol	4.3	39.0	3.7	22.9	3.7	50	54
2,4-Dichlorophenol	1.5	10.0	1.3	21.8	1.3	50	75
Isophorone	6.6	2.3	6.5	2.2	6.5	50	95
Naphthalene	25.6	3.2	24.9	4.3	24.9	50	79
2-Methylnaphthalene	7.2	3.5	7.3	1.9	7.3	50	73
2,6-Dichloropyridine	70.8	0.7	69.5	2.7	69.5	100	53
Pentachloropyridine	71.4	2.5	72.9	2.9	72.9	100	81
2,4-D	4.1	25.0	NA	NA	4.1	10000	68

* NA = Not Applicable, NS = Not Spiked, %RSD = Percent Relative Devation, S. Level = Spike Level, and %Rec = Percent Recovery.

Table 12. Blank Summary Results

Trip Blanks & DDI Water Blank, concentration is ug/L						
Compound	TB-01	TB-02	TB-03	TB-04	TB-05	WB-05
Methylene Chloride	<1*	<1	<1	<1	<1	11
2-Butanone (MEK)	<1	<1	<1	<1	<1	2
Chloroform	<1	<1	<1	<1	<1	4
1,1,1-Trichloroethane	<1	<1	<1	<1	<1	2
1,2-Dibromoethane	<1	<1	<1	<1	<1	<1
Acetone	<1	7	4	<1	3	<1
Equipment Rinse Water Blanks & Field Blanks, concentration is ug/L						
Compound		ERWB-01	ERWB-02	FB-G9B	FB-PCT	FB-RP
Methylene Chloride		8	3	<1	<1	<1
2-Butanone (MEK)		<1	<1	<1	<1	<1
Chloroform		3	<1	<1	<1	<1
1,1,1-Trichloroethane		3	<1	<1	<1	<1
1,2-Dibromoethane		<1	1	<1	<1	<1
Acetone		3	<1	3	3	<1
Phenol		4	2	<1	<1	<1
bis(2-Ethylhexyl)phathate		<1	<1	<1	<1	8

* = Compound not detected, 99% confident that the sample value is less than amount reported.